

1 JEREMY T. ELMAN (SBN 223696)
 2 jelman@whitecase.com
 3 WHITE & CASE LLP
 4 3000 El Camino Real
 5 2 Palo Alto Square, Suite 900
 6 Palo Alto, CA 94306
 7 Telephone: (650) 213-0300
 8 Facsimile: (650) 213-8158
 9 Attorneys for *Amicus Curiae*
 10 BRADY CENTER TO PREVENT GUN
 11 VIOLENCE

8 UNITED STATES DISTRICT COURT
 9 SOUTHERN DISTRICT OF CALIFORNIA

11 MATTHEW JONES; THOMAS
 12 FURRH; KYLE YAMAMOTO; PWGG,
 13 L.P. (d.b.a. POWAY WEAPONS AND
 14 GEAR and PWG RANGE); NORTH
 15 COUNTY SHOOTING CENTER, INC.;
 16 BEEBE FAMILY ARMS AND
 17 MUNITIONS LLC (d.b.a. BFAM and
 18 BEEBE FAMILY ARMS AND
 19 MUNITIONS); FIREARMS POLICY
 20 COALITION, INC.; FIREARMS
 21 POLICY FOUNDATION; THE
 22 CALIFORNIA GUN RIGHTS
 23 FOUNDATION; and SECOND
 24 AMENDMENT FOUNDATION,

Plaintiffs,

v.

21 XAVIER BECERRA, in his official
 22 capacity as Attorney General of the State
 23 of California; BRENT E. ORICK, in his
 24 official capacity as Acting Director of
 the Department of Justice Bureau of
 Firearms; and DOES 1-20,

Defendants.

Case No. 3:19-cv-01226-L-AHG

Hon. M. James Lorenz and
 Magistrate Judge Allison H.
 Goddard

**BRIEF OF AMICUS CURIAE
 BRADY IN OPPOSITION
 TO PLAINTIFFS' MOTION
 FOR PRELIMINARY
 INJUNCTION**

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

CORPORATE DISCLOSURE STATEMENT

The Brady Center to Prevent Gun Violence has no parent corporation. It has no stock and hence no publicly-held company owns 10% or more of its stock.

TABLE OF CONTENTS

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

CORPORATE DISCLOSURE STATEMENT..... i

INTEREST OF *AMICUS CURIAE* 1

INTRODUCTION 1

ARGUMENT..... 2

I. Success on the Merits is Unlikely Because Significant Evidence and Data Support the Rationale for Section 27510..... 2

 A. Mass shootings..... 2

 1. Mass shootings have a significant impact on public safety..... 2

 2. Young adults commit a significant portion of mass school shootings and current laws restricting the mentally ill and certain types of firearms will not stop most school shooters..... 4

 B. Disproportionate linkage of young adults to crime 6

 1. Young adults are disproportionately linked to gun homicides, violent crimes, and overall criminal behavior..... 6

 2. Age based regulations are supported by data and are already being used to address gun violence amongst young adults..... 7

 3. The Federal and state governments have long recognized a disproportionate connection between young adults and gun violence..... 7

 C. Cognitive Development of Young Adults 9

 1. Neuroscience..... 9

 2. Societal Changes and Sociological Evidence..... 11

 D. The correlation between restrictions in gun purchases with reduced crime and gun violence. 13

II. An Injunction is Not in the Public Interest Because Significant Evidence and Data Support the Rationale for Section 27510, Which is a Reasonable Regulatory Measure Consistent with *Heller* and *McDonald*..... 15

 A. Public safety reasonably regulates constitutional rights..... 15

 B. The Second Amendment is limited by reasonable regulation, including those intended to protect public safety 16

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

C. The nature of firearms distinguishes public safety as a
restraining force in the context of the Second Amendment 18

D. The right to self-defense necessarily implicates the right to live
safely 19

CONCLUSION..... 21

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

TABLE OF AUTHORITIES

Page(s)

CASES

American Federation of Government Employees, AFL-CIO, Local 2391 v. Martin, 969 F.2d 788 (9th Cir. 1992)..... 16

Bonidy v. U.S. Postal Serv., 790 F.3d 1121 (10th Cir. 2015)..... 18

District of Columbia v. Heller, 554 U.S. 570 (2008)passim

Drake v. Filko, 724 F.3d 426 (3d Cir. 2013) 17

Gann v. Schramm, 606 F. Supp. 1442 (D. Del. 1985) 19

Gov’t of V.I. v. Smith, 949 F.2d 677 (3d Cir. 1991) 19

Gulf, C. & S. F. R. Co. v. Ellis, 165 U.S. 150 (1897) 20

Jackson v. City & City of San Francisco, 746 F.3d 953 (9th Cir. 2014)..... 19

Jones et al. v. Becerra et al., No. 3:19-cv-01226-L-AHG 2, 18

Kachalsky v. County of Westchester, 701 F.3d 81 (2d Cir. 2012) 17

Kolbe, v. Hogan, 849 F.3d 114 (4th Cir. 2017) (*en banc*), *cert. denied*, 138 S. Ct. 469 (2017)..... 17

Mahoney v. Sessions, 871 F.3d 873 (9th Cir. 2017)..... 18

McDonald v. City of Chicago, 561 U.S. 742 (2010) 1, 16

New York State Rifle & Pistol Ass’n, Inc. v. Cuomo, 804 F.3d 242 (2d Cir. 2015) 17

New York v. Quarles, 467 U.S. 649 (1984) 16

NRA v. ATF, 700 F.3d 185 (5th Cir. 2012)..... 1

1 *Pena v. Lindley*,
 No. 2:09-cv-01185-KJM (CKD) (9th Cir. 2015) 1

2

3 *Price v. Sery*,
 513 F.3d 962 (9th Cir. 2008)..... 19

4 *Rhode v. Becerra*,
 No. 3:18-cv-00802-BEN-JLB (S.D. Ca 2019)..... 1

5

6 *Robinson v. Bibb*,
 840 F.2d 349 (6th Cir. 1988)..... 19

7 *Rodriguez v. City of San Jose*,
 No. 17-1744 (9th Cir. 2018)..... 1

8

9 *Schenck v. Pro-Choice Network*,
 519 U.S. 357 (1997) 19

10 *Schenck v. United States*,
 249 U.S. 47 (1919) 15, 16

11

12 *Swepi, Ltd. P’ship v. Mora Cty.*,
 81 F. Supp. 3d 1075 (D.N.M. 2015)..... 20

13 *Tennessee v. Garner*,
 471 U.S. 1 (1985) 19

14

15 *United States v. Adams*,
 914 F.3d 602 (8th Cir. 2019)..... 17

16 *United States v. Hayes*,
 555 U.S. 415 (2009) 1

17

18 *United States v. Marzzarella*,
 614 F.3d 85 (3d Cir. 2010) 15

19 *United States v. Masciandaro*,
 638 F.3d 458 (4th Cir. 2011)..... 17, 18

20

21 *United States v. Salerno*,
 481 U.S. 739 (1987) 15

22 *United States v. Singh*,
 924 F.3d 1030 (9th Cir. 2019)..... 18

23

24 *United States v. Torres*,
 911 F.3d 1253 (9th Cir. 2019)..... 17

25 *United States v. Yancey*,
 621 F.3d 681 (7th Cir. 2010)..... 18

26

27 *Weinmann v. McClone*,
 787 F.3d 444 (7th Cir. 2015)..... 19

28

1 *Winter v. Nat. Res. Def. Council, Inc.*,
555 U.S. 7 (2008) 2

2

3 *Yates v. Cleveland*,
941 F.2d 444 (6th Cir. 1991)..... 19

4 *Yick Wo v. Hopkins*,
118 U.S. 356 (1886) 20

5

6 *Young v. Hawaii*,
896 F.3d 1044 (9th Cir. 2018)..... 19

7 *Youngberg v. Romeo*,
457 U.S. 307 (1982) 19

8 **STATUTES AND REGULATIONS**

9 15 U.S.C. § 1637(c)(8) 13

10 18 U.S.C. § 922(b)(1) 8

11 23 U.S.C. § 158..... 12

12 Cal. Penal Code § 27505 8

13 Conn. Gen. Stat. § 29-34(b)..... 8

14 Conn. Gen. Stat. § 29-36(f)(a) 8

15 D.C. Code § 7-2502.03 8

16 D.C. Code § 22-4507 8

17 Del. Code Ann. tit. 24, § 903 8

18 Fla. Stat. § 790.065(13) 8

19 Haw. Rev. Stat. § 134-2(d) 8

20 Ill. Comp. Stat. 65/4(a)(2)(i)..... 8

21 Iowa Code § 724.22(2) 8

22 Mass. Gen. Laws Chapter 140, § 130..... 8

23 Md. Code Ann., Pub. Safety § 5-134(b)(1) 8

24 N.J. Stat. Ann. § 2C:58-6.1 8

25 N.Y. Penal Law 400.00(1)(a) 8

26 Neb. Rev. Stat. § 69-2403..... 8

27 Neb. Rev. Stat. § 69-2404..... 8

28

1 Ohio Rev. Code Ann. § 2923.21(2)..... 8
2 R.I. Gen. Laws § 11-47-35(a)..... 8
3 Vt. Stat. Ann. Title 13, § 4020..... 8
4 Wyo. Stat. Ann. § 6-8-404(d)(i)(A)..... 8

FEDERAL CONSTITUTION

6 Article I, § 9..... 15
7 First Amendment 16
8 Second Amendment.....passim
9 Fourth Amendment..... 16, 19
10 Fifth and Fourteenth Amendments19

TREATISES

12 75 A.L.R.3d 228 11

LEGISLATIVE HISTORY

14 *Federal Firearms Act: Hearings Before the Subcomm. to Investigate*
15 *Juvenile Delinquency of the S. Comm. on the Judiciary,*
16 *90th Cong. 36 (1967)..... 7*
17 S. Rules Comm. Rep. for S.B. 1100 (Ca. Aug. 28, 2018)..... 1, 6
18
19
20
21
22
23
24
25
26
27
28

1 **INTEREST OF AMICUS CURIAE**

2 Brady is the nation’s most long-standing nonpartisan, non-profit organization
3 dedicated to reducing gun violence through education, research, and legal
4 advocacy. In support of that mission, Brady files this brief as *amicus curiae* in
5 support of Defendant.

6 Brady has a substantial interest in ensuring that the Second Amendment is
7 not interpreted or applied in a way that would jeopardize the public’s interest in
8 protecting individuals, families, and communities from the effects of gun violence.
9 Brady has filed *amicus* briefs in numerous cases involving firearms regulations
10 including *McDonald v. City of Chicago*, 561 U.S. 742 (2010); *United States v.*
11 *Hayes*, 555 U.S. 415 (2009); *District of Columbia v. Heller*, 554 U.S. 570 (2008);
12 *Rhode v. Becerra*, No. 3:18-cv-00802-BEN-JLB (S.D. Ca 2019); *Rodriguez v. City*
13 *of San Jose*, No. 17-1744 (9th Cir. 2018); and *Pena v. Lindley*, No. 2:09-cv-01185-
14 KJM (CKD) (9th Cir. 2015). Further, Brady filed an *amicus* brief supporting
15 federal minimum age laws in *NRA v. ATF*, 700 F.3d 185 (5th Cir. 2012).

16 **INTRODUCTION**

17 When the California Senate considered, and ultimately passed, SB 1100, its
18 rationale was clear and supported by research: “those under age 21 are
19 disproportionately linked to crime.” *See* Declaration of Jeremy T. Elman (“Elman
20 Decl.”), Exh. 1 at 5. Because existing law already prohibited “the sale or transfer of
21 a handgun to any person below the age of 21[,]” and because long guns and assault
22 rifles were prominently used in mass shootings, it made sense that “the same age
23 restriction should apply to long guns.” *See id.* at 4-5. Accordingly, the legislature
24 passed and the Governor signed SB 1100, modifying Section 27510 of the
25 California Penal Code, to improve the public safety of Californians and combat the
26 nationally recognized epidemic of gun violence.

27 Plaintiffs ignore this reality and the scientific research underlying it. They
28 cite to four state interests underlying SB 1100, which they mischaracterize as a

1 blanket ban. *See* Pls.’ Mem. P. & A. Supp. Mot. Prelim. Inj. at 18, *Jones et al. v.*
2 *Becerra et al.*, No. 3:19-cv-01226-L-AHG (ECF 21-1) (“Pl. Br.”). Specifically,
3 Plaintiffs highlight (1) mass school shootings; (2) the immaturity and recklessness
4 of individuals between the ages of 18 and 20 (“young adults”); (3) crime and gun
5 violence reduction; and (4) the disproportionate linkage between young adults and
6 crime. *See id.* They claim that “none” of these state interests “are supported by
7 facts and reasonable inferences based on relevant data.” *Id.* at 18-19.

8 This could not be further from the truth. Overwhelming data and facts
9 support each of the four bases identified by the state and challenged by Plaintiffs.
10 This support demonstrates that Plaintiffs cannot satisfy their foremost burden for a
11 preliminary injunction: that success is likely on the merits. *See Winter v. Nat. Res.*
12 *Def. Council, Inc.*, 555 U.S. 7, 20 (2008). In addition, SB 1100’s reasonable
13 regulation of firearm purchases by young adults – consistent with relevant Supreme
14 Court jurisprudence and a constitutional right to live safely – demonstrates that a
15 preliminary injunction is not in the public interest. *See id.*

16 ARGUMENT

17 **I. Success on the Merits is Unlikely Because Significant Evidence and Data** 18 **Support the Rationale for Section 27510**

19 **A. Mass shootings**

20 Plaintiffs allege that mass school shootings by young adults are “rare,” yet
21 themselves cite three examples committed by young adults between the ages of
22 18-20. *See* Pl. Br. at 18-19. Gun violence’s frequency, randomness, and – in the
23 case of mass school shootings – effects on children creates a devastating picture of
24 gun culture in America.

25 **1. Mass shootings have a significant impact on public safety.**

26 Mass shootings are an epidemic affecting the entire country. Despite the
27 national scale, however, outcomes differ between states. There are more mass
28 shootings in states with lax gun regulations than in states with strict gun

1 regulations. *See* Elman Decl., Exh. 2. California is no exception. The state’s rate
2 of gun deaths from mass shootings is relatively low when compared to smaller
3 states, and research suggests that the state’s relatively strong gun laws are
4 responsible for preventing shootings. *See id.* Even so, California suffers mass
5 shootings all too often, with some of the deadliest and most notorious committed by
6 individuals between the ages of 18-20. Namely, the Poway Synagogue shooting
7 (19-year-old shooter);¹ the Gilroy Garlic Festival shooting (19-year-old shooter)
8 that killed three and injured 12 others;² and the Orinda Halloween party shooting
9 (two 20-year-old shooters) that killed five.³

10 Beyond California, there has been a mass shooting in the United States, on
11 average, *every 47 days since 2015*. *See* Elman Decl., Exh. 6. These shootings
12 include two of the top-ten deadliest mass shootings in U.S. history (only five of
13 which occurred after 2015), each committed by someone in the age range targeted
14 by Section 27510. Specifically, the February 14, 2018, Parkland, Florida shooting
15 at Marjory Stoneman Douglas High School, in which a 19-year-old shooter killed
16 17 and injured 17 victims; and the August 3, 2019 El Paso, Texas shooting at a
17 Wal-Mart, in which a shooter killed 22 and injured at least 24 victims one week
18 after turning 21 years old.⁴ *See* Elman Decl., Exh. 8.

19 According to the Center for Homeland Defense and Security, in the last ten
20 years, 655 people have been killed or injured in school shootings alone.⁵ *See*
21 Elman Decl., Exh. 9. In sum, mass shootings – both in and beyond the classroom –
22 exact a devastating societal cost. Reasonable regulations can prevent these
23 tragedies.

24
25
26 ¹ *See* Elman Decl., Exh. 3.

27 ² *See* Elman Decl., Exh. 4.

28 ³ *See* Elman Decl., Exh. 5.

⁴ *See* Elman Decl., Exh. 7.

⁵ This number may be under-inclusive as it only covers grades K-12 and omits fatalities and injuries on college campuses.

1 **2. Young adults commit a significant portion of mass school**
2 **shootings and current laws restricting the mentally ill and**
3 **certain types of firearms will not stop most school shooters.**

4 Young adults commit a greater proportion of mass school shootings than
5 Plaintiffs' brief admits. As Plaintiffs state, the simple average age of mass school
6 shooters is about 33. However, a weighted average – which accounts for the
7 frequency and severity of these shootings – demonstrates an average shooter age of
8 20 years old. *See* Elman Decl., Exh. 10. Mass school shooters aged 18-20 tend to
9 legally obtain firearms themselves. *See* Elman Decl., Exh. 11 at 17, 28. Such legal
10 means to purchase firearms may explain why this age group represents the second
11 largest proportion based on weighted averages, comprising 16.02 percent of all
12 mass school shooters. *See* Elman Decl., Exh. 10. Other reports show that 75
13 percent of active school shooters were under the age of 21, *see generally* Elman
14 Decl., Exh. 12, and that school shooters are generally “adolescent” males. *See*
15 Elman Decl., Exh. 11 at 19.⁶

16 Despite these clear statistics, current gun laws overlook mass shooters in the
17 18-20 age range. For example, regulations targeting mental illness have been a
18 popular response to school shootings, but school shooters often have “no
19 documented history of medical treatment for mental disorders[.]” *Id.* Moreover,
20 although younger shooters often use guns found in their homes, college-aged
21 shooters between 18 and 21 typically purchase firearms from licensed dealers, the
22 internet, or gun shows. *See* Elman Decl., Exh. 11 at 19, 28. This underscores the
23 need for a regulation like Section 27510, which addresses the problem through its
24 focus on the various legal means through which individuals aged 18-20 purchase

25 ⁶ Exhibit 11, “Youth Violence: What We Know and What We Need to Know” by
26 Brad J. Bushman et al., cites studies that define “adolescent” as ranging in age from
27 11 to 21 years old, with most attackers between the ages of 13 and 18, thereby
28 capturing the age range targeted by Section 27510. *See* Elman Decl., Exh. 11 at 19
(citing Elman Decl., Exh. 13 at 19 (“The Final Report and Findings of the Safe
School Initiative: Implications for the Prevention of School Attack in the United
States”)).

1 firearms.

2 Thus, 18-20 year-olds are often using *legally* obtained weapons to commit
3 school shootings, including the 19-year-old shooter who legally purchased the AR-
4 15 he used to murder 17 people at Marjory Stoneman Douglas High School in
5 Parkland, Florida. *Id.* at 28; *see also* Elman Decl., Exh. 14; *cf.* Elman Decl., Exh.
6 15 (discussing how most mass shooters attain weapons legally). Moreover, many
7 school shooters are “ambivalent,” so “anything that raises the stakes and makes it
8 harder for them to access guns can be an effective part of [gun violence] prevention
9 strategies.” *See* Elman Decl., Exh. 11 at 28. Sensible and effective legislation
10 focused on young adults aged 18-20 could literally save lives.

11 Effective regulation of a wide range of firearms is needed to prevent further
12 tragedies from occurring. The Center for Homeland Defense and Security notes
13 that the type of weapon used in school shootings varies, ranging from pistols to
14 assault-style AR-15s. *See* Elman Decl., Exh. 16. While most school shooters used
15 handguns, young adults in the deadliest school shootings⁷ used a combination of
16 handguns and long guns, including pistols, shotguns, and semiautomatic rifles like
17 AR-15s.⁸ *Id.*; *see also* Elman Decl., Exh. 14. Off-campus, young adult mass
18 shooters used a similar combination of handguns and long guns, frequently using
19 pistols, rifles, semiautomatic rifles like AR-15s and AK-47s, shotguns, and
20 revolvers. *Id.*, *see also* Elman Decl., Exh. 16.

21 In sum, the age of mass school shooters coalesces around 20 years old, and
22 bans targeting the mentally-ill will likely do nothing to prevent the majority of
23 shooters – who have no documented history of mental illness – from getting
24 firearms. Mass shooters in this age range commonly obtain their guns through

25 ⁷ Citing data from the Columbine High School shooting, the Sandy Hook
26 Elementary School shooting, and the Marjory Stoneman Douglas High School
shooting.

27 ⁸ It is widely understood that these assault-style weapons “dramatically increase the
28 lethality of shootings”: 155% more people are shot and 47% more are killed in
mass shootings where the killer used weapons like AR-15s and AK-47s. *See* Elman
Decl., Exh. 17.

1 *lawful purchases*, not from their homes or the black market. Because 18-20 year-
 2 olds have used a broad spectrum of weapons to kill on-campus and off, half-
 3 measures targeting only certain types of guns are no better. Thus, the data supports
 4 a reasonable, focused regulation like Section 27510, which effectively curbs young
 5 adults from legally purchasing firearms.

6 **B. Disproportionate linkage of young adults to crime**

7 **1. Young adults are disproportionately linked to gun homicides,**
 8 **violent crimes, and overall criminal behavior.**

9 It is well-documented that violent crimes disproportionately involve
 10 individuals under the age of 21. *See* Elman Decl., Exh. 18 at 145. Criminal
 11 behavior is most common during young adulthood and is attributed to a broader
 12 behavioral pattern in this age range. *See* Elman Decl., Exh. 19 at 645. Research
 13 consistently documents an age-crime curve in which “rates of criminal behavior
 14 increase over the course of adolescence, peak around age 18, and then decline
 15 during the early twenties.” *Id.* This trend demonstrates why the focus on ages 18-
 16 20 in Section 27510 is justified: it addresses the age range during which rates of
 17 criminal behavior are highest (*i.e.*, around age 18), and no longer applies once they
 18 begin to decline (*i.e.*, 21 onward).

19 These academic conclusions are supported by substantial, real-world
 20 evidence. Young adults commit gun homicides at a rate *four times* higher than
 21 adults over 21. *See* Elman Decl., Exh. 20 at 18. Young adults, *i.e.*, 18-20-year-
 22 olds, made up only 4 percent of the U.S. population in 2017, but committed 18
 23 percent of all gun homicides. *Id.* S.B. 1100’s legislative history specifically cites
 24 this linkage as a reason for passing the bill, finding that:

25 [T]hose under age 21 are disproportionately linked to crime . . . 23.4
 26 percent of those arrested for murder and non-negligent manslaughter in
 27 the U.S. were under 21 and 26.5 percent of those arrested for
 “weapons carrying, possession, etc.” were under age 21.

28 *See* Elman Decl., Exh. 1 at 5.

1 **2. Age based regulations are supported by data and are already**
2 **being used to address gun violence amongst young adults.**

3 Many states have implemented reasonable age-based restrictions based on
4 data showing a strong link between young adults and gun violence. Because young
5 adults make up such a large proportion of firearm offenders, age-based regulations
6 have the potential to decrease gun violence.

7 According to research conducted by the Johns Hopkins Bloomberg School of
8 Public Health, stronger gun regulations lead to fewer firearm deaths overall. *See*
9 *generally* Elman Decl., Exh. 21. The strength of a state's gun laws reduces the rate
10 of gun violence, with one study finding that the 10 states with the weakest gun laws
11 had rates of gun violence 3.2 times higher than the 10 states with the strongest laws,
12 and that these laws specifically impacted youth violence rates. *See* Elman Decl.,
13 Exh. 17. Another study found that 17 percent of incarcerated offenders in the states
14 with the weakest gun laws would have been prohibited from buying a gun, if their
15 state had raised the minimum age of possession to 21. *See* Elman Decl., Exh. 22 at
16 29.

17 Not every young adult will become a criminal, but the data demonstrates that
18 18-20-year-olds are responsible for a disproportionate number of gun deaths, and
19 thus, age-based regulations could save lives. Thus, 17 states and the District of
20 Columbia have already passed reasonable age-based regulations on gun purchases
21 in an attempt to decrease gun violence and crime rates. Section 27510 puts
22 California in good company by addressing the undeniable connection between
23 young adults and gun crimes.

24 **3. The Federal and state governments have long recognized a**
25 **disproportionate connection between young adults and gun**
26 **violence.**

27 The linkage between young adults and gun violence is long-standing. In
28 1967, Congress found that:

1 [T]he greatest growth of crime today is in the area of young people,
 2 juveniles, and young adults. The easy availability of weapons makes
 3 their tendency toward wild, and sometimes irrational behavior that
 much more violent, that much more deadly.

4 *See* Elman Decl., Exh. 23 at 57.

5 In 1999, the Federal Government recognized the “significant role that 18 to
 6 20-year-olds have in gun crime and violence” – concluding that “our Nation
 7 demands that we make changes in the legal regulation of their access to guns.” *See*
 8 Elman Decl., Exh. 24 at 4. The same investigation found that:

9 18, 19, and 20 year olds ranked first, second, and third in the number
 10 of gun homicides committed. For each of these ages, the number of
 11 homicides exceeded the number for any ages older or younger than 18
 to 20.

12 *Id.* at 6. In 2005, the U.S. Department of Justice (“DOJ”) reported that the rate of
 13 murder offenses peaks between 18 and 24. *See* Elman Decl., Exh. 25. In 2009, the
 14 FBI found that arrests for murder, non-negligent homicides, and other violent
 15 crimes culminate at ages 18-20. *See* Elman Decl., Exh. 26. The pervasiveness of
 16 this linkage means that continued action is necessary to regulate this group’s access
 17 to deadly firearms.

18 Thus, federal law bars licensed firearms dealers from selling handguns to
 19 those under 21. 18 U.S.C. § 922(b)(1). Additionally, 17 states and the District of
 20 Columbia prohibit individuals under 21 from purchasing or possessing a handgun,⁹
 21 while six states prohibit individuals under 21 from purchasing a long gun. *See*
 22 Elman Decl., Exh. 27.

23 ////

24 _____
 25 ⁹ Cal. Penal § 27505; Conn. Gen. Stat. §§ 29-34(b), 29-36(f)(a); D.C. Code §§ 7-
 26 2502.03, 22-4507; Del. Code Ann. tit. 24, § 903; Fla. Stat. § 790.065(13); Haw.
 27 Rev. Stat. § 134-2(d); 430 Ill. Comp. Stat. 65/4(a)(2)(i); Iowa Code § 724.22(2);
 28 Md. Code Ann., Pub. Safety § 5-134(b)(1); Mass. Gen. Laws ch. 140, § 130; Neb.
 Rev. Stat. §§ 69-2403, 69-2404; N.J. Stat. Ann. § 2C:58-6.1; N.Y. Penal Law
 400.00(1)(a); Ohio Rev. Code Ann. § 2923.21(2); 11 R.I. Gen. Laws § 11-47-35(a);
 Vt. Stat. Ann. tit. 13, § 4020; Wyo. Stat. Ann. § 6-8-404(d)(i)(A); Wash. Rev.
 Code. § 9.41.240(1).

C. Cognitive Development of Young Adults

Beyond historical data, scientific research provides further support for limiting access to firearms by individuals aged 18-20. Neuroscientific and sociological research demonstrate that young adults under 21 have less capacity to control impulsivity, make good decisions, and appreciate the consequences of their actions than older individuals. As the U.S. Department of Justice’s Office of Juvenile Justice and Delinquency Prevention explains:

Recent research indicates that youth experience protracted maturation, into their midtwenties, of brain systems responsible for self-regulation. . . . Between ages 14 and 25, youth continue to develop an increasing ability to control impulses, suppress aggression, consider the impact of their behavior on others, consider the future consequences of their behavior, take personal responsibility for their actions, and resist the influence of peers. *Psychosocial development is far from over at age 18.*

See Elman Decl., Exh. 28 at 1, 8 (emphasis added).

1. Neuroscience

The age of 18 as the cut-off for adulthood is unsupported by the weight of science. See Elman Decl., Exh. 29 at 217 (noting in the *Journal of Adolescent Health* that the brain continues to develop beyond cultural cut-offs for maturity in ways that affect “planning, response inhibition, working memory, and attention,” as well as “impulse control.”).

One key distinction in neurological development relates to “cold” versus “hot” cognition.

Cold cognition refers to mental processes (such as working memory or response inhibition) employed in situations calling for deliberation in the absence of high levels of emotion Hot cognition involves mental processes in affectively charged situations where deliberation is unlikely or difficult.

See Elman Decl., Exh. 30 at 71. As further explained by author Grace Icenogle:

[I]f our laws were more closely aligned with developmental science,

1 age boundaries for matters involving cold cognition might be lower
2 than those involving hot cognition, because effective hot cognition
3 requires both cognitive capacity and psychosocial maturity (e.g., self-
restraint).

4 *Id.*

5 Studies from the American Bar Association and the Johns Hopkins Center
6 for Gun Policy and Research show the dangers of allowing individuals aged 18-20
7 to acquire firearms, because:

8 The evidence now is strong that the brain does not cease to mature
9 until the early 20s in those relevant parts that govern impulsivity,
10 judgment, planning for the future, foresight of consequences, and other
characteristics that make people morally culpable.

11 *See* Elman Decl., Exh. 31 at 2; *see also id.*, Exh. 32. Scientists have concluded that
12 the “age 21 or 22 would be closer to the ‘biological’ age of maturity.” *See* Elman
13 Decl., Exh. 31 at 2; *see also* Elman Decl., Exh. 33 at 422 (“[T]he human brain
14 continues to develop well past age eighteen and in most cases into the early
15 twenties and perhaps beyond.”). Such scientific research is voluminous, extensive,
16 long-established, and ever-growing.¹⁰

17 This does not mean that people under 21 may not make any “adult”
18 decisions. It is widely accepted within the scientific community that, “because
19 different abilities mature along different timetables, adolescents of a given age
20 could be adult-like in some respects but not others.” *See* Elman Decl., Exh. 31 at
21 71 (citing an article in *American Psychologist* by Laurence Steinberg et al., Elman
22 Decl., Exh. 41). Thus, while it might be appropriate for an 18-year-old to vote, or
23 engage in some other activity requiring cold cognition; this is not the same as using

24 _____
25 ¹⁰ *See, e.g.*, various studies showing this research, including Elman Decl., Exhs. 34-
26 36; Exh. 37 (TIME magazine article discussing Dr. Jay N. Giedd’s study finding
27 that adolescents’ brains undergo extensive structural changes well past puberty, he
28 commented: “When we started, . . . we thought we’d follow kids until about 18 or
20. If we had to pick a number now, we’d probably go to age 25.”); Exh. 38 (“The
rational part of a teen’s brain isn’t fully developed and won’t be until age 25 or
so.”); *see also* Exhs. 39-40 (further studies on neurodevelopment and neuroscience
related to adolescents).

1 a firearm – which is more likely to involve “hot” cognition. Recent studies have
2 confirmed this distinction:¹¹ guns “may be called on in the very situations in which
3 adolescents are most developmentally vulnerable,” such as:

4 [I]n the context of high emotional arousal, situations that require rapid,
5 complex social information processing, those that involve reinforcing
6 or establishing peer relationships (*i.e.*, showing off), or in conditions of
perceived threat.

7 See Elman Decl., Exh. 32, at 19.

8 In sum, the ongoing brain development of young adults ages 18-20 means
9 that they make decisions in a fundamentally different manner than adults 21 and
10 over, have weaker self-control than adults, engage in riskier behavior, and
11 demonstrate poorer emotional regulation. These scientifically-backed
12 demonstrations demonstrate why selling guns to this age group is particularly
13 dangerous to the rest of society.

14 **2. Societal Changes and Sociological Evidence**

15 Significant societal changes over the past half-century provide further
16 reasons for why adolescents under the age of 21 should not be permitted to legally
17 purchase firearms.

18 Views of adulthood have shifted over time. As shown by recent law review
19 articles, the majority age of 21 was settled in England around the fifteenth century.
20 See Elman Decl., Exh. 33 at 415. This was “accepted and endured as the
21 unquestioned legal age of majority . . . from the Middle Ages until well into the
22 twentieth century.” *Id.* (citing Elman Decl., Exh. 42 at 410). This is reflected in
23 the common law. See, *e.g.*, 75 A.L.R.3d 228, at 2a. However, societal changes in
24 the second half of the twentieth century resulted in the age of 18 being widely

25 ¹¹ See, *e.g.*, Elman Decl., Exh. 31 at 71 (finding that “on response inhibition tasks,
26 young adults (aged 18-21) perform comparably with somewhat older individuals
27 when tested under emotionally neutral conditions but more poorly—and similarly
28 with younger teenagers—when tested under arousing ones”); see also Elman Decl.,
Exh. 31, at 72 (research published in 2019 replicated an earlier study “in a large
international sample,” confirming the validity of this distinction in 11 diverse
countries).

1 accepted as the age of majority. *See* Elman Decl., Exh. 33 at 413-18.

2 In the twenty-first century, society has returned to viewing 21 as the
3 appropriate age for maturity. *See* Elman Decl., Exh. 33 at 423-430, citing Elman
4 Decl., Exh. 43, at 469-470 (“Recently, Arnett coined the term ‘emerging adulthood’
5 for the age range from eighteen to twenty-five” based on observations “that
6 traditional adult roles were not being assumed as early as had been typical before
7 this time.”). Adolescence, in turn, is defined as “the time from the beginning of
8 puberty until adult responsibilities are taken on” in the early twenties. *See* Elman
9 Decl., Exh. 44 at 340-341; *see also* Elman Decl., Exh. 45 at 136-140 (assessing
10 seven different indicators to becoming an adult and by what age the transition
11 should occur).¹² The mean ages at which the respondents thought each of these
12 transition indicators should occur varied between 20.9 and 26.2.¹³ Demographic
13 data corroborates such findings.¹⁴

14 Societal changes recognizing 21 as the age of majority are now reflected in
15 law. The national legal drinking age is 21, not 18. 23 U.S.C. § 158. Federal law
16 requires that a credit card applicant under the age of 21 provide either the signature
17 of a cosigner over 21 years old or “financial information . . . indicating an

18
19 ¹² The seven indicators were: (1) financial independence from parents/guardians;
20 (2) independent living; (3) educational completion; (4) full-time employment; (5)
21 ability to support a family financially; (6) child rearing and care; and (7) marriage.

22 ¹³ This phenomenon is not limited to the United States. *See* Elman Decl., Exh. 46
23 at 3 (“That the schedule for coming of age has been rather sharply revised both in
24 the United States and more broadly throughout the industrialized world is by now
25 widely recognized.”); *see also* Elman Decl., Exh. 47 (“New guidance for
26 psychologists will acknowledge that adolescence now effectively runs up until the
27 age of 25 for the purposes of treating young people. . . . Child psychologists are
28 being given a new directive which is that the age range they work with is increasing
from 0-18 to 0-25.”).

¹⁴ For instance, the Census Bureau has collected data on the median age of first
marriages in the United States from 1890 to the present. *See* Elman Decl., Exh. 48
(The median age, which in 1950 was 22.8 for men and 20.3 for women, in 2018
was 29.8 for men and 27.8 for women). According to data collected by the U.S.
Department of Health and Human Services, the mean age of mothers giving birth to
their first child rose from 21.4 in 1970 to 26.3 in 2014, a five year increase in mean
age. *See* Elman Decl., Exh. 49 at 2; *see also* Elman Decl., Exh. 50. According to a
study by the Census Bureau, as of 2015 more than half of young adults (aged 18 to
24) live in their parents’ home. *See* Elman Decl., Exh. 51.

1 independent means of repaying any obligation arising from” credit obligations
2 related to the card. *See* 15 U.S.C. § 1637(c)(8); *see also* Elman Decl., Exh. 33 at
3 433-435 (identifying Congress’ goal in passing the legislation as reforming credit
4 card companies’ efforts to market to students on college and university campuses).
5 Eighteen states, including California, and the District of Columbia, have raised the
6 tobacco purchase age to 21, and recently, the Food and Drug Administration
7 announced that, as of December 20, 2019, the Federal Food, Drug, and Cosmetic
8 Act had been amended to “raise the federal minimum age of sale of tobacco
9 products from 18 to 21 years.” *See* Elman Decl., Exh. 52. In all states that have
10 legalized marijuana use, including California, the age threshold is 21. *See* Elman
11 Decl., Exh. 53.

12 It does not make sense that an individual who is too young to purchase an
13 alcoholic beverage or tobacco product, rent a car, or acquire a credit card without
14 restrictions can legally purchase a semiautomatic rifle capable of firing hundreds of
15 rounds per minute.

16 **D. The correlation between restrictions in gun purchases with**
17 **reduced crime and gun violence.**

18 Social science research demonstrates a correlation between restrictions on
19 gun ownership and a reduction in gun violence and crime. More guns correlate
20 with more gun violence and crime, and less guns correlate with less gun violence
21 and crime. It follows that Section 27510’s remedy of restricting legal gun
22 purchases for people between the ages of 18 to 20 is appropriate: not only are
23 young adults disproportionately linked to crime, but gun violence also has a
24 disproportionate impact on young adults.¹⁵

25 Guns are increasingly becoming the murderer’s weapon of choice.¹⁶ As a

26 ¹⁵ In 2014, gun violence surpassed vehicle accidents as the leading cause of death
27 for young adults. *See* Elman Decl., Exh. 17. In the United States in 2011, 84% of
28 homicide victims age 15-24 were killed with guns. *See* Elman Decl., Exh. 11 at 23.

¹⁶ In 2014, firearms were used in 64% of murders. *See* Elman Decl., Exh. 54. In
2018, firearms were used in 73% of murders. *Id.*

1 response, some states have passed “right-to-carry” or “shall issue” laws, which
2 attempt to address this epidemic by putting more guns into circulation. *See* Elman
3 Decl., Exh. 55. Yet, states that have passed these “right-to carry” laws suffer
4 increased incidences of gun violence. *See* Elman Decl., Exh. 56 at 198 (Right-to-
5 carry handgun laws are associated with a 13% to 15% increase in violent crime
6 rates a decade after a state adopts them). Put simply, “where there are more guns,
7 there are more violent deaths.” *See* Elman Decl., Exh. 57 at 13-15. *See also* Elman
8 Decl., Exh. 58 (based on data collected by John J. Donohue et al. in the *Journal of*
9 *Empirical Analysis* between 1977–2006, aggravated assault rises when right-to-
10 carry laws are adopted.).

11 Conversely, the strength of a state’s gun laws is inversely correlated with the
12 rate of gun violence.¹⁷ Most recently, an October 2019 study in the *Journal of*
13 *General Internal Medicine* examined the relationship between state firearm laws
14 and overall homicide rates at the state level across all 50 states over a 26-year
15 period. *See* Elman Decl., Exh. 61 at 2021. The findings provide scientific proof
16 that fewer guns mean less crime and gun violence: “Universal background checks
17 were associated with a 14.9% . . . reduction in overall homicide rates, violent
18 misdemeanor laws were associated with a 18.1% . . . reduction in homicide.” *Id.* at
19 2021. The study also concluded that “shall issue” laws were associated with a nine
20 percent increase in homicides. *Id.* Studies regarding firearm policies beyond the
21 United States also confirm the correlation between less guns and less crime.¹⁸

22 ¹⁷ One study found that the ten states with the weakest gun laws had rates of gun
23 violence more than three times higher than the ten states with the strongest laws.
24 *See* Elman Decl., Exh. 59. Another recent study in the *Journal of the American*
25 *Medical Association* examined whether firearm laws in one state may be associated
26 with increased firearm death rates from homicide and suicide in neighboring states.
27 *See* Elman Decl., Exh. 60 at 692 (“Strong state firearm policies were associated
28 with lower suicide rates regardless of other states’ laws. Strong policies were
associated with lower homicide rates, and strong interstate policies were also
associated with lower homicide rates, where home state policies were permissive.
Strengthening state firearm policies may prevent firearm suicide and homicide, with
benefits that may extend beyond state lines.”).

¹⁸ *See, e.g.,* Elman Decl. Exh. 62 at 152-153 (reviewing 130 studies across ten
countries and concluding that “simultaneous implementation of laws targeting

1 In sum, extensive scientific and statistical data provides overwhelming
2 support for all four of the rationales underlying Section 27510: Plaintiffs' assertion
3 that "none" of these justifications "are supported by facts and reasonable inferences
4 based on the relevant data" is wrong. Pl. Br. at 18-19. Accordingly, Plaintiffs are
5 unlikely to succeed on the merits.

6 **II. An Injunction is Not in the Public Interest Because Significant Evidence**
7 **and Data Support the Rationale for Section 27510, Which is a Reasonable**
8 **Regulatory Measure Consistent with *Heller* and *McDonald***

9 **A. Public safety reasonably regulates constitutional rights**

10 The rights enshrined in the Constitution are constrained by public safety. In
11 some cases, such constraints are explicit. For example, the Habeas Corpus
12 provision of the Constitution is explicitly limited by public safety concerns: "The
13 Privilege of the Writ of Habeas Corpus shall not be suspended, unless when in
14 Cases of Rebellion or Invasion the public Safety may require it." U.S. Const. art. I,
15 § 9. Where, however, the Constitution does not contain explicit restrictions, Courts
16 have recognized that public safety constitutes a compelling interest that can justify
17 state or federal limitations on constitutional rights. *See, e.g., Heller*, 554 U.S. at
18 689 (Breyer, J., dissenting) ("the Court has in a wide variety of constitutional
19 contexts found such public-safety concerns sufficiently forceful to justify
20 restrictions on individual liberties"); *Schenck v. Pro-Choice Network*, 519 U.S. 357,
21 376 (1997) (mentioning the "significant governmental interest in public safety");
22 *United States v. Salerno*, 481 U.S. 739, 745 (1987) (discussing the "Federal
23 Government's compelling interests in public safety"); *see also United States v.*
24 *Marzarella*, 614 F.3d 85, 89 (3d Cir. 2010) (citing to the Supreme Court's
25 "caution" in *Heller* that the Second Amendment right "is not absolute.").

26 For example, the Supreme Court held that a police officer's "need for
27 _____
28 multiple elements of firearms regulations reduced firearm-related deaths in certain
countries" and that "some specific restrictions on purchase, access, and use of
firearms are associated with reductions in firearm deaths.").

1 answers to questions in a situation posing a threat to the public safety outweighs . . .
2 the Fifth Amendment’s privilege against self-incrimination.” *New York v. Quarles*,
3 467 U.S. 649, 657 (1984). Likewise, public safety constrains individuals’ First
4 Amendment rights, which do not include falsely yelling “fire” in a crowded theatre.
5 *Schenck v. United States*, 249 U.S. 47, 52 (1919). Where the public safety is
6 threatened, the Fourth Amendment does not protect individuals from otherwise-
7 unconstitutional searches. *See, e.g., American Federation of Government*
8 *Employees, AFL-CIO, Local 2391 v. Martin*, 969 F.2d 788, 792 (9th Cir. 1992)
9 (citing prior holdings upholding random drug testing for individuals whose jobs
10 affected the public safety, including government employees with security
11 clearances; truck drivers; and airline employees).

12 **B. The Second Amendment is limited by reasonable regulation,**
13 **including those intended to protect public safety**

14 As with other constitutional amendments, public safety constrains the Second
15 Amendment right to keep and bear arms.

16 Like most rights, the right secured by the Second Amendment is *not*
17 *unlimited*. From Blackstone through the 19th-century cases,
18 commentators and courts routinely explained that the right was not a
19 right to keep and carry any weapon whatsoever in any manner
20 whatsoever and for whatever purpose.

20 *Heller*, 554 U.S. at 626 (2008) (emphasis added).

21 Put differently, *Heller* made clear that reasonable regulation of the right to
22 bear and keep arms does not infringe Second Amendment rights. Indeed, the
23 Supreme Court offered a non-exhaustive list of “presumptively lawful” measures,
24 including prohibitions on the possession by the mentally ill or felons, limitations on
25 the carrying in places like schools and government buildings, conditions and
26 qualifications imposed on the commercial sale of arms. *Id.* at 626-27. In
27 *McDonald*, the Supreme Court reaffirmed the validity of these longstanding
28 regulatory measures. *See* 561 U.S. 742, 786 (2010).

1 Following *Heller* and *McDonald*, courts, including the Ninth Circuit, have
2 upheld reasonable regulations of the right to keep and bear arms:

3 A law does not burden Second Amendment rights, if it either falls
4 within one of the presumptively lawful regulatory measures identified
5 in *Heller* or ***regulates conduct that historically has fallen outside the
scope of the Second Amendment.***

6 *United States v. Torres*, 911 F.3d 1253, 1258 (9th Cir. 2019) (emphasis added,
7 internal quotation marks omitted).

8 Other circuit courts have made similar findings. *See, e.g., Kolbe, v. Hogan*,
9 849 F.3d 114, 135 (4th Cir. 2017) (*en banc*), *cert. denied*, 138 S. Ct. 469 (2017)
10 (holding that “banned assault weapons and large-capacity magazines . . . are among
11 those arms that the Second Amendment does not shield”); *United States v. Adams*,
12 914 F.3d 602, 611 (8th Cir. 2019) (It is “most likely that the presumptively lawful
13 regulatory measures listed in *Heller*, including prohibitions on possession of
14 firearms by those with felony convictions, simply do not infringe on the Second
15 Amendment right.”) (internal quotations and citation omitted); *see also Drake v.*
16 *Filko*, 724 F.3d 426, 432 (3d Cir. 2013); *New York State Rifle & Pistol Ass’n, Inc.*
17 *v. Cuomo*, 804 F.3d 242, 258 n.76 (2d Cir. 2015). An age-based limitation on
18 firearms – aimed at regulating “conduct that historically fallen outside the scope of
19 the Second Amendment” – is similar to these other reasonable regulations.

20 Second, courts have specifically held that public safety is a reasonable
21 restraining force on the Second Amendment. “The Second Amendment does not
22 foreclose regulatory measures to a degree that would result in handcuffing
23 lawmakers’ ability to prevent armed mayhem in public places.” *Kachalsky v.*
24 *County of Westchester*, 701 F.3d 81, 96 (2d Cir. 2012) (quoting *United States v.*
25 *Masciandaro*, 638 F.3d 458, 471 (4th Cir. 2011)) (internal quotation marks
26 omitted). “[A]s we move outside the home, firearm rights have always been more
27 limited, because public safety interests often outweigh individual interests in self-
28 defense.” *Masciandaro*, 638 F.3d at 470 (citing *Heller*, 554 U.S. at 626); *see also*

1 *Mahoney v. Sessions*, 871 F.3d 873, 882 (9th Cir. 2017) (holding that a law
2 regulating the use of police officers’ firearms while on duty ensured the safety of
3 the public and was a significant government’s interest); *United States v. Yancey*,
4 621 F.3d 681, 683-85 (7th Cir. 2010) (ruling that prohibiting habitual drug abusers
5 from bearing firearms is in the public interest); *United States v. Singh*, 924 F.3d
6 1030, 1057 (9th Cir. 2019) (holding that prohibition on firearm possession by
7 nonimmigrant visa holders served an important public interest in crime control and
8 public safety).

9 **C. The nature of firearms distinguishes public safety as a restraining**
10 **force in the context of the Second Amendment**

11 The protection of public safety is all the more important when considering
12 the fact that firearms are inherently lethal. Indeed, courts have highlighted the
13 unique consequences of the right to keep and bear arms due to their dangerous
14 nature. As the Tenth Circuit recognized:

15 The risk inherent in firearms and other weapons distinguishes the
16 Second Amendment right from other fundamental rights that have
17 been held to be evaluated under a strict scrutiny test, such as the right
18 to marry and the right to be free from viewpoint discrimination, which
can be exercised without creating a risk to others.

19 *Bonidy v. U.S. Postal Serv.*, 790 F.3d 1121, 1126 (10th Cir. 2015).

20 Because the consequences of the right to bear and keep arms are unique and
21 irremediable, the interpretation of the Second Amendment “is serious business. We
22 do not wish to be even minutely responsible for some unspeakably tragic act of
23 mayhem because in the peace of our judicial chambers we miscalculated as to
24 Second Amendment rights.” *Masciandaro*, 638 F.3d at 475. Consequently, the
25 State of California had a manifest interest in enacting – and has a continuing
26 interest in the enforcement of – Section 27510. It is a reasonable regulatory
27 measure to protect the public safety and, therefore, appropriately constrains the
28 Second Amendment right to bear arms.

1 **D. The right to self-defense necessarily implicates the right to live**
2 **safely**

3 The Second Amendment is further constrained by one’s right to live safely
4 (*i.e.*, not be seriously harmed) – a right that is concordant with and inherent to the
5 right to self-defense.

6 In *Heller*, the Supreme Court recognized the right to self-defense as “central
7 to the Second Amendment right” to keep and bear arms. 554 U.S. at 628. Courts
8 have since held that “the Second Amendment is, and always has been, an individual
9 right centered on self-defense[.]” *Young v. Hawaii*, 896 F.3d 1044, 1057 (9th Cir.
10 2018); *see also Jackson v. City & City of San Francisco*, 746 F.3d 953 (9th Cir.
11 2014). Yet the need for self-defense only arises when an individual possesses a
12 reasonable belief of “imminent danger” to one’s life or health. *See Gov’t of V.I. v.*
13 *Smith*, 949 F.2d 677, 684 (3d Cir. 1991). The right to self-defense therefore
14 necessarily implicates a right to live safely.

15 The right to live safely is embedded in the Constitution – first and foremost
16 in the Due Process Clause of the Fifth and Fourteenth Amendments. Aside from
17 establishing that no person shall be deprived of life without due process of law,
18 these clauses guarantee a “right to personal security” and safety. *Youngberg v.*
19 *Romeo*, 457 U.S. 307, 315 (1982). The “ultimate deprivation” of this right is death.
20 *Gann v. Schramm*, 606 F. Supp. 1442, 1448 (D. Del. 1985).

21 The Constitutional right to live safely is further entrenched in the Fourth
22 Amendment guarantee against the unreasonable use of force. The use of deadly
23 force can only be justified by “an objective belief that an imminent threat of death
24 or serious physical harm[.]” *Price v. Sery*, 513 F.3d 962, 969 (9th Cir. 2008); *see*
25 *also Tennessee v. Garner*, 471 U.S. 1, 11 (1985). Further, this guarantee implicates
26 “a constitutional right not to be shot” unless a police officer reasonably believes
27 that an individual “poses a threat to the officer or someone else.” *Weinmann v.*
28 *McClone*, 787 F.3d 444, 450 (7th Cir. 2015); *see also Robinson v. Bibb*, 840 F.2d

1 349 (6th Cir. 1988); *Yates v. Cleveland*, 941 F.2d 444 (6th Cir. 1991). Although
2 these cases concern the exercise of force by police officers, there is no reason why
3 this “constitutional right not to be shot” should be limited to such cases.

4 Moreover, the constitutional right to live safely evokes a longstanding
5 societal principle that preexists the foundation of the United States. John Locke, in
6 his *Two Treatises of Government*, regarded the right to live safely as the “law of
7 nature” and asserted that everyone is “bound to preserve himself[.]” *See* Elman
8 Decl., Exh. 63, at 197-198. Similarly, Samuel Adams found the right to self-
9 preservation and preservation of one’s own life to be the “first law of nature.” *See*
10 Elman Decl., Exh. 64 at 417. Blackstone stated that life “cannot legally be
11 disposed of or destroyed by any individual” and was such a fundamental value that
12 “whatever is done by a man to save either life or member, is looked upon as done
13 upon the highest necessity and compulsion.” *See id.* These philosophers’ message
14 is consistent and clear: life – and its preservation – constitutes society’s utmost
15 value, such that the deprivation of one life can only be justified by safeguarding
16 another.

17 With this background, the Framers agreed that the purpose of any
18 government – particularly that established with the Declaration of Independence –
19 was to ensure inalienable rights, particularly life, liberty and pursuit of happiness.¹⁹
20 The Declaration of Independence is “a statement of ideals, not law.” *Swepi, Ltd.*
21 *P’ship v. Mora Cty.*, 81 F. Supp. 3d 1075, 1172 (D.N.M. 2015) (citation and
22 internal quotation marks omitted). However, it “is always safe to read the letter of
23 the Constitution in the spirit of the Declaration of Independence.” *Gulf, C. & S. F.*
24 *R. Co. v. Ellis*, 165 U.S. 150, 160 (1897). Indeed, the Supreme Court has ruled:

25 [F]undamental rights to life, liberty, and the pursuit of happiness,

26 _____
27 ¹⁹ “We hold these truths to be self-evident, that all men are created equal, that they
28 are endowed by their Creator with certain unalienable Rights, that among these are
Life, Liberty and the pursuit of Happiness. That to secure these rights,
Governments are instituted among Men, deriving their just powers from the consent
of the governed.” THE DECLARATION OF INDEPENDENCE, para. 2 (U.S. 1776).

1 considered as individual possessions, are secured by those maxims of
2 constitutional law which are the monuments showing the victorious
3 progress of the race in securing to men the blessings of civilization
under the reign of just and equal laws. . . .

4 *Yick Wo v. Hopkins*, 118 U.S. 356, 370 (1886).

5 In sum, the right to live safely is not only a Constitutional right – closely
6 related to and from which stem many other guarantees, such as the right to self-
7 defense and the guarantee against the use of unreasonable force – but also a
8 fundamental national principle. Commentators have recognized, such as in “*The*
9 *Right Not to Be Shot: Public Safety, Private Guns, and the Constellation of*
10 *Constitutional Liberties*”, it is “America’s first right.” See Elman Decl., Exh. 65 at
11 196.

12 This, combined with the clear constraining role that public safety plays with
13 respect to constitutional rights, means that the continued enforcement of Section
14 27510 is in the public interest. The Court should therefore deny Plaintiffs’ motion
15 for a preliminary injunction.

16 **CONCLUSION**

17 For the foregoing reasons, and those set forth by Defendant, the Court should
18 deny Plaintiffs’ motion for preliminary injunction.

19
20 Dated: January 3, 2020

Respectfully submitted,

21
22 WHITE & CASE LLP

23 By: /s/ Jeremy T. Elman

Jeremy T. Elman

24 Attorneys for *Amicus Curiae* Brady
25
26
27
28

1 JEREMY T. ELMAN (SBN 223696)
jelman@whitecase.com
2 WHITE & CASE LLP
3 3000 El Camino Real
2 Palo Alto Square, Suite 900
4 Palo Alto, CA 94306
Telephone: (650) 213-0300
5 Facsimile: (650) 213-8158

6 Attorney for *Amicus Curiae*
BRADY CENTER TO PREVENT GUN
7 VIOLENCE

8 UNITED STATES DISTRICT COURT
9 SOUTHERN DISTRICT OF CALIFORNIA

10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

MATTHEW JONES; THOMAS
FURRH; KYLE YAMAMOTO; PWGG,
L.P. (d.b.a. POWAY WEAPONS AND
GEAR and PWG RANGE); NORTH
COUNTY SHOOTING CENTER, INC.;
BEEBE FAMILY ARMS AND
MUNITIONS LLC (d.b.a. BFAM and
BEEBE FAMILY ARMS AND
MUNITIONS); FIREARMS POLICY
COALITION, INC.; FIREARMS
POLICY FOUNDATION; THE
CALIFORNIA GUN RIGHTS
FOUNDATION; and SECOND
AMENDMENT FOUNDATION,

Plaintiffs,

v.

XAVIER BECERRA, in his official
capacity as Attorney General of the State
of California; BRENT E. ORICK, in his
official capacity as Acting Director of
the Department of Justice Bureau of
Firearms; and DOES 1-20,

Defendants.

Case No. 3:19-cv-01226-L-AHG

Hon. M. James Lorenz and
Magistrate Judge Allison H.
Goddard

**DECLARATION OF
JEREMY T. ELMAN IN
SUPPORT OF BRADY'S
MEMORANDUM OF
POINTS AND
AUTHORITIES IN
SUPPORT OF MOTION
FOR LEAVE TO
PARTICIPATE AS *AMICUS
CURIAE***

1 I, Jeremy T. Elman, declare as follows:

2 1. I am Counsel at White & Case LLP and counsel for Amicus Curiae
3 Brady Center to Prevent Gun Violence (“Brady”). I have personal knowledge of
4 the facts set forth herein and, if called as a witness, could and would testify
5 competently to those facts.

6 2. Attached hereto as Exhibit 1 is a true and correct copy of S. Rules
7 Comm. Rep. for S.B. 1100.

8 3. Attached hereto as Exhibit 2 is a true and correct copy of an article by
9 Megan Molteni, *The Looser a State’s Gun Laws, the More Mass Shootings It Has*,
10 WIRED (Aug. 6, 2019).

11 4. Attached hereto as Exhibit 3 is a true and correct copy of an article by
12 Jill Cowan, *What to Know About the Poway Synagogue Shooting*, N.Y. Times,
13 (Apr. 29, 2019).

14 5. Attached hereto as Exhibit 4 is a true and correct copy of an article by
15 David Ingram et al., *Gilroy Garlic Festival Gunman Referred to ‘Might is Right’*
16 *Manifesto Before Shooting*, NBC News (July 29, 2019).

17 6. Attached hereto as Exhibit 5 is a true and correct copy of an article by
18 the Associated Press, *5 Suspects Arrested in Halloween Airbnb Party Shooting*,
19 USA Today (Nov. 15, 2019).

20 7. Attached hereto as Exhibit 6 is a true and correct copy of an article by
21 Bonnie Berkowitz et al., *More and Deadlier: Mass Shooting Trends in America*,
22 Wash. Post (Aug. 5, 2019).

23 8. Attached hereto as Exhibit 7 is a true and correct copy of an article by
24 Bill Hutchinson, *Family of alleged gunman in El Paso massacre claims he was*
25 *influenced by ‘people we do not know’*, ABC News (Aug. 7, 2019).

26 9. Attached hereto as Exhibit 8 is a true and correct copy of an article
27 *Mass Shootings in the US Fast Facts*, CNN (Aug. 19, 2019), [https://www.cnn.com/](https://www.cnn.com/2019/08/19/us/mass-shootings-fast-facts/index.html)
28 [2019/08/19/us/mass-shootings-fast-facts/index.html](https://www.cnn.com/2019/08/19/us/mass-shootings-fast-facts/index.html).

1 10. Attached hereto as Exhibit 9 is a true and correct copy of Center for
2 Homeland Defense and Security, *Incidents by Injuries and Fatalities Annually*, K-
3 12 School Shooting Database, [https://www.chds.us/ssdb/incidents-by-injuries-and-](https://www.chds.us/ssdb/incidents-by-injuries-and-fatalities-annually-2010-present/)
4 [fatalities-annually-2010-present/](https://www.chds.us/ssdb/incidents-by-injuries-and-fatalities-annually-2010-present/) (last visited Nov. 20, 2019).

5 11. Attached hereto as Exhibit 10 is a true and correct copy of Center for
6 Homeland Defense and Security, *Incidents by Age of Shooter*, K-12 School
7 Shooting Database, <https://www.chds.us/ssdb/incidents-by-age-of-shooter-2/> (last
8 visited Nov. 20, 2019).

9 12. Attached hereto as Exhibit 11 is a true and correct copy of a
10 publication by Brad J. Bushman et al., *Youth Violence: What We Know and What*
11 *We Need to Know*, 71 Am. Psychol. 17 (2016).

12 13. Attached hereto as Exhibit 12 is a true and correct copy of a
13 publication by James P. O’Neill et al., *Active Shooter Recommendation and*
14 *Analysis for Risk Mitigation* (2016).

15 14. Attached hereto as Exhibit 13 is a true and correct copy of a
16 publication by Bryan Vossekuil et al., *The Final Report and Findings of the Safe*
17 *School Initiative: Implications for the Prevention of School Attacks in the United*
18 *States* (2004).

19 15. Attached hereto as Exhibit 14 is a true and correct copy an article by
20 Bonnie Berkowitz et al., *The Terrible Numbers That Grow With Each Mass*
21 *Shooting*, Wash. Post (Nov. 17, 2019), [https://www.washingtonpost.com/graphics/](https://www.washingtonpost.com/graphics/2018/national/mass-shootings-in-america)
22 [2018/national/mass-shootings-in-america](https://www.washingtonpost.com/graphics/2018/national/mass-shootings-in-america).

23 16. Attached hereto as Exhibit 15 is a true and correct copy of an article by
24 Mark Follman et al., *A Guide to Mass Shootings in America*, Mother Jones (Nov.
25 13, 2019), <https://www.motherjones.com/politics/2012/07/mass-shootings-map/21/>.

26 17. Attached hereto as Exhibit 16 is a true and correct copy of Center for
27 Homeland Defense and Security, *Incidents by Caliber of Firearm*, K-12 School
28

1 Shooting Database, [https://www.chds.us/ssdb/incidents-by-caliber-of-firearm-2010-](https://www.chds.us/ssdb/incidents-by-caliber-of-firearm-2010-present/)
2 present/ (last visited Nov. 20, 2019).

3 18. Attached hereto as Exhibit 17 is a true and correct copy of a
4 publication by Chelsea Parsons, et al., *America's Youth Under Fire*, Center for
5 American Progress (May 4, 2018, 9:02 AM) [https://www.americanprogress.org/](https://www.americanprogress.org/issues/guns-crime/reports/2018/05/04/450343/americas-youth-fire/)
6 issues/guns-crime/reports/2018/05/04/450343/americas-youth-fire/ (last visited Jan.
7 3, 2020).

8 19. Attached hereto as Exhibit 18 is a true and correct copy of a
9 publication by RAND Corporation, *The Science of Gun Policy: A Critical Synthesis*
10 *of Research Evidence on the Effects of Gun Policies in the United States* (2018).

11 20. Attached hereto as Exhibit 19 is a true and correct copy of a
12 publication by Elizabeth S. Scott et al., *Young Adulthood as a Transitional Legal*
13 *Category: Science, Social Change, and Justice Policy*, 85 Fordham L. Rev. 641
14 (2016).

15 21. Attached hereto as Exhibit 20 is a true and correct copy of Everytown
16 for Gun Safety, *Keeping Our Schools Safe: A Plan to Stop Mass Shootings and End*
17 *Gun Violence in American Schools* (2019).

18 22. Attached hereto as Exhibit 21 is a true and correct copy of a
19 publication by Johns Hopkins Bloomberg School of Public Health, *Reducing Gun*
20 *Violence in America: Informing Policy with Evidence and Analysis* (Daniel W.
21 Webster & Jon S. Vernick eds. 2013).

22 23. Attached hereto as Exhibit 22 is a true and correct copy of a
23 publication by Katherine A. Vittes et al., *Legal Status and Source of Offenders'*
24 *Firearms in States with Least Stringent Criteria for Gun Ownership*, 19 Injury
25 Prevention 26 (2013).

26 24. Attached hereto as Exhibit 23 is a true and correct copy of *Federal*
27 *Firearms Act: Hearings Before the Subcomm. to Investigate Juvenile Delinquency*
28 *of the S. Comm. on the Judiciary*, 90th Cong. 36 (1967).

1 25. Attached hereto as Exhibit 24 is a true and correct copy of U.S. Dep't
2 of the Treasury & U.S. Dep't of Justice, *Gun Crime in the Age Group 18-20* (1999).

3 26. Attached hereto as Exhibit 25 is a true and correct copy of U.S. Dep't
4 of Justice, Bureau of Justice Statistics, *Homicide Trends in the United States*
5 (2005).

6 27. Attached hereto as Exhibit 26 is a true and correct copy of U.S. Dep't
7 of Justice, Federal Bureau of Investigations, *Crime in the United States, Arrests by*
8 *Age, 2009*, https://www2.fbi.gov/ucr/cius2009/data/table_38.html (last visited Nov.
9 20, 2019).

10 28. Attached hereto as Exhibit 27 is a true and correct copy of Giffords
11 Law Center to Prevent Gun Violence, *Minimum Age to Purchase & Posses*,
12 [https://lawcenter.giffords.org/gun-laws/policy-areas/who-can-have-a](https://lawcenter.giffords.org/gun-laws/policy-areas/who-can-have-a-gun/minimum-age/#federal)
13 [gun/minimum-age/#federal](https://lawcenter.giffords.org/gun-laws/policy-areas/who-can-have-a-gun/minimum-age/#federal) (last visited Nov. 20, 2019).

14 29. Attached hereto as Exhibit 28 is a true and correct copy of a
15 publication by Steinberg, et al., *Psychosocial Maturity and Desistance From Crime*
16 *in a Sample of Serious Juvenile Offenders*, *Juvenile Justice Bulletin*, DOJ Office of
17 Juvenile Justice and Delinquency Prevention (March 2015).

18 30. Attached hereto as Exhibit 29 is a true and correct copy of a
19 publication entitled Sara B. Johnson et al., *Adolescent Maturity and the Brain: The*
20 *Promises and Pitfalls of Neuroscience Research in Adolescent Health Policy*,
21 45 J. Adolescent Health 216 (2009).

22 31. Attached hereto as Exhibit 30 is a true and correct copy of a
23 publication by Grace Icenogle et al., *Adolescents' Cognitive Capacity Reaches*
24 *Adult Levels Prior to Their Psychosocial Maturity: Evidence for a "Maturity Gap"*
25 *in a Multinational, Cross-Sectional Sample*, 43 Law & Human Behavior 69 (2019).

26 32. Attached hereto as Exhibit 31 is a true and correct copy of a
27 publication by Adam Ortiz, *Adolescence, Brain Development, and Legal*
28 *Culpability*, American Bar Association Juvenile Justice Center (Jan. 2004).

1 33. Attached hereto as Exhibit 32 is a true and correct copy of a
2 publication by Daniel W. Webster et al., *Firearms on College Campuses: Research*
3 *Evidence and Policy Implications*, Johns Hopkins Ctr. For Gun Policy and
4 Research (Oct. 2016).

5 34. Attached hereto as Exhibit 33 is a true and correct copy of a
6 publication by Wayne R. Barnes, *Arrested Development: Rethinking the Contract*
7 *Age of Majority for the Twenty-First Century Adolescent*, 76 Md. L. Rev. 405
8 (2017).

9 35. Attached hereto as Exhibit 34 is a true and correct copy of a
10 publication by Jay N. Giedd, et al., *Brain Development During Childhood and*
11 *Adolescence: A Longitudinal MRI Study*, 2 Nature Neuroscience 861 (1999).

12 36. Attached hereto as Exhibit 35 is a true and correct copy of a
13 publication by Nitin Gogtay et al., *Dynamic Mapping of Human Cortical*
14 *Development During Childhood Through Early Adulthood*, 101 Proceedings of the
15 Nat'l Acad. of Sci. of the U.S.A. 8174 (2004).

16 37. Attached hereto as Exhibit 36 is a true and correct copy of Nat'l Inst.
17 of Mental Health (Press Release), *Imaging Study Shows Brain Maturing* (May 17,
18 2004).

19 38. Attached hereto as Exhibit 37 is a true and correct copy of an article by
20 Claudia Wallis, *What Makes Teens Tick*, TIME, May 10, 2004.

21 39. Attached hereto as Exhibit 38 is a true and correct copy of a
22 publication by Anne Fetterman, et al. *Understanding the Teen Brain*, University of
23 Rochester Medical Center Health Encyclopedia, [https://www.urmc.](https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=3051)
24 [rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=3051](https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=3051) (last
25 visited Jan. 3, 2020).

26 40. Attached hereto as Exhibit 39 is a true and correct copy of a
27 publication by Philip Shaw et al., *Neurodevelopmental Trajectories of the Human*
28 *Cerebral Cortex*, 28 J. Neuroscience 3586 (2008).

1 41. Attached hereto as Exhibit 40 is a true and correct copy of a
2 publication by Catherine A. Hartley & Leah H. Somerville, *The Neuroscience of*
3 *Adolescent Decision-Making*, 5 *Current Opinion Behav. Sci.* 108 (2015).

4 42. Attached hereto as Exhibit 41 is a true and correct copy of a
5 publication by Laurence Steinberg, et al., *Are adolescents less mature than adults?:*
6 *Minors' access to abortion, the juvenile death penalty, and the alleged APA "flip-*
7 *flop"*, 64 *American Psychologist* 583 (2009).

8 43. Attached hereto as Exhibit 42 is a true and correct copy of a
9 publication by Alexandra O. Cohen, et al., *When is an adolescent an adult?*
10 *Assessing cognitive control in emotional and non-emotional contexts*, 27
11 *Psychological Science* 549 (2016)

12 44. Attached hereto as Exhibit 43 is a true and correct copy of a
13 publication by Andrew A. Schwartz, *Old Enough to Fight, Old Enough to Swipe: A*
14 *Critique of the Infancy Rule in the Federal Credit CARD Act*,
15 2011 Utah L. Rev. 407.

16 45. Attached hereto as Exhibit 44 is a true and correct copy of a
17 publication by Jeffrey Jensen Arnett, *Emerging Adulthood*, 55 *Am. Psychologist*
18 469 (2000).

19 46. Attached hereto as Exhibit 45 is a true and correct copy of a
20 publication by Jeffrey Arnett, *Reckless Behavior in Adolescence: A Developmental*
21 *Perspective*, 12 *Developmental Rev.* 339 (1992).

22 47. Attached hereto as Exhibit 46 is a true and correct copy of a
23 publication by Tom W. Smith, *Coming of Age in Twenty-First Century America:*
24 *Public Attitudes Towards the Importance and Timing of Transitions to Adulthood*,
25 29 *Ageing Int'l* 136 (2004).

26 48. Attached hereto as Exhibit 47 is a true and correct copy of a
27 publication by Gordon Berlin et al., *Introducing the Issue*, 20 *Transition to*
28 *Adulthood* 3 (2010).

1 49. Attached hereto as Exhibit 48 is a true and correct copy of an article by
2 Lucy Wallis, *Is 25 the new cut-off point for adulthood?*, BBC News (Sept. 2013),
3 <https://www.bbc.com/news/magazine-24173194> (last visited Jan. 3, 2020).

4 50. Attached hereto as Exhibit 49 is a true and correct copy of U.S. Census
5 Bureau, *Fig. MS-2, Median Age at First Marriage: 1890 to Present*,
6 [https://www.census.gov/content/dam/Census/library/visualizations/time-](https://www.census.gov/content/dam/Census/library/visualizations/time-series/demo/families-and-households/ms-2.pdf)
7 [series/demo/families-and-households/ms-2.pdf](https://www.census.gov/content/dam/Census/library/visualizations/time-series/demo/families-and-households/ms-2.pdf) (last visited Nov. 17, 2019).

8 51. Attached hereto as Exhibit 50 is a true and correct copy of a
9 publication by T.J. Mathews & Brady E. Hamilton, *Mean Age of Mother, 1970-*
10 *2000*, 51 Nat'l Vital Stat. Rep. 1, 2 (2002), [http://www.cdc.gov/nchs/data/nvsr/](http://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51_01.pdf)
11 [nvsr51/nvsr51_01.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51_01.pdf) (last visited Jan. 3, 2020).

12 52. Attached hereto as Exhibit 51 is a true and correct copy of a
13 publication by T.J. Mathews & Brady E. Hamilton, *Mean Age of Mothers is on the*
14 *Rise: United States, 2000-2014*, NCHS Data Brief, No. 232 (2016),
15 <https://www.cdc.gov/nchs/data/databriefs/db232.pdf> (last visited Jan. 3, 2020).

16 53. Attached hereto as Exhibit 52 is a true and correct copy of a
17 publication by Jonathan Vespa, *The Changing Economics and Demographics of*
18 *Young Adulthood: 1975-2016*, [https://www.census.gov/content/dam/Census/](https://www.census.gov/content/dam/Census/library/publications/2017/demo/p20-579.pdf)
19 [library/publications/2017/demo/p20-579.pdf](https://www.census.gov/content/dam/Census/library/publications/2017/demo/p20-579.pdf) (last visited Jan. 3, 2020).

20 54. Attached hereto as Exhibit 53 is a true and correct copy of U.S. Food
21 and Drug Administration, *Selling Tobacco Products in Retail Stores*,
22 [https://www.fda.gov/tobacco-products/retail-sales-tobacco-products/selling-](https://www.fda.gov/tobacco-products/retail-sales-tobacco-products/selling-tobacco-products-retail-stores)
23 [tobacco-products-retail-stores](https://www.fda.gov/tobacco-products/retail-sales-tobacco-products/selling-tobacco-products-retail-stores) (last visited Jan. 3, 2020).

24 55. Attached hereto as Exhibit 54 is a true and correct copy of an article by
25 Jeremy Berke & Skye Gould, *Legal marijuana just went on sale in Illinois. Here*
26 *are all the states where cannabis is legal*, Business Insider, June 25, 2019,
27 <https://www.businessinsider.com/legal-marijuana-states-2018-1> (last visited Jan. 3,
28 2020).

1 56. Attached hereto as Exhibit 55 is a true and correct copy of U.S. Dep't
2 of Justice, Federal Bureau of Investigations, *2018 Crime in the United States*,
3 [https://ucr.fbi.gov/crime-in-the-u.s/2018/crime-in-the-u.s.-2018/tables/expanded-](https://ucr.fbi.gov/crime-in-the-u.s/2018/crime-in-the-u.s.-2018/tables/expanded-homicide-data-table-8.xls)
4 [homicide-data-table-8.xls](https://ucr.fbi.gov/crime-in-the-u.s/2018/crime-in-the-u.s.-2018/tables/expanded-homicide-data-table-8.xls) (last visited Jan. 3, 2020).

5 57. Attached hereto as Exhibit 56 is a true and correct copy of a
6 publication by Giffords Law Center to Prevent Gun Violence, *Concealed Carry*,
7 [https://lawcenter.giffords.org/gun-laws/policy-areas/guns-in-public/concealed-](https://lawcenter.giffords.org/gun-laws/policy-areas/guns-in-public/concealed-carry/)
8 [carry/](https://lawcenter.giffords.org/gun-laws/policy-areas/guns-in-public/concealed-carry/) (last visited Jan. 3, 2020).

9 58. Attached hereto as Exhibit 57 is a true and correct copy of a
10 publication by John J. Donohue et al., *The Impact of Right to Carry Laws and the*
11 *NRC Report: The Latest Lessons for the Empirical Evaluation of Law and Policy*,
12 National Bureau of Economic Research (2012).

13 59. Attached hereto as Exhibit 58 is a true and correct copy of a
14 publication by Matthew Miller, et al., *Firearms and Violent Death in the United*
15 *States, in Reducing Gun Violence in America*.

16 60. Attached hereto as Exhibit 59 is a true and correct copy of a
17 publication by John J. Donohue et al., *Right-to-Carry Laws and Violent Crime: A*
18 *Comprehensive Assessment Using Panel Data and a State-Level Synthetic Control*
19 *Analysis*, 16 J. Empirical Analysis 198 (2019).

20 61. Attached hereto as Exhibit 60 is a true and correct copy of a
21 publication by Chelsea Parsons and Eugenio Weigend, *America Under Fire*,
22 Center for American Progress (2016).

23 62. Attached hereto as Exhibit 61 is a true and correct copy of a
24 publication by Elinore J. Kaufman, et al., *State Firearm Laws and Interstate*
25 *Firearm Deaths From Homicide and Suicide in the United States*,
26 178 JAMA Intern Med. 692 (2018).

27 63. Attached hereto as Exhibit 62 is a true and correct copy of a
28 publication by Michael Siegel et al., *The Impact of State Firearm Laws on*

1 *Homicide and Suicide Deaths in the USA, 1991–2016: a Panel Study*, 34 J. Gen
2 Intern. Med. 2021 (2019).

3 64. Attached hereto as Exhibit 63 is a true and correct copy of a
4 publication by Julian Santaella-Tenorio et al., *What Do We Know About the*
5 *Association Between Firearm Legislation and Firearm-Related Injuries?*,
6 38 Epidemiol Rev. 140 (2016).

7 65. Attached hereto as Exhibit 64 is a true and correct copy of a
8 publication by John Locke, *Two Treatises of Government*
9 (London Prints, 1690).

10 66. Attached hereto as Exhibit 65 is a true and correct copy of a
11 publication by Samuel Adams, *The Rights of the Colonists: Report of the*
12 *Committee of Correspondence to the Boston Town Meeting*,
13 173 Old South Leaflets 417 (1772).

14 67. Attached hereto as Exhibit 66 is a true and correct copy of a
15 publication by Jonathan Lowy & Kelly Sampson, *The Right Not to Be Shot: Public*
16 *Safety, Private Guns, and the Constellation of Constitutional Liberties*,
17 14 Geo. J.L. & Pub. Pol’y 187 (2016).

18 I declare under penalty of perjury under the laws of the United States of
19 America and the State of California that the foregoing is true and correct.

20
21 Dated: January 3, 2020

Respectfully submitted,

22 By: /s/ Jeremy T. Elman

23 Jeremy T. Elman

24 Attorney for *Amicus Curiae* Brady

EXHIBIT 1

SENATE RULES COMMITTEE
Office of Senate Floor Analyses
(916) 651-1520 Fax: (916) 327-4478

SB 1100

UNFINISHED BUSINESS

Bill No: SB 1100
Author: Portantino (D), et al.
Amended: 8/23/18
Vote: 21

SENATE PUBLIC SAFETY COMMITTEE: 5-2, 4/17/18
AYES: Skinner, Bradford, Jackson, Mitchell, Wiener
NOES: Anderson, Stone

SENATE APPROPRIATIONS COMMITTEE: 5-1, 5/25/18
AYES: Lara, Beall, Bradford, Hill, Wiener
NOES: Nielsen
NO VOTE RECORDED: Bates

SENATE FLOOR: 24-10, 5/29/18
AYES: Allen, Atkins, Beall, De León, Dodd, Galgiani, Glazer, Hernandez,
Hertzberg, Hill, Hueso, Jackson, Lara, Leyva, McGuire, Mitchell, Monning,
Pan, Portantino, Roth, Skinner, Stern, Wieckowski, Wiener
NOES: Anderson, Bates, Fuller, Gaines, Moorlach, Morrell, Nielsen, Stone,
Vidak, Wilk
NO VOTE RECORDED: Berryhill, Bradford, Cannella, Newman, Nguyen

ASSEMBLY FLOOR: 47-30, 8/28/18 - See last page for vote

SUBJECT: Firearms: transfers

SOURCE: Author

DIGEST: This bill increases the age for which a person can purchase a long-gun from a licensed dealer from 18 to 21 years of age, except as specified.

Assembly Amendments add additional exemptions including sale and control by specified members of the military and active peace officers.

ANALYSIS:

Existing law:

- 1) Prohibits the sale or transfer of a handgun, except as specifically exempted, to any person below the age of 21 years.
- 2) Prohibits any person from making an application to purchase more than one handgun within any 30-day period.
- 3) Exempts from the above 30-day prohibition any of the following:
 - a) Any law enforcement agency;
 - b) Any agency duly authorized to perform law enforcement duties;
 - c) Any state or local correctional facility;
 - d) Any private security company licensed to do business in California;
 - e) Any person who is a peace officer, as specified, and is authorized to carry a firearm in the course and scope of employment;
 - f) Any motion picture, television, video production company or entertainment or theatrical company whose production by its nature involves a firearm;
 - g) Any authorized representative of a law enforcement agency, or a federally licensed firearms importer or manufacturer;
 - h) Any private party transaction conducted through a licensed firearms dealer;
 - i) Any person who is a licensed collector and has a current certificate of eligibility issued by the Department of Justice (DOJ);
 - j) The exchange, replacement, or return of a handgun to a licensed dealer within the 30-day period; and,
 - k) A community college that is certified by the Commission on Peace Officer Standards and Training to present law enforcement academy basic course or other commission- certified training.
- 4) Prohibits a handgun from being delivered when a licensed firearms dealer is notified by the DOJ that within the preceding 30-day period the purchaser has made another application to purchase a handgun and the purchase was not exempted, as specified.

- 5) Provides that the penalties for making more than one application to purchase a handgun within any 30-day period is as follows:
 - a) A first violation is an infraction punishable by a fine of \$50;
 - b) A second violation is an infraction punishable by a fine of \$100; and,
 - c) A third violation is a misdemeanor.

This bill:

- 1) Exempts the sale of a firearm, that is not a handgun, to the following persons that are 18 years of age or older:
 - a) A person who possesses a valid, unexpired hunting license issued by the Department of Fish and Wildlife;
 - b) An active peace officer, who is authorized to carry a firearm in the course and scope of his or her employment;
 - c) An active federal officer, or law enforcement agent, who is authorized to carry a firearm in the course and scope of his or her employment;
 - d) A reserve peace officer, who is authorized to carry a firearm in the course and scope of his or her employment;
 - e) An active member of the United States Armed Forces, the National Guard, the Air National Guard, or the active reserve components of the United States, where the individuals in these organizations are properly identified. Proper identification includes the Armed Forces Identification Card or other written documentation certifying that the individual is an active or honorably retired member; and,
 - f) A person who provides proper identification that that he or she is an honorably discharged member of the United States Armed Forces, the National Guard, the Air National Guard, or the active reserve components of the United States. For the purposes of this exemption proper identification includes an Armed Forces Identification or other written documentation certifying that he person is an honorably discharged member.
- 2) Makes conforming changes to the age requirements for an application for the granting of serial number by the DOJ to persons wishing to manufacture or assemble a firearm.

Background

This bill increases the minimum age from 18 to 21 years for a person to purchase all firearms in California. The age restriction also impacts the ability to transfer a weapon. Under current law a person must be 21 years of age to purchase a handgun, and this bill applies those same rules to the purchase and transfer of all firearms (including long guns). This bill creates an exception to this rule when the purchaser or transferee has a valid, unexpired hunting license issued by the Department of Fish and Wildlife.

On February 14, 2018 Nikolas Cruz shot and killed 17 people and wounded an additional 17 people at Marjory Stoneman Douglas High School in Parkland, Florida. The perpetrator was 19-years old at the time of the incident, and he used assault rifles. Following the incident Florida passed legislation to increase the minimum age for buying rifles to 21-years. The National Rifle Association challenged the law and filed a lawsuit in the United States District court for the Northern District of Florida alleging that the ban on gun sales to people under 21 years of age is unconstitutional because it violates their rights under the Second and Fourteenth Amendments to the U.S. Constitution because 18-year-olds are classified as adults.

FISCAL EFFECT: Appropriation: No Fiscal Com.: Yes Local: Yes

According to the Assembly Appropriations Committee:

- 1) GF costs of \$342,000 in 2018-19, \$654,000 in 2019-20, and \$556,000 in 2020-21 and ongoing for the DOJ to hire three additional staff and pay for overtime and other cost associated with increased workload to update and maintain information technology systems and criminal records systems.
- 2) DOJ anticipates annual losses of \$152,000 in revenue to the Dealers Record of Sale Fund, \$75,000 to the Firearms Safety and Enforcement Special Fund, and \$8,000 to the Firearms Safety Account from a reduction in submissions resulting from the increased minimum age to purchase long-guns.

SUPPORT: (Verified 8/27/18)

California Chapters of the Brady Campaign to Prevent Gun Violence
City of Santa Monica
Giffords Law Center to Prevent Gun Violence

OPPOSITION: (Verified 8/27/18)

California Sportsman's Lobby
Firearms Policy Coalition
National Shooting Sports Foundation
Outdoor Sportsmen's Coalition of California
Safari Club International

ARGUMENTS IN SUPPORT: According to the California Chapters of the Brady Campaign to Prevent Gun Violence:

Existing law prohibits the sale or transfer of a handgun to any person below the age of 21 years. SB 1100 will similarly prohibit, with exceptions, the sale or transfer of a long gun by a licensed firearm dealer to a person under age of 21. Additionally, the bill will require those who manufacture or assemble a long gun to be at least 21 years old in order to obtain a serial number for the firearm and register it with the California Department of Justice. These provisions makes sense as those under age 21 are disproportionately linked to crime. In 2015, 23.4 percent of those arrested for murder and non-negligent manslaughter in the U.S. were under 21 and 26.5 percent of those arrested for "weapons carrying, possession, etc." were under age 21. Individuals age 18 to 20 compromise only 4% of the population but commit 17% of gun homicides.

Maturity, impulsive or reckless behavior, and responsibility vary greatly among 18-20 year olds. This is recognized in other areas – those under age 21 cannot buy alcohol, rent a car, or purchase a handgun – and the same age restriction should apply to long guns.

ARGUMENTS IN OPPOSITION: According to the Outdoor Sportsmen's Coalition of California:

SB 1100 would needlessly raise the age for purchasing a rifle or shotgun from 18 to 21onth.

Rather than raise the minimum age for lawful individuals to purchase a rifle or shotgun, or limit such purchases to one firearm per month, experience with mass homicides and other crimes involving firearms has clearly shown that the focus should be on preventing criminals and individuals suffering from mental illness from acquiring firearms, not on those who are not a part of the problem.

Persons who have an intent to commit such crimes, or other illegal acts involving the use of a firearm, will always be able to obtain firearms through unlawful sources without going through a licensed firearms dealer.

The restrictions proposed in SB 1100 will not prevent it.

ASSEMBLY FLOOR: 47-30, 8/28/18

AYES: Aguiar-Curry, Baker, Berman, Bloom, Bonta, Burke, Calderon, Carrillo, Chau, Chiu, Chu, Eggman, Friedman, Gabriel, Cristina Garcia, Eduardo Garcia, Gipson, Gloria, Gonzalez Fletcher, Grayson, Holden, Irwin, Jones-Sawyer, Kalra, Kamlager-Dove, Levine, Limón, Low, Maienschein, McCarty, Medina, Mullin, Muratsuchi, Nazarian, O'Donnell, Quirk, Quirk-Silva, Reyes, Rivas, Rubio, Santiago, Mark Stone, Thurmond, Ting, Weber, Wood, Rendon

NOES: Acosta, Travis Allen, Arambula, Bigelow, Brough, Caballero, Cervantes, Chávez, Chen, Choi, Cooley, Cunningham, Dahle, Flora, Fong, Frazier, Gallagher, Gray, Harper, Kiley, Lackey, Mathis, Mayes, Melendez, Obernolte, Patterson, Salas, Steinorth, Voepel, Waldron

NO VOTE RECORDED: Cooper, Daly, Rodriguez

Prepared by: Gabe Caswell / PUB. S. /
8/28/18 21:35:58

**** END ****

EXHIBIT 2

Get Unlimited Wired Access

SUBSCRIBE

MEGAN MOLTENI SCIENCE 08.06.2019 03:11 PM

The Looser a State's Gun Laws, the More Mass Shootings It Has

Researchers have begun to see a trend: The rate of mass shootings is consistently much higher for places with fewer restrictions on guns.

Holiday Sale. [Subscribe](#)



The country is splitting into the gun law-haves, and the gun law have-nots, and deadly statistics are now revealing the impact those policy decisions have on people's lives. JOHN MINCHILLO/GETTY IMAGES

It happened again. This time, gunmen in El Paso, Texas, and Dayton, Ohio, murdered 31 people and injured at least 50 more in separate mass shooting attacks within 13 hours of each other Saturday night and Sunday morning. It was, in many ways, just another weekend in America, the only nation in the developed world where horrific gun massacres regularly occur. Though nothing new, the frequency of such public mass

Holiday Sale. [Subscribe](#)

shooting event has claimed the lives of four or more people every 47 days since June 2015. In the mid-'90s, such attacks happened just twice a year, on average.

has had six such incidents, defined by the US government as four or more people killed by a single individual, in the past three years alone, according to data from the nonprofit [Gun Violence Archive](#). And like other forms of gun violence—including homicide, suicide, and unintended accidents—researchers are finding that mass shooting events happen more often in states with looser gun laws.

Because while Congress may not have passed any [national gun laws](#) in the aftermath of past mass shootings, individual state legislatures have. And as the disparity between states with weak gun laws and those with tough ones has widened, so too has the gap in mass shootings. Which means that terrorist acts like those committed in El Paso and Dayton over the weekend are more likely to keep happening to people who live in places where it's easy to buy, sell, and carry guns. The country is splitting into the gun law haves and the gun law have-nots, and deadly statistics are now revealing the impact those policy decisions have on people's lives.

Studying mass shootings, which make up only a tiny fraction of all gun deaths, has long been tricky, because of their historical rarity and [a general dearth of data on guns or gun deaths](#). (That's because of [research-stifling federal legislation](#) that was only recently overturned.) But one ironic effect of there being more mass shootings lately is scientists now have enough data [to start to see trends emerging](#).

In a [paper](#) published earlier this year in *BMJ* (previously the *British Medical Journal*), epidemiologists at Columbia University looked back at the Federal Bureau of Investigation's crime database from 1998 to 2015 to calculate annual rates of mass shootings in each state. Then they matched that up against each year's edition of the [The Gun Law Guide to the Five States](#)—a annual report that rates the Holiday Sale. [Subscribe](#)

Published by a Kentucky attorney and arms dealer for a gun-toting audience, the guide is frequently promoted by the National Rifle Association. States are scored zero (for completely restrictive) to 100 (for completely permissive) based on 13 factors, including

What the researchers found was that over time states have dug themselves into a bimodal distribution. That is, they've self-clumped into two distinct groups—a smaller one made up of eight states scoring between 5 and 25, and another, much larger, one clustered around scores from 70 to 100. "One of the most interesting things about this data is that we aren't seeing a full spectrum, because there just aren't that many states directly in the middle," says Paul Reeping, the study's lead author.

When they compared those scores to mass shootings per million residents, they found that for every 10-point relaxation in a state's gun laws, the rates of mass shootings in that state increased by 11.5 percent. This trend showed up even after the models were adjusted for population demographics like household income, unemployment, poverty, education, incarceration rates, and race. The eight most restrictive states include Hawaii, Massachusetts, New Jersey, Connecticut, Maryland, California, Illinois, and New York. Leading the pack in both permissive laws and mass shooting rate were Vermont, South Carolina, Louisiana, and Arizona. (Florida, where the Parkland shooting took place last year, was the only state not included in the analysis because it doesn't participate in the FBI's Uniform Crime Reporting program.)

Both Texas and Ohio, where the latest terror attacks were carried out, also scored high on gun law permissibility. In both states it's legal to carry concealed weapons in public, provided the gun owner has the proper permits to own it. In Texas, permits are issued to applicants over the age of 21 who pass a four-to-six-hour training course and don't have any pending criminal charges. According to Ohio's gun laws, residents 21 years and older must complete an eight-hour training course. not be addicted to any controlled

Holiday Sale. [Subscribe](#)

Most relevant to the recent killings in El Paso and Dayton, though, is the fact that the semiautomatic weapons used to carry out the attacks can be purchased legally. Only six states and the District of Columbia have enacted bans on these types of military-style firearms. Texas and Ohio are not among them. Both states also allow large-capacity

It's worth noting here that while living in a state with strict gun laws does appear to confer some significant public health advantages—fewer gun-related suicides and homicides; one recent study found it cut rates of premature deaths in half—those laws only go so far. Motivated individuals will find ways around them, either over the internet or across porous state borders. The gunman who killed three people in Gilroy, California, in July, for example, traveled to Nevada to buy a military-style rifle configured in a way that was illegal in his home state.

And this type of thing happens a lot. Second Amendment activists often point to Chicago, a city with rampant gun violence in a state that has some of the nation's strongest gun laws. But most of the guns recovered in Chicago were purchased outside Illinois, in neighboring states with laxer laws, according to a 2017 report by the Chicago Mayor's Office.

But at least according to Reeping's analysis, the trend of more permissive laws being linked to more mass shootings is actually gaining momentum. Starting around 2010, the data begins really diverging—mass shooting rates dropped in states with restrictive laws as they accelerated in states with more lax ones.

Reeping says this could be related to polarizing trends in gun policy-making, as generally permissive states make their laws more relaxed and restrictive states clamp down tighter and tighter in the face of rising violence. In Texas, for instance, where four of the ten deadliest mass shootings in US history have taken place, ten new pro-gun laws are set to take effect before the end of the month. The associations are strong, though Reeping shies away from suggesting any causality in the data. "There's so much going on and we

Holiday Sale. [Subscribe](#)

AMERICAN PUBLIC IS WILLING TO BELIEVE EVERY STUDY THAT SUGGESTS COFFEE IS ASSOCIATED WITH living longer or that eating chocolate is linked to lower rates of depression but view the data linking gun laws to gun violence with suspicion.

larger, more prospective studies that could answer these questions definitively, he says. "But even now we have very, very strong indicators based off the number of studies published that more permissive gun laws really do have an effect."

More Great WIRED Stories

- How a 6,000-year-old dog cancer spread around the world
- These chaotic games are a referee's worst nightmare
- Did this international drug dealer create bitcoin? Maybe!
- How Loon's balloons find their way to deliver the internet
- Social media could make it impossible to grow up
-  Upgrade your work game with our Gear team's favorite laptops, keyboards, typing alternatives, and noise-canceling headphones
-  Want more? Sign up for our daily newsletter and never miss our latest and greatest stories



Megan Molteni is a staff writer at WIRED, covering biotechnology, public health, and genetic privacy. Previously, she freelanced as a reporter, audio producer, and fact-checker. Her work has appeared in Rolling Stone, Dinosaur, Huck, Nerd, and Aeon. She studied biological anthropology at Colgate.

Holiday Sale. [Subscribe](#)

STAFF WRITER 

FEATURED VIDEO

Why Some Cities Are Banning Facial Recognition Technology



BUSINESS CULTURE GEAR IDEAS SCIENCE

SUBSCRIBE



WATCH

Why Some Cities Are Banning Facial Recognition Technology

TOPICS GUNS TERRORISM PUBLIC HEALTH

MORE FOR YOU

Holiday Sale. [Subscribe](#)





Why Some Cities Are Banning Facial Recognition Technology

A handful of US cities have banned government use of facial recognition technology due to concerns over its accuracy and privacy. WIRED's Tom Simonite talks with computer vision scientist and lawyer Gretchen Greene about the controversy surrounding the use of this technology.

WIRED

1 Year of WIRED for \$10

Subscribe

Stories to help you understand the future.

WIRED is where tomorrow is realized. It is the essential source of information and ideas that make sense of a world in constant transformation. The WIRED conversation illuminates how technology is changing every aspect of our lives—from culture to business, science to design. The breakthroughs and innovations that we uncover lead to new ways of thinking, new connections, and new industries.



Holiday Sale. [Subscribe](#)

CONTACT

RSS



Site map

Accessibility Help

Condé Nast Store

© 2020 Condé Nast. All rights reserved. Use of this site constitutes acceptance of our [User Agreement](#) (updated 1/1/20) and [Privacy Policy and Cookie Statement](#) (updated 1/1/20) and [Your California Privacy Rights](#). Settings *Wired* may earn a portion of sales from products that are purchased through our site as part of our Affiliate Partnerships with retailers. The material on this site may not be reproduced, distributed, transmitted, cached or otherwise used, except with the prior written permission of Condé Nast. [Ad Choices](#)

Holiday Sale. [Subscribe](#)

EXHIBIT 3

The JS 44 civil cover sheet and the information contained hereon shall be replaced or supplemented by the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON PAGE TWO OF THE FORM.)

I. (a) PLAINTIFFS
HTC CORPORATION and HTC AMERICA, INC.
(b) County of Residence of First Listed Plaintiff Taoyuan, Taiwan, R.O.C.
(c) Attorney's (Firm Name, Address, and Telephone Number)
(SEE ATTACHMENT)

DEFENDANTS
TECHNOLOGY PROPERTIES LTD AND ALLIACENSE LTD.
County of Residence of First Listed Defendant
NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE LAND INVOLVED.
Attorneys (If Known)
C08 00882JL

II. BASIS OF JURISDICTION (Place an "X" in One Box Only)
1 U.S. Government Plaintiff
2 U.S. Government Defendant
3 Federal Question (U.S. Government Not a Party)
4 Diversity (Indicate Citizenship of Parties in Item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES (Place an "X" in One Box for Plaintiff and One Box for Defendant)
Citizen of This State
Citizen of Another State
Citizen or Subject of a Foreign Country
Incorporated or Principal Place of Business In This State
Incorporated and Principal Place of Business In Another State
Foreign Nation

IV. NATURE OF SUIT (Place an "X" in One Box Only)
CONTRACT: 110 Insurance, 120 Marine, 130 Miller Act, 140 Negotiable Instrument, 150 Recovery of Overpayment & Enforcement of Judgment, 151 Medicare Act, 152 Recovery of Defaulted Student Loans (Excl. Veterans), 153 Recovery of Overpayment of Veteran's Benefits, 160 Stockholders' Suits, 190 Other Contract, 195 Contract Product Liability, 196 Franchise
REAL PROPERTY: 210 Land Condemnation, 220 Foreclosure, 230 Rent Lease & Ejectment, 240 Torts to Land, 245 Tort Product Liability, 290 All Other Real Property
TORTS: PERSONAL INJURY (310 Airplane, 315 Airplane Product Liability, 320 Assault, Libel & Slander, 330 Federal Employers' Liability, 340 Marine, 345 Marine Product Liability, 350 Motor Vehicle, 355 Motor Vehicle Product Liability, 360 Other Personal Injury), PERSONAL INJURY (362 Personal Injury - Med. Malpractice, 365 Personal Injury - Product Liability, 368 Asbestos Personal Injury Product Liability), PERSONAL PROPERTY (370 Other Fraud, 371 Truth in Lending, 380 Other Personal Property Damage, 385 Property Damage Product Liability), PRISONER PETITIONS (510 Motions to Vacate Sentence, Habeas Corpus: 530 General, 535 Death Penalty, 540 Mandamus & Other, 550 Civil Rights, 555 Prison Condition)
FORFEITURE/PENALTY: 610 Agriculture, 620 Other Food & Drug, 625 Drug Related Seizure of Property 21 USC 881, 630 Liquor Laws, 640 R.R. & Truck, 650 Airline Regs., 660 Occupational Safety/Health, 690 Other
LABOR: 710 Fair Labor Standards Act, 720 Labor/Mgmt. Relations, 730 Labor/Mgmt. Reporting & Disclosure Act, 740 Railway Labor Act, 790 Other Labor Litigation, 791 Empl. Ret. Inc. Security Act
IMMIGRATION: 462 Naturalization Application, 463 Habeas Corpus - Alien Detainee, 465 Other Immigration Actions
BANKRUPTCY: 422 Appeal 28 USC 158, 423 Withdrawal 28 USC 157
PROPERTY RIGHTS: 820 Copyrights, 830 Patent, 840 Trademark
SOCIAL SECURITY: 861 HIA(1395ff), 862 Black Lung (923), 863 DIWC/DIWW (405(g)), 864 SSID Title XVI, 865 RSI (405(g))
FEDERAL TAX SUITS: 870 Taxes (U.S. Plaintiff or Defendant), 871 IRS-Third Party 26 USC 7609
OTHER STATUTES: 400 State Reapportionment, 410 Antitrust, 430 Banks and Banking, 450 Commerce, 460 Deportation, 470 Racketeer Influenced and Corrupt Organizations, 480 Consumer Credit, 490 Cable/Sat TV, 810 Selective Service, 850 Securities/Commodities/Exchange, 875 Customer Challenge 12 USC 3410, 890 Other Statutory Actions, 891 Agricultural Acts, 892 Economic Stabilization Act, 893 Environmental Matters, 894 Energy Allocation Act, 895 Freedom of Information Act, 900 Appeal of Fee Determination Under Equal Access to Justice, 950 Constitutionality of State Statutes

V. ORIGIN (Place an "X" in One Box Only)
1 Original Proceeding
2 Removed from State Court
3 Remanded from Appellate Court
4 Reinstated or Reopened
5 Transferred from another district (specify)
6 Multidistrict Litigation
7 Appeal to District Judge from Magistrate Judgment

VI. CAUSE OF ACTION
Cite the U.S. Civil Statute under which you are filing (Do not cite jurisdictional statutes unless diversity):
28 U.S.C. §§1331, 1338, 2201
Brief description of cause:
Declaratory judgment action for patents.

VII. REQUESTED IN COMPLAINT:
CHECK IF THIS IS A CLASS ACTION UNDER F.R.C.P. 23
DEMAND \$
CHECK YES only if demanded in complaint:
JURY DEMAND: Yes No

VIII. RELATED CASE(S) IF ANY
PLEASE REFER TO CIVIL L.R. 3-12 CONCERNING REQUIREMENT TO FILE "NOTICE OF RELATED CASE".

IX. DIVISIONAL ASSIGNMENT (CIVIL L.R. 3-2)
PLACE AND "X" IN ONE BOX ONLY
SAN FRANCISCO/OAKLAND
SAN JOSE

DATE: February 8, 2008
SIGNATURE OF ATTORNEY OF RECORD: Kyle Chen
American LegalNet, Inc. www.FormsWorkflow.com

Attachment to Civil Cover Sheet

WILLIAM SLOAN COATS (SBN 98464)

MARK R. WEINSTEIN (SBN 193043)

SAM O'ROURKE (SBN 205233)

KYLE D. CHEN (SBN 239501)

WHITE & CASE LLP

3000 El Camino Real

Five Palo Alto Square, 9th Floor

Palo Alto, California 94306

Telephone: (650) 213-0300



CALIFORNIA TODAY

What to Know About the Poway Synagogue Shooting

By Jill Cowan

April 29, 2019

*Good morning.**(Want to get California Today by email? Here's the sign-up.)*

On Saturday, another community was stunned by an attack on a house of worship.

This time, the place was Poway, a quiet, shaded suburb north of San Diego, where a gunman opened fire at a synagogue during a service on the last day of Passover.

A 60-year-old woman was killed. A rabbi was shot in the hand and two other people were left with shrapnel wounds.

Mayor Steve Vaus of Poway told me he saw the timing of the shooting, a little more than a week after leaders hosted an interfaith event aimed at building strength across the city's religious communities, as "a bit of a twisted irony."

I reached Mr. Vaus by phone in the midst of a flurry of interviews in which he said the shooting was a hate crime — a description echoed by President Trump.

Mr. Vaus emphasized that Poway is an "idyllic" place where neighbors have helped one another fend off wildfire flames with garden hoses. Its residents, he said, wouldn't be "bowed by hatred."

The perfect gift for everyone on your list.
Gift subscriptions to The Times. Starting at \$25.

As for the gunman? "I'm anxious for the suspect to feel the full force of the law," he said.

[Read the latest here.]

Here's what you need to know:

What happened?

The police say a 19-year-old man armed with an AR-15-style gun stormed into the Chabad of Poway synagogue a little before noon on Saturday, yelling anti-Semitic slurs. The synagogue was more full than usual, since it was a holiday.

Lori Gilbert Kaye was shot as she prepared to say the traditional prayer for the dead in honor of her mother. The congregation's rabbi, Yisroel Goldstein, tried talking to the man after he opened fire, but he fired again. The rabbi was hit in both hands.

The gunman left the building, potentially after his weapon malfunctioned, and surrendered to the police a short time later. He was charged with one count of murder and three counts of attempted murder on Sunday morning. Officials said they were investigating whether he posted an anti-Semitic manifesto online before the attack.

[Read the full account of the attack here.]

What do we know about the gunman?

Authorities have identified the gunman as John Earnest, from San Diego.

Officials said they're investigating whether Mr. Earnest posted a racist manifesto on the online message board 8chan ahead of the attack.

The document is an anti-Semitic screed filled with white nationalist conspiracy theories. Its author said he was inspired by a horrific mass shooting at a mosque in Christchurch, New Zealand, which was streamed online, and the massacre at a synagogue in Pittsburgh, which took place exactly six months prior.

The author also says he was responsible for a fire at a mosque in Escondido, not far away.

Mr. Earnest was charged with one count of murder and three counts of attempted murder on Sunday morning.

Does this fit into any broader patterns?

Gift subscriptions to The Times. Starting at \$25. X
 In a word, yes. Experts said the shooting appeared to fit at the intersection of two troubling trends: Growing anti-Semitism in the United States and a rise in violence both fueled by and partially carried out for the internet.

The shooting put religious leaders on edge and reignited conversations about securing churches, mosques, synagogues and other sacred spaces.

Nevertheless, Rabbi Goldstein said he continued his sermon even as he waited for the authorities to arrive at the synagogue, because “it was just 70 years ago during the Holocaust we were gunned down like this, and I just want to let my fellow Americans know that we’re not going to let this happen,” he said.

Here’s what else you may have missed this weekend

(We often link to sites that limit access for nonsubscribers. We appreciate your reading Times stories, but we’d also encourage you to support local news if you can.)



A worker packages cannabis at the CMX Distribution facility in Costa Mesa, Calif. The center is a licensed medical marijuana distributor. Jenna Schoenefeld for The New York Times

- About a year ago, California legalized recreational marijuana. **The illegal market is still peeling off business.** [The New York Times]
- The police said the man who intentionally plowed into a crowd of pedestrians in Sunnyvale, injuring eight people, **did so in part because he thought some were Muslim.** [The New York Times]
- And the crash **rattled the Bay Area Muslim community.** [The San Francisco Chronicle]
- Los Angeles Fire Department officials said **their response to the devastating Woolsey Fire was distracted by requests** from local politicians to check on specific addresses. [The Los Angeles Times]
- **Families from China allegedly paid millions to William Singer, the man prosecutors say was the architect of the college admissions fraud scheme.** But the lawyer for one young woman who attended high school in San Juan Capistrano and was a freshman at Yale said neither the student nor her family knew the \$1.2 million they paid to guarantee her admission was going to a bribe. [The New York Times]
- The New York Times editorial board **argues that increasing housing supply is one answer to the affordability crisis.** And State Senator Scott Wiener’s S.B. 50 is the most promising way to achieve that. [New York Times Opinion]
- Uber is set to start its I.P.O. road show this week. **That means you’ll be hearing about how the company is a lot like Amazon.** [The New York Times]

More California stories

Gift subscriptions to The Times. Starting at \$25.



The perfect gift for everyone on your list.

GIVE THE TIMES



The crowd at the Stagecoach Festival in Indio. Etienne Laurent/EPA, via Shutterstock

- **“It could have been any bar. It could have been any festival.” Stagecoach 2019, the big country music festival, paid tribute to the survivors of the Borderline Bar & Grill shooting in Thousand Oaks.** [The Press-Enterprise]
- **In a reversal, movie theaters actually raked it in over the weekend,** with the record-shattering \$1.2 billion opening of “Avengers: Endgame.” [The New York Times]
- **The Warriors coach Steve Kerr must have been feeling a sense of urgency ahead of the team’s opening game against the Houston Rockets;** he made a big lineup change, making sure his most accomplished lineup was on the court from the start. [The New York Times]

And Finally ...



A distinctive property in Hillsborough, Calif., known as the Flintstone House, surrounded by a menagerie of prehistoric animal statues. The town has taken the owner of the home to court. Karl Mondon/Bay Area News Group

Last week, I wrote about the National Trust for Historic Preservation’s “40 Under 40” list, a roster of places that aren’t yet old enough to be historic, but are worth preserving nonetheless. I asked you for sites that fit the bill in California.

I got pointers about sites across the state. But with a boost from the podcast East Bay Yesterday on Twitter, several were truly odd structures around the Bay Area. One was Eugene Tssui’s “fish house” — the plans for which caused an uproar in the Berkeley neighborhood where it was built in about 1995. There were shingled geodesic domes tucked behind the Oakland hills in a quirky community known as Canyon — although some of those may have been built in the 1960s, making them a little older than the others.

And then, I got emails from readers about the “Flintstone House,” a home that’s drawn national attention for its commitment to a theme.

California Today goes live at 6:30 a.m. Pacific time weekdays. Tell us what you want to see: CAtoday@nytimes.com. Were you forwarded this email? [Sign up to California Today here.](#) X

Jill Cowan grew up in Orange County, went to school at U.C. Berkeley and has reported all over the state, including the Bay Area, Bakersfield and Los Angeles — but she always wants to see more. Follow along here or on Twitter, [@jillcowan](#).

The perfect gift for everyone on your list.

California Today is edited by Julie Bloom, who grew up in Los Angeles and graduated from U.C. Berkeley.

GIVE THE TIMES
Correction: April 29, 2019

An earlier version of this article relying on earlier reports mischaracterized Lori Gilbert Kaye's actions during a synagogue shooting on Saturday. She was killed while preparing to say the traditional prayer for the dead, not jumping in front of the rabbi to protect him.

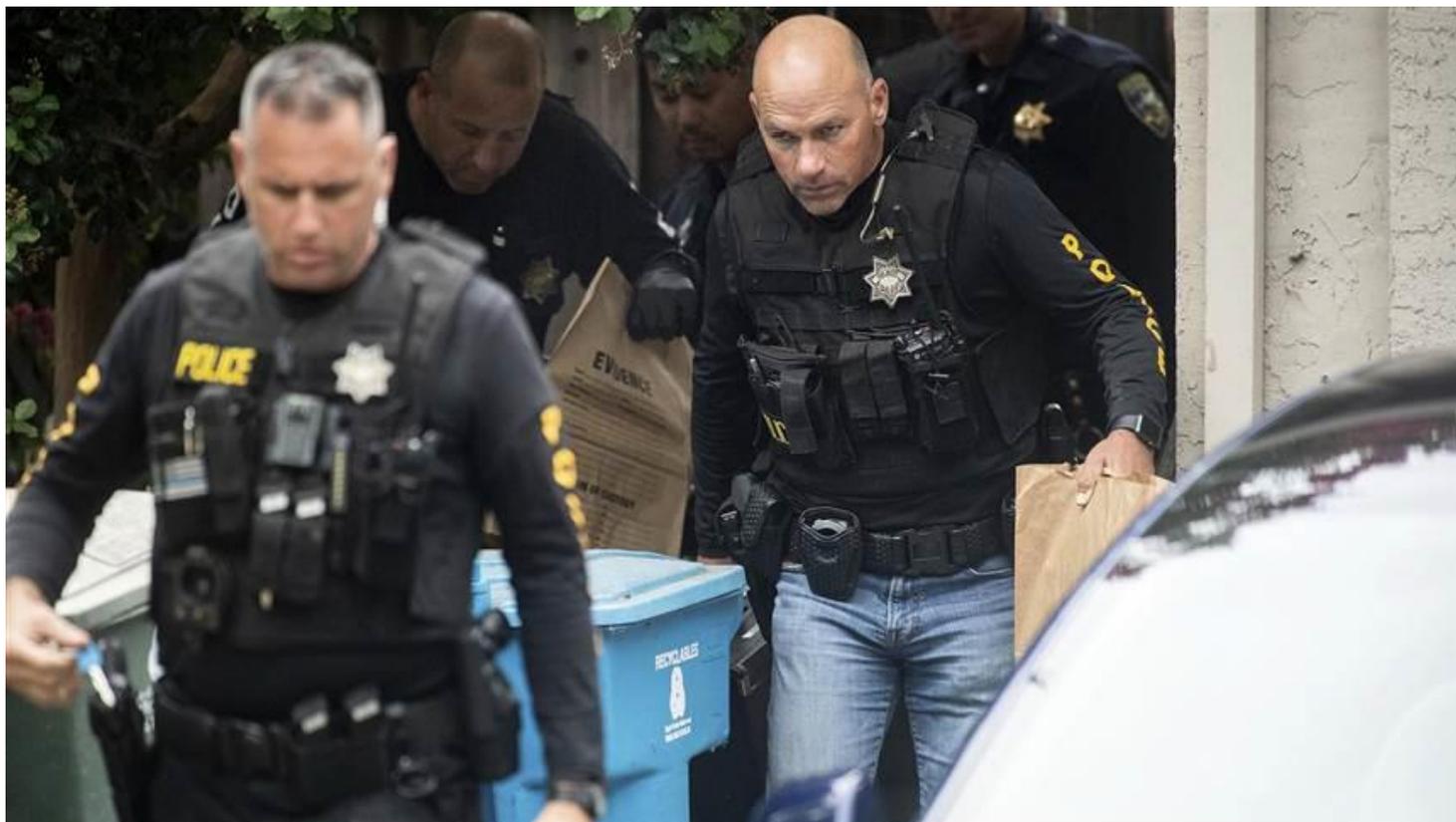
READ 6 COMMENTS

EXHIBIT 4

[U.S. NEWS](#)

Gilroy Garlic Festival gunman referred to 'Might is Right' manifesto before shooting

Santino William Legan used an AK-47-style rifle he bought legally in Nevada to kill three and wound a dozen more.



July 29, 2019, 2:13 PM EDT / Updated July 29, 2019, 5:05 PM EDT

By David Ingram, Brandy Zadrozny and Corky Siemaszko

GILROY, Calif. – The gunman who [killed three people](#) and wounded a dozen more at the Gilroy Garlic Festival in Northern California was an angry 19-year-old who had recently waded into the world of white supremacy.

Santino William Legan, who was shot dead by police Sunday before he could do more damage, posted online about an 1890 racist manifesto, “Might is Right or The Survival of the Fittest,” NBC News confirmed.

“Read Might is Right by Ragnar Redbeard,” Legan posted on his Instagram page. He then used a slurs against mixed-race people and misogynistic descriptions of white Silicon Valley workers, complaining about “hordes” of them “overcrowding” towns.

Redbeard, which was a pseudonym, argued that only strength and violence determined what is morally right. The work, which is filled with misogynistic and anti-Semitic rhetoric, is a staple among neo-Nazis and white supremacists on extremist sites.



[Witnesses describe panic at Gilroy Garlic Festival shooting](#)

JULY 29, 2019 03:07

And the phrase “might is right” is often posted as a sort of motto or catchphrase indicating white supremacy on neo-Nazi extremist forums.

Legan was also apparently no fan of the festival, a three-day food fair that began in 1979 to celebrate the local garlic industry – and which was in walking distance from his home on a tree-lined street in Gilroy.

“Ayyy garlic festival time,” his post read. “Come get wasted on overpriced s---.”

Below that was a post from someone named futboieden, which read “when you get too wasted and accidentally shoot up the festival.”

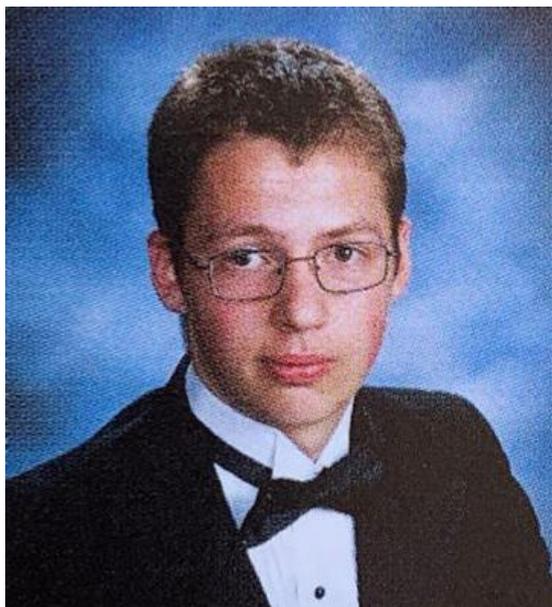
Just who futboieden was remained unclear a day after the nation was left grappling with yet another mass shooting. This one claimed the lives of 6-year-old [Stephen Romero](#), a 13-year-old girl, and a man in his 20s. The names of the other two victims were not released.

Investigators also said they were looking into reports that Legan might have had an accomplice but said that had not been confirmed. They said the AK-47-style assault rifle Legan used in the shooting was purchased July 9 in Nevada.

“We don’t have a motive for the shooting as yet,” Gilroy Police Chief Scot Smithee said during a press conference.

Legan was from a family of boxers. He was coached, along with his brothers, by their father, Tom.

Neighbors said the family converted its garage into a boxing gym and the boys were often seen sparring with each other.



Santino Legan in a high school yearbook photo.

"I'm so confused and hurt for the parents to go through this," said Elia Scettrini, 65, who lives two doors away and teaches Spanish at Gilroy High School.

Scettrini said Legan just graduated from high school and described the family as friendly and polite.

Police on Monday could be seen carrying several bags of evidence out of the family home and searching a car parked outside.

This was not the first time the Legan family has found itself in the crosshairs of a police investigation.

Legan's grandfather Thomas Legan was a Santa Clara County supervisor running for re-election in 1988 when he was accused of molesting one of his daughters six years earlier.

Thomas Legan, who died last year, insisted he was innocent and maintained his ex-wife had manipulated the girl into making a false accusation. A jury agreed and found him not guilty after six days of deliberations.

Rep. Dan Lipinski, D-Ill., said he and his wife, Judy, were in the crowd Sunday when the shots rang out.

"The shooter was not far from us as we heard the loud 'pops,' which seemed to get closer as we ran," the congressman said in a statement.

The Gilroy Garlic Festival is one of the county's best-known food festivals and has been held for 41 years. It draws hundreds of thousands of paying visitors every year.

The focus of the festival is garlic-flavored food, from garlic bread and calamari to ice cream and frog legs, and some people even show their fondness for the plant by wearing garlic-shaped hats.

The festival made several changes this year to try to reverse a recent 20 percent decline in attendance, Gilroy Life, a local lifestyle publication, reported last week. The changes included adding a concert by singer-songwriter Colbie Caillat and an appearance by celebrity chef Tom Colicchio.

The festival is run primarily by volunteers and much of the money goes to local charities.

"It's been able to supply money for all groups, whether it's the little kids' swimming team or the high school football teams," said Alex Larson, 57, who owns the Garlic Shoppe in Gilroy with his brother.

Larson said the festival is so central to the community that people will rally behind it, rather than letting the shooting mar its reputation.

“If it were a festival that someone was profiting from, it would be completely different, but this is a festival that everyone profits from,” he said. Next year, he said, “People are going to show up, and it’s going to be better.”

People in Gilroy were using the hashtag #gilroystrong on social media on Monday, echoing a saying that became popular in Boston after the marathon bombing there in 2013.

David Ingram reported from Gilroy, and Brandy Zadrozny and Corky Siemaszko from New York.

David Ingram

David Ingram covers tech for NBC News.



Brandy Zadrozny

Brandy Zadrozny is an investigative reporter for NBC News.



Corky Siemaszko

Corky Siemaszko is a senior writer at NBC News Digital.

Ben Collins contributed.



[ABOUT](#)

[CONTACT](#)

[CAREERS](#)

[PRIVACY POLICY](#)

[TERMS OF SERVICE](#)

[NBCNEWS.COM SITE MAP](#)

[ADVERTISE](#)

[ADCHOICES](#)

© 2019 NBC UNIVERSAL



EXHIBIT 5



NATION

5 suspects arrested in Halloween Airbnb party shooting

Associated Press

Published 10:29 a.m. ET Nov. 15, 2019 | Updated 10:31 a.m. ET Nov. 15, 2019

ORINDA, Calif. — Four men were arrested Thursday on suspicion of murder in the deaths of five people in a shooting at a Halloween party at an Airbnb rental home in the San Francisco Bay Area. A fifth man was arrested on a charge of being an accessory to the crime, the Contra Costa Sheriff's Department said.

Sheriff David Livingston said search warrants were executed in several Northern California cities Thursday. He did not address a possible motive in the fatal shootings in Orinda that sent more than 100 terrified partygoers running for safety, but he said in a statement that investigators found two of the victims were armed, "which may have played a role in this tragedy."

Tiyon Farley, 22, of Antioch; Omar Taylor, 24, of Pittsburg; Raymon Hill Jr., 23, of San Francisco and Oakland; Javlin County, 29, of Sausalito and Richmond; and Oshiana Tompkins, 19, of Vallejo and Hercules, died in the shooting and at least four others were injured.

Halloween shooting: Airbnb plans to ban 'party houses' after Orinda shooting. Now people are asking how

"Extraordinary cooperation among multiple law enforcement agencies led to these arrests and a small measure of justice for the true victims," Livingston said in a statement.

Those arrested Thursday were: Lebraun Tyree Wallace, 28, of San Mateo; Shamron Joshua Mitchell, 30, of Antioch; and Jaquez Deshawn Sweeney and Jason D. Iles, both 20 and of Marin City on charges of murder and conspiracy. All four were being held without bail.

Devin Isiah Williamson, 21, of Vallejo, was arrested as an accessory and was being held in lieu of \$500,000 bail.

Airbnb's CEO Brian Chesky has since said that the San Francisco-based company was taking steps to stop unauthorized parties in the wake of the deadly shooting. In a series of tweets Nov. 2, Chesky said company is stepping up efforts to "combat unauthorized parties and get rid of abusive host and guest conduct."

Orinda shooting background: Manhunt for Airbnb Halloween party shooter continues in California

EXHIBIT 6

National

More and deadlier: Mass shooting trends in America

By [Bonnie Berkowitz](#) ,
[Adrian Blanco](#) ,
[Brittany Renee Mayes](#) ,
Klara Auerbach and
[Danielle Rindler](#) August 5

Public mass shootings are occurring more frequently in recent years, and they are claiming more lives, according to an analysis of The Post's [public mass shootings database](#).

Four or more people have been killed in a mass shooting every 47 days, on average, since June 17, 2015. That was the evening a young white supremacist killed nine people at a Bible study in a [historic African American church](#) in Charleston, S.C.

This weekend, the 30th and 31st such shootings since then took place just 13 hours apart.

On the morning of Aug. 3, 22 people were shot to death and 24 more wounded at an [El Paso Walmart](#). Investigators believe the 21-year-old suspect drove almost 10 hours from his home near Dallas to target Latinos in the border city. At least eight of the dead were [Mexican citizens](#).

After midnight, another nine people were killed and 27 injured in a bustling entertainment district [in Dayton, Ohio](#), where a 24-year-old wearing a mask and body armor opened fire on a busy street. His younger sister was among the dead.

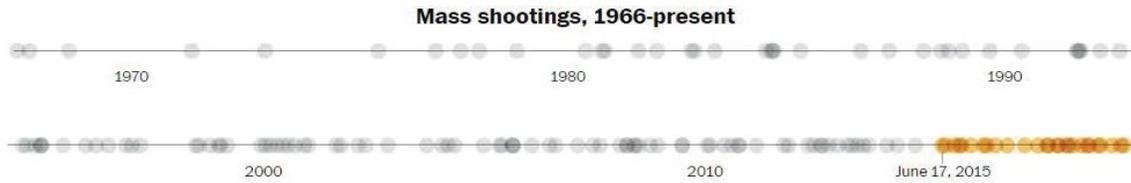
The pace of mass shootings has quickened

Before Charleston, eight months had passed since a 15-year-old football player killed four friends and himself at his [Marysville, Wash., high school](#), a relatively long lull. The average time between each of the 165 shootings in The Post's database is four months.

Before the 1999 shooting in which two teens killed 13 and wounded 24 at [Columbine High School](#) in Littleton, Colo., mass shootings took place roughly every six months. Between Columbine and Charleston, the pace was roughly one every 2½ months. After Charleston? One almost every six weeks.

A mass shooting has no standard definition, and The Post's database defines it narrowly. It contains shootings since 1966 in which at least four people were killed, not including the

shooters, in public places or large private gatherings. It excludes shootings tied to other crimes such as robberies and domestic killings in homes. Other definitions yield much higher numbers. As of Aug. 5, GunViolenceArchive.org, which uses a much broader definition of a mass shooting, counted 255 just this year.



Death tolls have gone up

Although the data goes back to 1966, nearly a third of the 1,196 total victims have died since Charleston, and the two deadliest shootings in U.S. history fall into that time frame.

In October 2017, a 64-year-old gambler with a cache of high-powered rifles fired from his Las Vegas hotel room window and shot 480 people in a [country music festival](#) below. Fifty-eight of them died.

Less than 15 months earlier, a security company employee killed 49 and wounded 53 in a [gay nightclub in Orlando](#), the second-highest toll.

The shooters have gotten younger

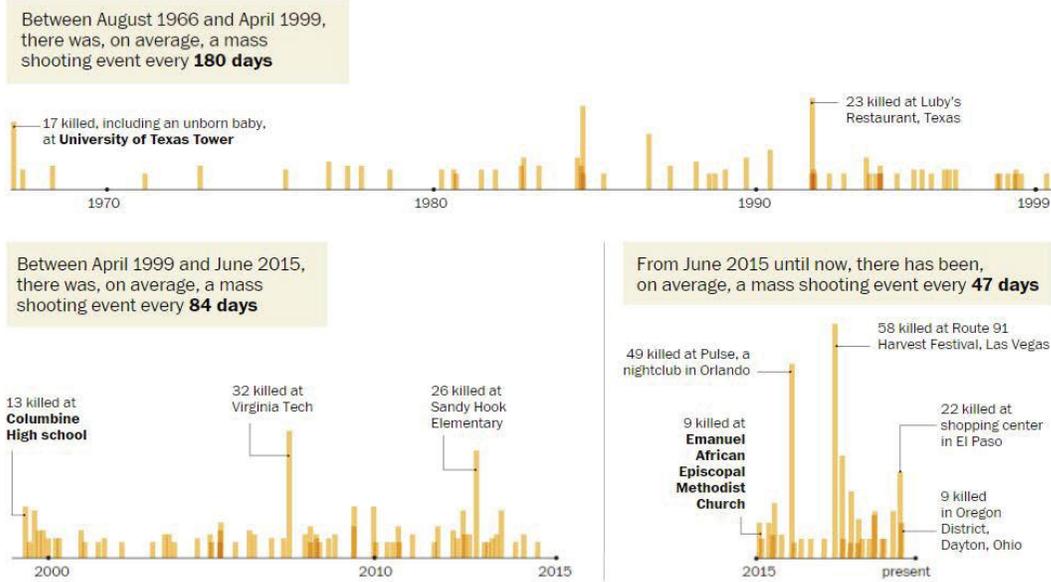
The 169 shooters ranged in age from 11 to 73, but they were mostly young to middle-aged men, and they have trended still younger recently. Shooters before Charleston averaged just under 34 years old; from Charleston to the present, they have averaged 32 years old.

Since Charleston, twenty of the 34 shooters have been in their 20s, and two were teenagers.

The venues have changed

It is hard to name a type of place where a mass shooting hasn't occurred. Playground? Yes.

Nursing home? Yes. Theater. Campground. House party. Yacht. And of course many schools, churches and military sites.



The El Paso and Dayton shootings took place in busy retail areas, two of a growing percentage that have happened in such places. More than a third of the recent shootings have occurred in or near stores, restaurants or other establishments. Before Charleston, shooters more often targeted office buildings or other types of workplace sites such as warehouses.

While there may be trends in the types of places targeted, the geography remains unpredictable. Mass shootings have occurred all over the country, in red and blue and purple states, in huge metropolises, medium-sized cities and tiny rural towns.

They are always shocking but may be getting less surprising.

In the aftermath of nearly every mass shootings, a horrified survivor says some version of "I didn't think it could happen here." But in May 2018, after a gunman killed 10 at her [Santa Fe, Tex., high school](#), 17-year-old Paige Curry had a different take.

"Eventually," she said, "it was going to happen here."

Some data in [The Post's mass shooting database](#) comes from Grant Duwe, author of "Mass Murder in the United States: A History," and [Mother Jones](#) in addition to [Washington Post](#) research.

EXHIBIT 7

Family of alleged gunman in El Paso massacre claims he was influenced 'by people we do not know'

The alleged gunman killed 22 people at a crowded El Paso Walmart on Saturday.

By **Bill Hutchinson**
August 7, 2019, 11:51 AM • 7 min read



El Paso, Gilroy shootings spark domestic terror concerns

The suspect who opened fire at the Gilroy Garlic Festival in California allegedly planned to target churches, religious groups, governments and political parties, officials said.

Callaghan O'Hare/Reuters

The family of a man who allegedly gunned down 22 people at a Walmart in El Paso and reportedly told investigators he intended to kill as many Mexicans as he could says he was "influenced and informed by people we do not know."

Patrick Crusius' relatives released a statement condemning the mass shooting, one of the deadliest in U.S. history, and praising first responders who "intervened to stop the devastation."



Top Stories

Family of alleged gunman in El Paso massacre claims he was influenced 'by people we do not know'



Aug 07, 11:51 AM

Leader of Iran's elite Quds Force killed in airstrike: Reports



21 minutes ago

'Affluenza teen' Ethan Couch arrested for probation violation



3 hours ago

Missing woman last seen leaving bar with 2 men, texted she was in trouble



Dec 27, 9:39 AM

What to know about the deadly Australia bushfires



Jan 02, 4:12 PM

ABC News Live



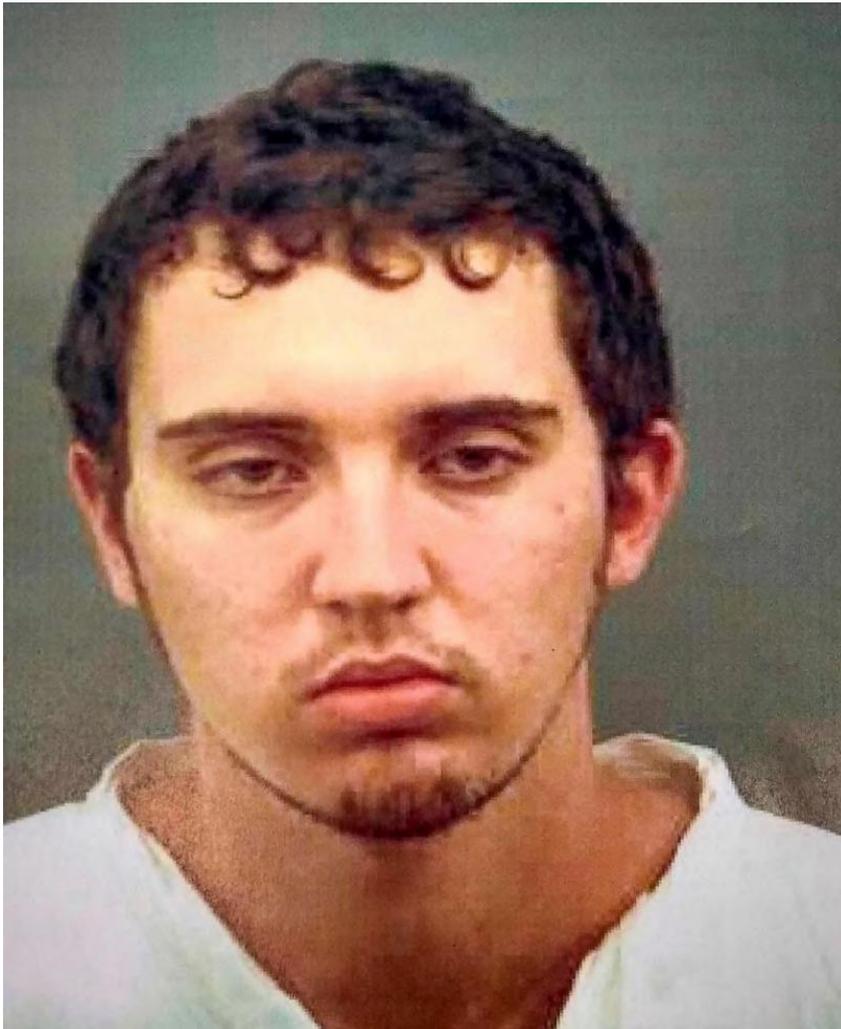
24/7 coverage of breaking news and live events

Family of alleged gunman in El Paso massacre claims he was influenced by people we do not know - ABC News
People gather to pay their respects at a growing memorial three days after a mass shooting at a Walmart store in El Paso, Texas, August 6, 2019.
Callaghan O'Hare/Reuters

"Patrick's actions were apparently influenced and informed by people we do not know, and from ideas and beliefs that we do not accept or condone, in any way," the family said in a statement released Tuesday night. "He was raised in a family that taught love, kindness, respect, and tolerance -- rejecting all forms of racism, prejudice hatred, and violence. There will never be a moment for the rest of our lives when we will forget each and every victim of this senseless tragedy."

One week after his 21st birthday, Crusius allegedly drove more than 650 miles to El Paso from his suburban Dallas home, allegedly bent on targeting Mexicans, authorities said. El Paso is about five miles from the U.S.-Mexico border.

The majority of those [killed in the rampage](#) were either Mexican nationals or Mexican-Americans. At least two dozen people were injured in the shooting.



Patrick Crusius in a photo provided by the FBI.
FBI via AP

The mass shooting came one day before another alleged gunman, identified by police as 24-year-old Connor Betts, [killed nine people and](#)

wounded dozens more in an entertainment district in Dayton, Ohio. The shooting occurred approximately a week after a gunman killed three people, including two children, at the Gilroy Garlic Festival in Northern California.

Crusius was arrested shortly after the attack and charged with capital murder. Federal authorities are handling the case as a "domestic terrorism" incident and said they could seek federal hate-crime and weapons charges that carry the death penalty.

Investigators say they suspect Crusius is the same person who authored a rambling screed posted on the controversial online message board 8chan before allegedly launching the rampage, saying the massacre was in response to an "invasion" of Hispanics coming across the southern border and railing against the dangers of mass immigration.

In their statement, Crusius' family did not address whether he shared similar anti-immigrant sentiments with them.

+ (MORE: Victims of the Dayton and El Paso shooting remembered: 'I'm just speechless')

"Since learning of the events in El Paso this past Saturday morning, we have been and are focused on the lives lost, those struggling in their recovery, and the countless families and friends of those affected by this atrocity," the family said. "We also know that the destruction Patrick did is not limited to the victims and their families. It touches the entire El Paso and Ciudad Juarez communities, the State of Texas and this country."



The names of the shooting victims adorn a makeshift memorial at the Cielo Vista Mall Walmart in El Paso, Texas, on August 6, 2019. Mark Ralston/AFP/Getty Images

+ (MORE: Suspected Dayton shooter's family is 'shocked and devastated by' the shooting)

They added, "We appreciate, more than words can express, the dedication of those who intervened to stop this devastation – especially the brave men and women in law enforcement, all the other first responders, and ordinary

citizens of who courageously rushed to aid those in danger. We likewise wish to thank the medical community who brought to bear all available resources to aid those in desperate need. The selflessness and devotion to total strangers in the face of indescribable suffering is something that we deeply respect and admire.

+ (MORE: Trump paints Dayton shooter as liberal sympathizer as he heads to Ohio, Texas)

"We issue this statement to reflect our family's position about what has transpired," the statement continued. "We do not plan to make further public comment, at this time. Our hope and prayer now is that the collective focus will be with those who are attempting to grieve and heal."

Investigators said Crusius carried out the attack using a 7.62-caliber AK-47 style assault rifle that he legally purchased near his hometown of Allen, Texas.

Law enforcement officials told ABC News the suspect cased the Walmart to size up the clientele before leaving the store and allegedly returning with his gun and launching the deadly rampage.

 Comments (15)



EXHIBIT 8

Mass Shootings in the US Fast Facts

CNN Library



Photos: Worst mass shootings in the United States

Parents wait for news after a shooting at Marjory Stoneman Douglas High School in Parkland, Florida Wednesday, February 14. [At least 17 people were killed at the school](#), Broward County Sheriff Scott Is said. The suspect, 19-year-old former student Nikolas Cruz, is in custody, the sheriff said. The sheriff s was expelled for unspecified disciplinary reasons.

1 of 21

Hide Ca

(CNN) — Here is a list of the deadliest mass shootings in modern US history (1949 to present).

Suicides, gang-related incidents and deaths resulting from domestic conflicts are not included. "Deadliest" includes shootings with 10 or more fatalities. Shooters are not included in fatality totals.

Because there is no universal definition of mass shootings or central database tracking them, this list is based primarily on media reports and may not be complete or representative of all mass shootings.

Events:

58 killed - October 1, 2017 - In Las Vegas, [64-year-old Stephen Paddock](#) of Mesquite, Nevada, [sprays gunfire on a crowd of 22,000 concertgoers from the 32nd floor of the Mandalay Bay Resort and Casino](#), killing 58 people and

49 killed - June 12, 2016 - Omar Saddiqui Mateen, 29, opens fire inside Pulse, a gay nightclub, in Orlando. [At least 49 people are killed](#) and more than 50 are injured. Police shoot and kill Mateen during an operation to free hostages officials say he was holding at the club.

32 killed - April 16, 2007 - [Virginia Tech in Blacksburg, Virginia](#). A gunman, 23-year-old student Seung-Hui Cho, goes on a shooting spree killing 32 people in two locations and wounding an undetermined number of others on campus. The shooter dies by suicide.

27 killed - December 14, 2012 - [Sandy Hook Elementary School](#) - Newtown, Connecticut. Adam Lanza, 20, guns down 20 children, ages six and seven, and six adults, school staff and faculty, before turning the gun on himself. Investigating police later find Nancy Lanza, Adam's mother, dead from a gunshot wound.

25 and an unborn child killed - November 5, 2017 - [A gunman opens fire on a small church in Sutherland Springs, Texas, killing 25 people and an unborn child and wounding 20 others](#). The shooter, identified by two law enforcement sources as Devin Patrick Kelley, is found dead after a brief chase, but it's unclear if it was self-inflicted.

23 killed - October 16, 1991 - In Killeen, Texas, 35-year-old George Hennard crashes his pickup truck through the wall of a Luby's Cafeteria. After exiting the truck, Hennard shoots and kills 23 people. He dies by suicide.

22 killed - August 3, 2019 - In El Paso, [Texas 22 people are killed after a mass shooting at a Walmart store](#) in a case that's being treated as [domestic terrorism](#). Police say they found an anti-immigrant document espousing white nationalist and racist views, which they believe was written by the suspect, 21-year-old Patrick Crusius. He may face hate crime charges in addition to capital murder charges.



21 killed - July 18, 1984 - In San Ysidro, California, 41-year-old James Huberty, armed with a long-barreled Uzi, a pump-action shotgun and a handgun, shoots and kills 21 adults and children at a local McDonald's. A police sharpshooter kills Huberty one hour after the rampage begins.

Related Video: Mass shootings up; murder rate down 02:52

18 killed - August 1, 1966 - In Austin, Texas, Charles Joseph Whitman, a former US Marine, kills 16 and wounds at least 30 at the University of Texas while shooting from a tower. Police officers Ramiro Martinez and Houston McCoy shoot and kill

Whitman in the tower. Whitman had also killed his mother and wife earlier in the day.

17 killed - February 14, 2018 - [A former student unleashes a hail of gunfire at Marjory Stoneman Douglas High School in Parkland, Florida](#), killing at least 17 adults and children. Nikolas Cruz, 19, has been charged with 17 counts of premeditated murder.

14 killed - December 2, 2015 - Married couple Syed Rizwan Farook and Tashfeen Malik open fire on an employee gathering taking place at Inland Regional Center in San Bernardino, California, [killing 14 people](#). They are later killed in a shootout with police.

14 killed - August 20, 1986 - In Edmond, Oklahoma, Patrick Henry Sherrill, a part-time mail carrier armed with three handguns, kills 14 postal workers in 10 minutes and then takes his own life.

13 and an unborn child killed - November 5, 2009 - [Maj. Nidal Malik Hasan kills 13 people and one unborn child and injures 32 at Fort Hood, Texas](#), during a shooting rampage. He is convicted and sentenced to death.

13 killed - April 3, 2009 - In Binghamton, New York, Jiverly Wong kills 13 people and injures four during a shooting at an immigrant community center. He then kills himself.

13 killed - February 18, 1983 - Three men enter the Wah Mee gambling and social club in Seattle, rob the 14 occupants and then shoot each in the head, killing 13. Two of the men, Kwan Fai Mak and Benjamin Ng, are convicted of murder in August 1983. Both are serving life in prison. The third, Wai-Chiu "Tony" Ng, after years on the run in Canada, is eventually convicted of first-degree robbery and second-degree assault. He is deported to Hong Kong in 2014.

13 killed - September 25, 1982 - In Wilkes-Barre, Pennsylvania, 40-year-old prison guard George Banks kills 13 people including five of his own children. In September 2011, the Pennsylvania Supreme Court overturns his death sentence, stating that Banks is mentally incompetent.

13 killed - September 5, 1949 - In Camden, New Jersey, 28-year-old Howard Unruh, a veteran of [World War II](#), shoots and kills 13 people as he walks down Camden's 32nd Street using a German-crafted Luger pistol. He is found insane and is committed to a state mental institution. He dies at the age of 88.

12 killed - May 31, 2019 - [A shooter opens fire indiscriminately on a Virginia Beach city building, killing 12 people and injuring at least four others.](#) The shooter dies at the scene after a gunfight with police. The gunman, later identified as 40-year-old DeWayne Craddock, was a certified professional engineer in the city's public utilities department for 15 years and had [emailed a resignation letter that morning, citing "personal reasons."](#)

12 killed - November 7, 2018 - [Twelve people are killed in a shooting at the Borderline Bar & Grill](#) in Thousand Oaks, California. Officials say the gunman, Ian David Long, shot an unarmed security guard outside the bar, then went in and continued shooting, injuring other security workers, employees and patrons. Long dies by suicide.

12 killed - September 16, 2013 - Shots are fired inside the Washington Navy Yard, killing 12. The shooter, identified as Aaron Alexis, 34, is also killed.

12 killed - July 20, 2012 - [Twelve people are killed, and 58 are wounded in a shooting at a screening of the new Batman film in Aurora, Colorado.](#) James E. Holmes, 24, dressed head-to-toe in protective tactical gear, sets off two devices of some kind before spraying the theater with bullets from an AR-15 rifle, a 12-gauge shotgun and at least one of two .40-caliber handguns police recovered at the scene. On July 16, 2015, Holmes is found guilty on all 165 counts against him, 24 first-degree murder, 140 attempted murder and one count of possession or control of an explosive or incendiary device. He is sentenced to life in prison without parole.

12 killed - July 29, 1999 - In Atlanta, 44-year-old Mark Barton kills his wife and two children at his home. He then opens fire in two different brokerage houses, killing nine people and wounding 12. He later kills himself.

11 killed - October 27, 2018 - [Eleven people are killed in a shooting at the Tree of Life synagogue](#) in the Squirrel Hill neighborhood of Pittsburgh. 46-year-old Robert Bowers surrenders to authorities on the third floor of the building and is now facing federal charges, including hate crimes. [Bowers told a SWAT officer while receiving medical care that he wanted all Jews to die](#) and that Jews "were committing genocide to his people," a criminal complaint filed in Allegheny County says.

10 Killed - May 18, 2018 - Dimitrios Pagourtzis, 17, allegedly walks into an art class and begins firing, killing [eight students and two teachers](#) at Santa Fe High School in Santa Fe, Texas. [Pagourtzis is arrested](#) and charged with capital murder and aggravated assault of a public servant.

10 killed - March 10, 2009 - In Alabama, [Michael McLendon](#) of Kinston, kills 10 and himself. The dead include his mother, grandparents, aunt and uncle.

Sources: *CNN, Washington Post, New York Times, Hartford Courant (Connecticut), Patriot News (Pennsylvania), Long Beach Press--Telegram (California), Richmond Times--Dispatch (Virginia), Fayetteville Observer (North Carolina), Omaha World-Herald (Nebraska), Los Angeles Times, Chicago Tribune, Arizona Republic*



- US
- World
- Politics
- Business
- Opinion
- Health
- Entertainment
- Tech
- Style
- Travel
- Sports
- Videos
- Coupons
- More



FOLLOW CNN



[Terms of Use](#)
[Privacy Policy](#)
[Do Not Sell My Personal Information](#)
[AdChoices](#)
[About Us](#)
[CNN Studio Tours](#)
[CNN Store](#)
[Newsletters](#)
[Transcripts](#)
[License Footage](#)
[CNN Newsource](#)
[Sitemap](#)

© 2019 Cable News Network. Turner Broadcasting System, Inc. All Rights Reserved.
 CNN Sans™ & © 2016 Cable News Network.

EXHIBIT 9

-12 School Shooting Database

DOTING INCIDENTS GRAPHS 2010-PRESENT

INCIDENTS BY INJURIES AND FATALITIES ANNUALLY

used on publicly available data from 2010-present

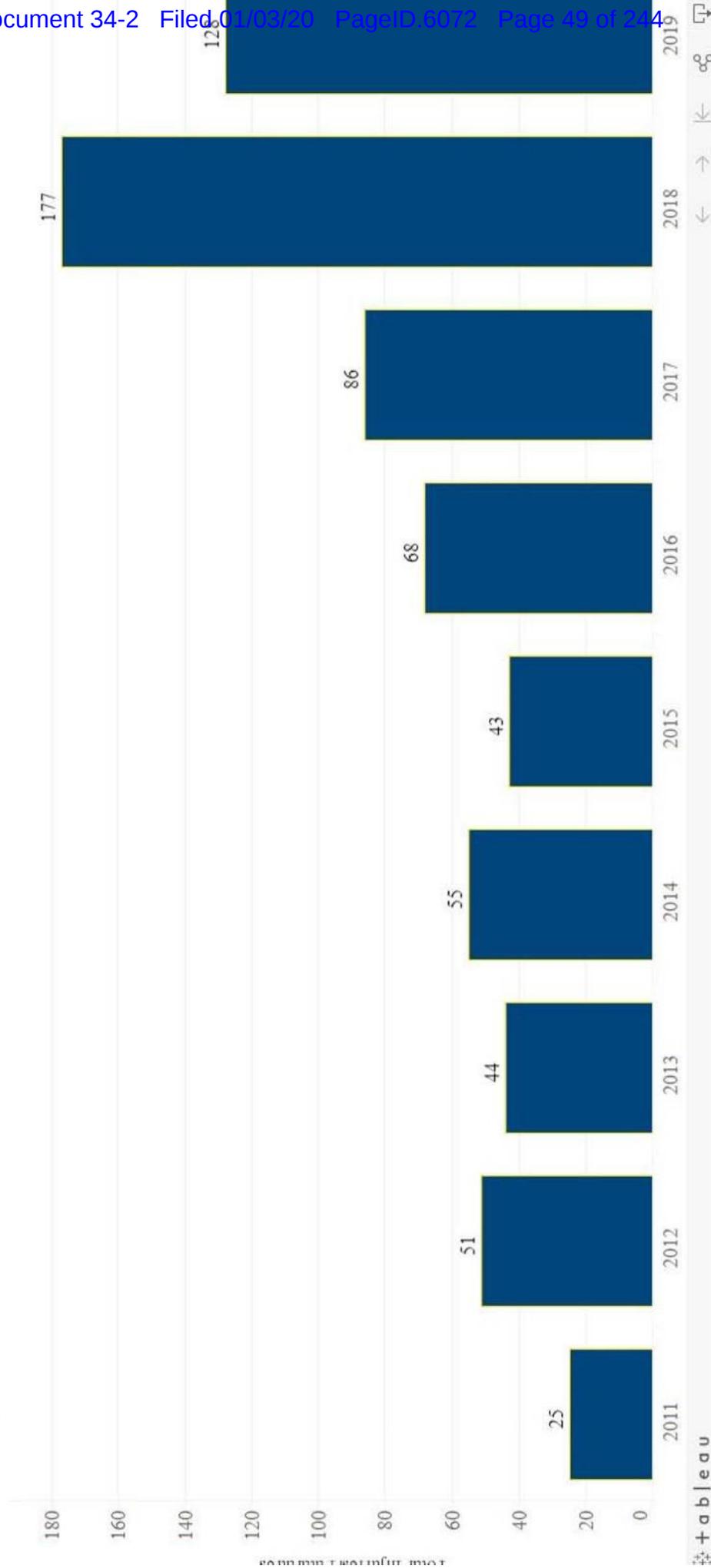


EXHIBIT 10



K-12 School Shooting Database

SHOOTING INCIDENTS GRAPHS 2010-PRESENT

INCIDENTS BY AGE OF SHOOTER

Based on publicly available data from 2010-present

Date
Last 10 years

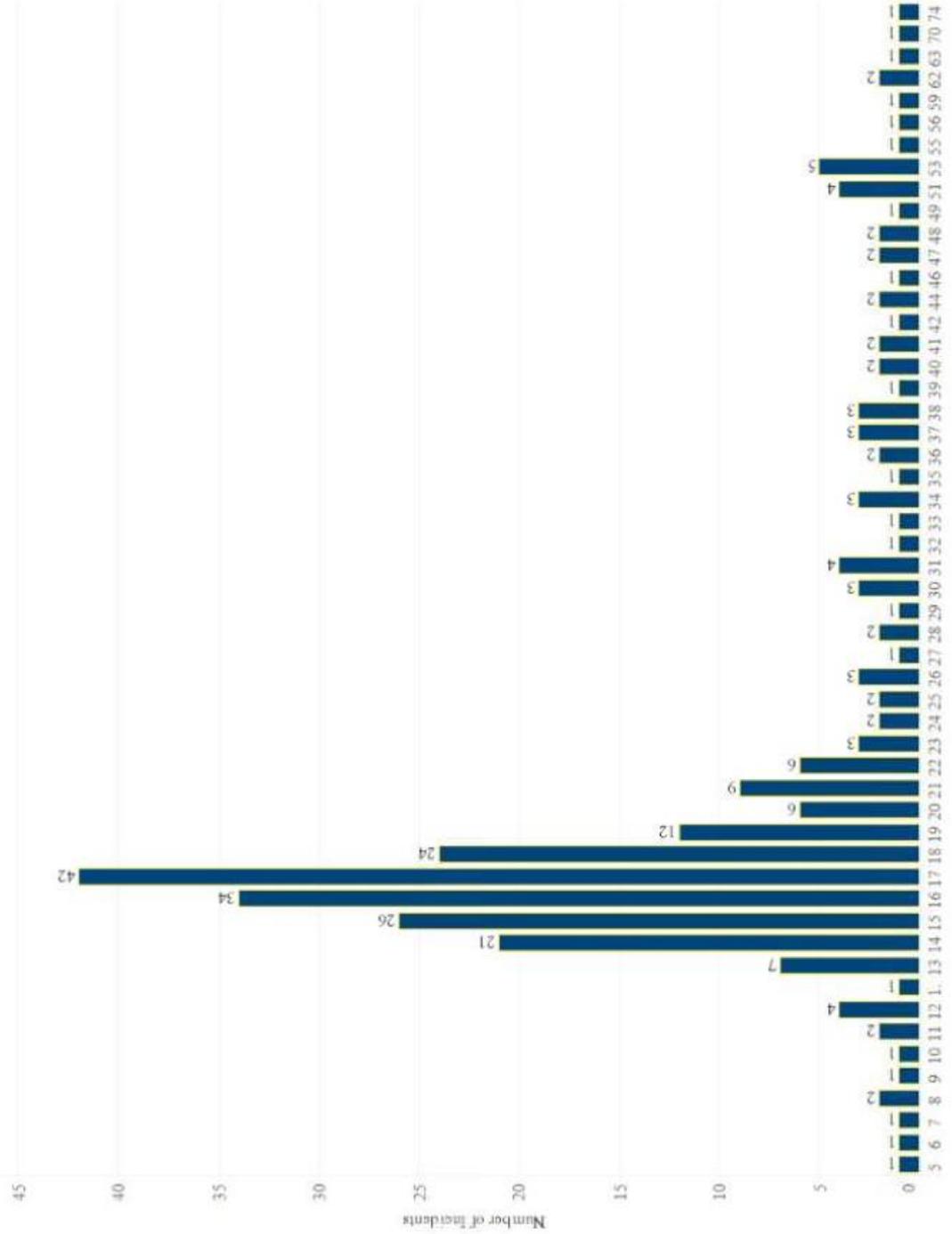


EXHIBIT 11

Youth Violence: What We Know and What We Need to Know

Brad J. Bushman

The Ohio State University and VU University Amsterdam

Katherine Newman

University of Massachusetts, Amherst

Sandra L. Calvert
Georgetown University

Geraldine Downey
Columbia University

Mark Dredze
Johns Hopkins University

Michael Gottfredson
University of California, Irvine

Nina G. Jablonski
The Pennsylvania State University

Ann S. Masten
University of Minnesota

Calvin Morrill
University of California, Berkeley

Daniel B. Neill
Carnegie Mellon University

Daniel Romer
University of Pennsylvania

Daniel W. Webster
Johns Hopkins University

School shootings tear the fabric of society. In the wake of a school shooting, parents, pediatricians, policymakers, politicians, and the public search for “the” cause of the shooting. But there is no single cause. The causes of school shootings are extremely complex. After the Sandy Hook Elementary School rampage shooting in Newtown, Connecticut, we wrote a report for the National Science Foundation on what is known and not known about youth violence. This article summarizes and updates that report. After distinguishing violent behavior from aggressive behavior, we describe the prevalence of gun violence in the United States and age-related risks for violence. We delineate important differences between violence in the context of rare rampage school shootings, and much more common urban street violence. Acts of violence are influenced by multiple factors, often acting together. We summarize evidence on some major risk factors and protective factors for youth violence, highlighting individual and contextual factors, which often interact. We consider new quantitative “data mining” procedures that can be used to predict youth violence perpetrated by groups and individuals, recognizing critical issues of privacy and ethical concerns that arise in the prediction of violence. We also discuss implications of the current evidence for reducing youth violence, and we offer suggestions for future research. We conclude by arguing that the prevention of youth violence should be a national priority.

Keywords: aggression, violence, rampage shooting, school shooting, street shooting

Brad J. Bushman, School of Communication and Department of Psychology, The Ohio State University, and Department of Communication Science, VU University Amsterdam; Katherine Newman, Department of Sociology, University of Massachusetts, Amherst; Sandra L. Calvert, Department of Psychology and Children’s Digital Media Center, Georgetown University; Geraldine Downey, Department of Psychology and Center for Justice, Columbia University; Mark Dredze, Department of Computer Science, Johns Hopkins University; Michael Gottfredson, Department of Criminology, Law, and Society, University of California, Irvine; Nina G. Jablonski, Department of Anthropology, The Pennsylvania State University; Ann S. Masten, Institute of Child Development, University of Minnesota; Calvin Morrill, School of Law and Department of Sociology, University of California, Berkeley; Daniel B. Neill, Event and Pattern Detection Laboratory, H. J.

Heinz III College, Carnegie Mellon University; Daniel Romer, Adolescent Communication Institute of the Annenberg Public Policy Center, University of Pennsylvania; Daniel W. Webster, Center for Gun Policy and Research, Johns Hopkins University.

We would like to thank Rolf Loeber and Lia Ahonen for their helpful comments on an earlier draft of this paper. This research was partially funded by National Science Foundation Grant “Workshop on Youth Violence” (BCS-1322155). The views expressed in this article do not necessarily reflect those of the National Science Foundation.

Correspondence concerning this article should be addressed to Brad J. Bushman, School of Communication, The Ohio State University, 3016 Derby Hall, 154 North Oval Mall, Columbus, OH 43210-1339. E-mail: bushman.20@osu.edu

We cannot tolerate this anymore. These tragedies must end. And to end them, we must change. We will be told that the causes of such violence are complex, and that is true. No single law—no set of laws can eliminate evil from the world, or prevent every senseless act of violence in our society. But that cannot be an excuse for inaction. Surely, we can do better than this. If there is even one step we can take to save another child, or another parent, or another town . . . then surely we have an obligation to try.

—President Barack Obama, Interfaith Prayer Vigil, Newtown High School, Newtown, Connecticut, December 16, 2012

President Obama made these remarks 2 days following the Newtown, Connecticut, shooting, in which a 20-year-old man first killed his mother and then went to a nearby elementary school in Newtown and killed 20 children and six staff members before killing himself. In the wake of the Newtown shooting, the National Science Foundation (NSF), at the request of Representative Frank Wolf (Republican-Virginia), assembled an advisory committee to the NSF Social, Behavioral, and Economic Sciences Division to summarize key evidence on youth violence, focusing particularly on school rampage shootings, but also on other forms of youth violence. The first two authors of this article assembled a team of experts to write an advisory report on what we know and what we need to know about youth violence. The 12 authors of this article met and completed that report early in 2013 (Bushman et al., 2013). This article is based on our conclusions, augmented by additional evidence. We also discuss the implications of the findings on youth violence for prevention, public policy, and future research.

Defining Violence

In contrast to aggression, usually defined as any behavior intended to harm another person who does not want to be harmed, violence is usually defined as aggression with the goal of extreme physical harm, such as injury or death (Bushman & Huesmann, 2010). For example, one youth spreading rumors about a peer is an act of aggression but is not an act of violence. One youth hitting, kicking, shooting, or stabbing a peer is an act of violence. Thus, all violent acts are aggressive, but not all aggressive acts are violent—only those designed to cause extreme physical harm are violent.

Why Focus on Youth Violence?

Youth violence includes violent acts committed by young people who are not viewed as fully mature. “Youth” often includes young people who are legally adults. For example, the 2014 report by the Center for Disease Control and Prevention (CDC, 2014) titled “Preventing Youth Violence:

Opportunities for Action” includes data on 10- to 24-year-olds (David-Ferdon & Simon, 2014). We use the same age range for this article, but concentrate on 15- to 24-year-olds.

Incidents of violence increase in frequency during adolescence and early adulthood for a subset of individuals, and then rapidly and continuously decrease throughout life (Loeber & Farrington, 2012). A disproportionate amount of violent crime in the United States is committed by 15- to 24-year-olds (Federal Bureau of Investigation, 2013). More U.S. youth die from homicide each year than from cancer, heart disease, birth defects, flu and pneumonia, respiratory diseases, stroke, and diabetes combined (David-Ferdon & Simon, 2014).

U.S. youth perpetrate and experience very high rates of violence compared to youth from many other developed nations (David-Ferdon & Simon, 2014). For example, youth homicide rates are 3 to 40 times higher than rates in similarly high-income countries (David-Ferdon & Simon, 2014, p. 8). Youth violence disproportionately affects males and youth from ethnic/racial minority groups, although rates vary for different kinds of violence.

Two Distinct Types of Youth Gun Violence

Violent rampage shootings in schools differ in dramatic ways from street shootings (or “street violence”) commonly associated with U.S. inner cities. Table 1 summarizes major descriptive differences between these two types of youth violence, which will be discussed further.

School Rampage Shootings

The Newtown school tragedy joined a small but growing list of rampage shootings committed by youth in schools, but also in other public places (e.g., movie theaters, shopping malls, supermarkets). The scale of the loss when these events happen is so devastating and apparently random that the public and the nation’s legislators are seeking answers to questions about causes and potential prevention measures. Yet because these events are rare, most of the evidence on the features of rampage shooters is based on intensive case history studies as well as analyses of databases such as the School-Associated Violent Deaths maintained by the CDC (2014) on school-related homicides. This review relies primarily upon an in-depth study of all school shootings from 1974 through 2001 (Newman, Fox, Harding, Mehta, & Roth, 2004), and a review of research on school shootings through 2011 (Rocque, 2012).

Newman and her colleagues (2004) interviewed 163 people in two sites that experienced extensive injury and deaths in school mass shootings: Heath, Kentucky, and Westside, Arkansas. The team also analyzed all newspaper accounts of every rampage school shooting in the United States from 1974 to 2002, which amounted to 25 incidents involving 27



Brad J. Bushman

attackers. Based on these materials, they developed a framework for characterizing shooting rampages. They then assessed this framework against the CDC database (CDC, 2014; annual reports of school homicides and suicides that included 12 incidents with 19 attackers from 1994 to 1999), the Secret Service's Safe School Initiative (Vossekuil, Fein, Reddy, Borum, & Modzeleski, 2002; 37 incidents with 41 attackers from 1974 to 2000), case studies from the National Academy of Sciences report *Deadly Lessons: Understanding Lethal School Violence* (Moore, Petrie, Braga, & McLaughlin, 2003; 45 incidents from 1974 to 2001), and the *Columbine Review Commission Report* (Erickson, 2001). We also use a review of additional evidence on the prevalence and nature of school rampage shootings based on 22 incidents with 24 attackers and data extending to the 2008–2009 school year (Rocque, 2012). These cases represented a total of 85 incidents from 1974 to 2008. Based on these sources, some common factors emerge.

School shootings typically occur in stable, close-knit, low-crime, small rural towns or suburbs (92% of the incidents in Newman et al., 2004, study). The school shooter generally is a White adolescent male (85% in the Newman et al., 2004, study and 76% in the Secret Service study, Vossekuil et al., 2002), with little history of disciplinary problems (63% never in trouble in the Secret Service study). Perpetrators often have average or better than average intelligence and academic achievement (41% mostly As and Bs, only 2% failing in the Secret Service study). School shooters are commonly assumed to be loners, but ethnographic and archival research indicates otherwise (e.g., only 34% were classified as “loners” in the Secret Service study). Usually, school shooters are boys with a history of trying to

join peer groups, but find themselves socially marginalized. In their analysis of media reports of school shootings, Newman and her colleagues found that 78% of school shooters were socially marginalized. In the CDC database, 84% of school shooters were described by principals or law enforcement officials as “wannabees,” “gothic,” “geeks,” and so forth. The Secret Service (Vossekuil et al., 2002) found that 27% of the school shooters “socialized with peers who were either disliked by mainstream students or were “considered part of a ‘fringe’ group” (p. 20).

Individual vulnerabilities that accentuate the difficulties of coping with social marginalization often are evident. Although school shooters often have no documented history of medical treatment for mental disorders, both media accounts and other studies indicate a variety of signs of early stage onset of mental illness, including depression and suicidality (see also Langman, 2009). For example, in the Secret Service study (Vossekuil et al., 2002), 61% of the perpetrators experienced feelings of severe depression and 78% considered or attempted suicide prior to the shooting. It is important to note, however, that millions of adolescents who feel depressed or consider or attempt suicide never become school shooters.

In almost half of the 37 school shooting incidents studied by the Secret Service, “attackers were influenced or encouraged by others” (Vossekuil et al., 2002, p. 64), and police sometimes considered charging these “bystanders” as co-conspirators. But this rarely transpires because the evidence of actual collaboration is weak, and bystanders say they thought the killer was only engaging in “fantasy talk.” Newman et al. (2004) were only able to identify one case in which a bystander was charged.

Many high school shooters manifest intense interest in guns prior to the shooting incident. In the Secret Service study (Vossekuil et al., 2002), 63% of the shooters had a known history of weapons use. These youth often get guns from their parents. The percent of guns obtained from home or a relative was 68% in the Secret Service study, 67% in the Newman et al. (2004) study, and 53% in the CDC study. High school shooters growing up in rural small towns had experience with the use of guns because they lived in communities where hunting has been part of local culture (Newman et al., 2004, p. 69). Older rampage shooters, such as college students, typically turn to the Internet, gun shows, and other means of legal acquisition of guns (Newman & Fox, 2009).

Rampage shooters also often kill themselves after killing as many victims as they can (Vossekuil et al., 2002; Everytown for Gun Safety, 2014; Fast, 2008). In a study of recent mass shootings, 43% of perpetrators committed suicide during the incident (Everytown for Gun Safety, 2014). In comparison, less than 0.001% of all homicides also involve suicides (Eliason, 2009). What distinguishes perpetrators of murder-suicide, an extremely rare event, from those who



**Katherine
Newman**

commit suicide is suicidal ideation co-occurring with hostile ideation reflecting long-standing resentments toward others (e.g., [Vossekuil et al., 2002](#)). This combination likely helps explain why people who commit homicide followed by suicide tend to leave more homicide victims than those who only commit homicide ([CDC, 2012](#)). Some of the case studies of rampage shooters suggest that killing multiple victims prior to suicide may be a way of achieving fame and notoriety as their final statement ([Newman et al., 2004](#)). Moreover, the intense media coverage surrounding rampage shootings may provide scripts for youth with suicidal-homicidal ideation. Based on an analysis of suicides following reports of suicides in the news, [Romer, Jamieson, and Jamieson \(2006\)](#) concluded that approximately 10% of suicides among individuals aged 15 to 24 years were attributable to press coverage of public acts of suicide. Coverage of murder-suicides may be especially likely to elicit contagion ([Stack, 1989](#)).

The evidence we summarize points to the conclusion that a school shooting itself may be a symbolic event directed at the school as an institution rather than specific individuals and is, as one writer described, “theatrical, tragic, and pointless” ([Fast, 2008](#), p. 11). School shooters generally do not personally know anyone who has killed before, and they are not imitating individuals they know, but may be imitating other rampage shooters or media characters.

Street Shootings

The database for street violence comes from decades of social science research. In contrast to school shooters, “street shooters” more commonly live in densely populated

areas with high crime levels, low social trust levels, and poverty rates reaching beyond 40% ([Harding, 2010](#); [Sampson, 2012](#)). In one study, for example, a Boston, Massachusetts, neighborhood with these characteristics accounted for 10% of the city’s homicides over a 2-year period, even though it only contained 2% of the city’s population ([Harding, 2010](#), p. 28).

Although structural factors are important for predicting the incidence of urban street shootings, researchers note that even in the most violent of neighborhoods, a small minority of youth commit the vast majority of violent acts ([Harding, 2010](#); [Jones, 2010](#)). These youth often have inordinately strong loyalties to their neighborhood “turfs,” and are engaged in contests of will with known antagonists. Street shootings are rarely random acts of violence, but instead aim to hurt or kill individuals they know, often because they perceive themselves or their group to be in danger and in need of protection ([Fagan & Wilkinson, 1998](#); [Rios, 2011](#)).

Another difference between school shooters and street shooters is where they obtain weapons. Data from a nationally representative sample of people in state prison indicate that individuals incarcerated for crimes committed when they were younger than 18 years old most commonly obtain them from “street or black market” sources (47%) or receive them from a friend or family members (38%). Because transferring a handgun to a juvenile is illegal in almost all contexts, and only 13% of youth reported theft as their means of gun acquisition, the vast majority of street shooters are armed via illegal transactions ([Webster, Freed, Fratrotoli, & Wilson, 2002](#); [Webster, Meyers, & Buggs, 2014](#)). In addition, street shooters rarely commit suicide after shooting others ([Harding, 2010](#)).

Risk and Protective Factors for Youth Violence

When youth use guns to kill others, it is only natural for citizens and policymakers to seek to identify “the” cause. However, as President Obama noted, violent behavior is very complex. Evidence, as well as theories about the causes of youth violence, implicate multiple influences occurring in complex combinations over differing time scales (from distal to immediate) that lead to acts of violence (e.g., [David-Ferdon & Simon, 2014](#)). Notwithstanding this complexity, there is considerable interest in identifying key risk and protective factors for youth violence, and particularly those influences that may be malleable.

Following the Newtown shooting, Congress and the media focused on three risk factors for school shootings: (a) access to guns, (b) exposure to violent media, and (c) mental health. However, these are only three of a host of possible risk factors for youth violence. The [Report of the Office of the Child Advocate for the State of Connecticut \(2014\)](#) of the Sandy Hook shooting also focused on mental health and access to guns, but additionally underscored numerous other



**Sandra L.
Calvert**

risks, misunderstandings, and inadequate supports in the life of the shooter leading up to the Sandy Hook killings. The 2014 CDC youth violence report also summarized numerous risk and protective factors, noting that there has been more attention to risk than protective influences, although both are important in determining violent behavior (David-Ferdon & Simon, 2014).

In this article, we consider multiple risk and protective factors implicated by the literature on youth violence, drawing on those that appear early in development (e.g., family abuse and neglect) and those that are more relevant during adolescence (e.g., access to guns). Our list is certainly not exhaustive. We assume that whether a violent act occurs results from interactions among many individual and contextual factors. Although many characteristics associated with youth violence apply to both school and street shooters, some may not. We note wherever possible how individual and contextual risk factors may differ for school and street shooters.

Longitudinal studies of youth development have identified an early and stable trajectory of youth antisocial behavior, including tendencies toward the use of violence. These studies indicate that characteristics of the parents, their child, and the social environment play a substantial role in the development and course of this trajectory (e.g., Moffitt et al., 2011; Odgers et al., 2008; Zheng & Cleveland, 2013). It is also noteworthy that this stable trajectory typically includes less than 15% of youth, and that even within this group violence is not a universal behavior. Indeed, most youth do not engage in antisocial or more extreme violent behaviors. A second frequently observed

antisocial trajectory arises later in adolescence, but tends to be less prone to violence (e.g., Odgers et al., 2008).

Family Influences

Families appear to play multiple roles that may increase or decrease the risk of youth violence. Many of the best-established risk factors for youth violence are based in the family, including harsh and rejecting parents, interparental violence, child abuse and neglect, chaotic family life, inconsistent discipline, and poor monitoring by parents of children showing early signs of aggression (Dodge, Greenberg, & Malone, 2008; Loeber & Farrington, 1998, 2012; Lösel & Farrington, 2012; Stoddard et al., 2013). Risk factors for youth violence often co-occur and also predict multiple negative outcomes in addition to violence, including related antisocial behaviors, substance abuse, mental health problems, and health-risk behaviors. Evidence on factors associated with *lower* risk for youth violence often implicate similar factors, including close attachment bonds with consistently supportive caregivers, effective and developmentally sensitive parenting (including consistent disciplinary practices and monitoring), and families operating in ways that children experience as safe, stable, well-managed, and well-regulated (e.g., David-Ferdon & Simon, 2014; Loeber & Farrington, 1998, 2012).

Neurobiological Factors

Neurobiological risk factors have long been implicated in youth violence. These include neurocognitive deficits, perinatal complications, genetic risks, and psychophysiological differences (e.g., low resting heart rate), among others (Glenn & Raine, 2014). There is now a greater understanding about how chronic and traumatic stress resulting from adverse childhood experiences (e.g., family violence and conflict, child physical abuse and neglect, sexual abuse, traumatic separation from caretakers) can shape the development and functioning of the hypothalamic-pituitary-adrenocortical axis in ways that compromise adaptive responses to stress (Lupien, McEwen, Gunnar, & Heim, 2009). Research using animal models is shedding light on how the development of the hypothalamic-pituitary-adrenocortical axis is associated with aggression and impulsiveness in humans (Veenema, 2009). There is also emerging evidence of gene-environment interaction effects in humans that alter the developing brain in ways that moderate the risk of antisocial outcomes, including violence (Caspi et al., 2002; Dodge, 2009).

Academic Achievement

Data from multiple longitudinal studies suggest that school readiness and academic achievement during the school years, along with school engagement, predict *lower*



**Geraldine
Downey**

rates of urban youth violence (e.g., Herrenkohl, Lee, & Hawkins, 2012; Resnick, Ireland, & Borowsky, 2004). For example, in the National Longitudinal Study of Adolescent Health (Resnick et al., 2004), boys with a grade point average (GPA) in the top quartile (high GPA) at Time 1 (students in Grades 7 to 11) had a 26.6% probability (15.2% for girls) of reporting any Time 2 violent behavior (about 11 months later) compared to 43.9% of the boys (27.9% of the girls) in the bottom quartile (low GPA). Among boys in this study with multiple risk factors for violence, those with higher GPAs had a predicted probability of 52.6% (38.8% for girls) for falling in the top quintile of violent behavior compared to a probability of 70.5% (60.8% for girls) for those with lower GPAs. Such findings may reflect a variety of cognitive and emotional self-control skills associated with school readiness and success, as well as the effectiveness of schools in engaging children and preventing dropout (Herrenkohl et al., 2012; Lösel & Farrington, 2012). Poor academic achievement does not appear to be a predictor of rampage shootings. If anything, rampage shooters often have average or better than average academic achievement levels (e.g., Vossekuil et al., 2002).

Personality Traits and Individual Differences

One of the best predictors of future behavior is past behavior. Thus, it is not surprising that individuals who are characteristically aggressive or impulsive with difficulties in self-control are more likely to engage in later acts of aggression, violence, delinquency, and crime (e.g., Loeber & Farrington, 1998). Individual differences in self-control (the inverse of impulsivity) are among the strongest and

most consistent observed individual correlates of crime, delinquency, violence, and other problem behaviors (Gottfredson, 2005; Loeber & Farrington, 2012; Moffitt et al., 2011). For example, a study of a large birth cohort of males in New Zealand found that persons convicted of violent crimes scored significantly lower on measures of self-control than did those not convicted of violent crimes (d 's ranged from 0.5 to more than 1.0; Caspi et al., 1994). Another study found that low self-control was correlated with both psychological ($r = .47$) and physical ($r = .38$) bullying among adolescents (Moon & Alarid, 2015). Violent behavior often is short-sighted, producing little longer-term gain at the risk of considerable long-term cost for the perpetrator. Many acts of violence among urban youth erupt so suddenly that they seem to be nearly spontaneous (even to the offender, in hindsight). In contrast, rampage shootings tend to be planned and deliberate (Cornell et al., 2013; Newman et al., 2004).

Three other personality traits are broadly related to aggression and violence, the so-called Dark Triad of Personality—psychopathy, narcissism, and Machiavellianism (Paulhus & Williams, 2002). Psychopaths show a pervasive disregard for, and violation of, the rights of others. They are callous and unemotional individuals who mainly focus on obtaining their own goals, regardless of whether they hurt others in the process. A meta-analysis indicates that “callous-unemotional” traits that are the antithesis of empathy in youth are associated with more severe antisocial and aggressive behavior ($r = .33$; Frick, Ray, Thornton, & Kahn, 2014). People high in narcissism have a grandiose sense of who they are and of the recognition and status to which they are entitled. When narcissists do not get the special treatment they think they deserve, they may lash out aggressively against others (e.g., Bushman & Baumeister, 1998). It is a common myth that violent people have low self-esteem (Baumeister, Smart, & Boden, 1996). One meta-analysis found that violent criminals had much higher levels of narcissism than other young men ($d = 1.63$; Bushman & Baumeister, 2002), but their self-esteem scores did not differ ($d = 0.0002$; Bushman & Baumeister, 2002). “Machiavellianism” refers to using any means necessary to get power, including manipulation, aggression and violence. Machiavellianism is positively related to bullying in school (e.g., $r = .33$ in a study by Andreou, 2004). Taken together, these three dispositional qualities embody the lack of empathy, sense of entitlement, and motivation to gain power that appear to facilitate involvement in violence. However, whether they are specific risk factors for either rampage shooting or street violence has yet to be established.

Exposure to Media Violence

Public debate on the link between violent media and youth violence can become especially contentious in the



Mark Dredze

wake of a shooting rampage. In many rampage shootings, the perpetrator puts on a uniform (e.g., hockey mask, trench coat, movie costume, military uniform), as if following a media script. The perpetrator then collects several guns and ammunition, goes to a public place, kills as many people as possible, and then often kills himself (or is killed by the police). It is tempting for some to conclude that violent media caused the shooting rampage. However, it is not possible to make causal inferences about the link between exposure to violent media and violent criminal behavior because it is unethical to conduct experimental studies in which research participants can commit violent crimes.

One can, however, draw causal inferences about the link between exposure to media violence and aggression. Hundreds of studies have shown that exposure to media violence is a significant risk factor for aggressive behavior in youth (e.g., for a meta-analytic review, see [Bushman & Huesmann, 2006](#); $d = 0.39$ for aggressive behavior across all studies), and experimental studies indicate that the link is causal. Studies also have shown that parents who set limits on the amount and content of children's media use provide a powerful protective factor against aggression. For example, one 1-year longitudinal study of 430 children 7- to 11-year-old children found that parental involvement in children's media consumption reduced the likelihood of getting into a fight from 44% to 35% ([Gentile & Bushman, 2012](#)).

Exposure to media violence is significantly related to violent criminal behavior, although the effects are smaller than for aggressive behavior. One meta-analysis included a violent outcome variable called "criminal violence against a person (e.g., homicide, suicide, stabbing, etc.)" ([Paik &](#)

[Comstock, 1994](#)). Across 58 studies (of all types), there was a significant effect of exposure to TV violence on criminal violence ($d = 0.20$; see also [Savage & Yancey, 2008](#), who found a similar effect of $d = 0.21$). Across 271 studies, there was a significant effect of TV violence exposure on "physical violence against a person (non-illegal behavior)" ($d = 0.47$; [Paik & Comstock, 1994](#)). Several longitudinal studies have shown that early repeated exposure to violent media predicts later aggressive and violent behavior, after controlling for early aggressive and violent behavior as well as other predictors, such as intelligence, poverty, and parenting style (e.g., [Huesmann, Moise-Titus, Podolski, & Eron, 2003](#)). However, it must be noted that millions of young Americans consume violent media and do not commit violent crimes.

There is a downward spiral between aggression, rejection, and consumption of violent media ([Slater, Henry, Swaim, & Anderson, 2003](#)). Specifically, aggressive youth tend to be rejected by nonaggressive peers, and therefore spend more time consuming violent media and associating with other aggressive youth (who have also been rejected by others), which, in turn, is associated with even more aggressive behavior.

According to psychoanalytic theory, exposure to media violence can act as a safety valve by releasing violent impulses into harmless channels through catharsis. However, scientific evidence contradicts the catharsis hypothesis (e.g., [Bushman, 2002](#); [Bushman, Baumeister, & Stack, 1999](#); [Geen & Quanty, 1977](#)). Another theory proposes that media violence may reduce violent crime by keeping young men off the street ([Dahl & DellaVigna, 2009](#)), but more evidence is needed before firm conclusions can be drawn.

Access to Guns

In the United States in 2011, 84% of homicide victims ages 15–24 were killed with guns ([National Center for Injury Prevention and Control, 2011](#)). The frequent involvement of guns in lethal youth violence, and the ability of guns to inflict more lethal wounds than other personal weapons, suggest that gun availability is an important cause of youth homicides. There are methodological challenges to making causal inferences about the positive association between gun availability and homicide risks ([National Research Council, 2005](#)); nonetheless, three types of evidence point in the direction of causation.

First, high levels of gun ownership and much more lax gun control laws in the United States likely make unsupervised access to handguns more available to youth within the United States compared with other high-income countries ([Richardson & Hemenway, 2011](#)). Second, a study comparing homicide rates across U.S. states, which controlled for other risk factors for lethal violence (e.g., economic and social resource deprivation, racial composition, alcohol use,



**Michael
Gottfredson**

rates of nonlethal violent crime), found that for every 1% increase in household gun ownership youth homicides committed with guns increased by 2.4% (Miller, Hemenway, & Azrael, 2007). It can be difficult to discern the independent effects of gun ownership from those of lax gun laws that make it easier for youth to access guns, because states with the highest prevalence of gun ownership typically have the most lax gun laws (Fleegler, Lee, Monuteaux, Hemenway, & Mannix, 2013). Both likely play a role in youth's unsupervised access to guns and associated risks for lethal violence (Webster, Vernick, & Bulzacchelli, 2009). Third, temporal changes in illegal gun availability to youth coincide with temporal changes in youth homicide. The extraordinary increase in youth homicides of young African American males that were committed with guns during the late 1980s and early 1990s mirrored trends in arrests for illegally carrying guns and deaths due to gun suicides and accidental shootings (Blumstein & Cork, 1996). Similarly, the dramatic reduction in juvenile-involved murders between 1994 and 1999 and leveling off since then has closely mirrored trends for juvenile arrests for weapons violations, almost all of which are for illegal possession of a gun (Snyder, 2011).

Young men may be particularly sensitive to cultural influences on masculinity in adolescence when they are physically maturing, particularly in the context of popular media that glorify violence and domination of others (Kimmel & Mahler, 2003). The least physically developed young boys may lose out in pecking orders that value height, big muscles, athletic prowess, and mature looks (Newman et al., 2004). Guns could become a great equalizer in this tournament of recognition (Harcourt, 2006). Whereas street sources and peers are common sources of guns for street

shooters, rampage school shooters who are ages 18 and younger tend to gain access to guns that are in their own households by stealing legal guns from their parents or other relatives (CDC, 2014; Newman et al., 2004; Vossekuil et al., 2002).

Alcohol and Other Drugs of Abuse

Alcohol and substance abuse have long been associated with risk for youth violence (e.g., Herrenkohl, Lee, & Hawkins, 2012; Loeber & Farrington, 2012; Whiteside et al., 2013). It has been a practice for centuries to issue soldiers alcohol before they go into battle, both to increase aggression and to decrease fear (Keegan, 1993). Recent accounts of child soldiers also describe the role of drugs in desensitizing children to extreme violence (Betancourt, Agnew-Blais, Gilman, Williams, & Ellis, 2010). Nevertheless, available data do not suggest a connection between rampage shootings and either intoxication or a history of substance abuse. There is little evidence that rampage shooters are on alcohol or drugs at the time they commit their acts (Cornell et al., 2013; Newman et al., 2004), an important difference from youth involved in street violence (see Table 1).

Social Rejection and Peer Hierarchies

Status anxieties, a history of social rejection, and peer hierarchies also can create conditions that increase the risk of youth violence. Some evidence suggests that rampage shooters have a history of rejection from relatively small and cohesive peer networks into which they have sought entry through behaviors intended to curry favor, but which peers perceive as socially inept (Newman et al., 2004). With regard to street violence, rejection in the form of disrespect of one's group can lead to collective violence (Fagan & Wilkinson, 1998). Youth may join neighborhood gangs for protection from such violence only to become involved in dynamics that alternate among protection, predation, and victimization (Rios, 2011).

Under most conditions, however, rejection in various forms—exclusion, devaluation, disrespect, bullying—can lead to aggression but rarely to lethal violence. When rejection occurs in adverse family, community, and peer circumstances, it can lead individuals to develop a heightened sensitivity for future threats of rejection, which has been shown to lead to a small but significant increase in the likelihood of aggression and violence (Downey, Lebolt, Rincón, & Freitas, 1998). Rejection from peer groups may have a stronger impact on males than rejection from best friends or romantic partners, with the opposite pattern occurring for females (Baumeister & Sommer, 1997). Among adolescent males, rejection in forms that convey powerlessness and devaluation of one's masculinity may be especially threatening (Bourgeois, 1996).



**Nina G.
Jablonski**

Rejection and disrespect may have a more profound effect on youth than older adults. During adolescence, when passion and peer influence are rising but brain systems that support self-control and planning are not fully mature, the typical youth is more likely to engage in risky behaviors, especially in emotionally charged social circumstances (Steinberg, 2008). However, the vast majority do not exhibit violence as a result of extreme reactivity and risky decision making (Frick & Viding, 2009). Moreover, violence could emerge at any time in the life course in reaction to identity-challenging stress and factors that compromise self-control such as substance abuse.

Intense reactions to rejection are especially likely for rejection sensitive individuals with low self-control (Mischel & Ayduk, 2004). One such impulsive reaction may be to use a lethal weapon that happens to be accessible. Youth with a history of being bullied and bullying others are 5 times more likely to report carrying weapons than peers with no bullying history (Bradshaw, Waasdorp, Goldweber, & Johnson, 2013; van Geel, Vedder, & Taniol, 2014). A second reaction is to ruminate about a plan for revenge, which may increase the probability of its implementation (Gollwitzer, 1999). This outcome may be particularly likely in the case of school shooters, especially if the shooter has released warnings about his intentions in order to gain attention, and fears another episode of rejection if he “backs down” (Newman et al., 2004).

Poverty and Social Distrust

In urban areas of concentrated poverty, youth violence can become a form of rough street justice in response to

failures by the formal justice system to secure neighborhoods, increasing social distrust of the police by youth of color (especially African American youth), and limited opportunities for youth to generate respect and dignity among peers (Harding, 2010). Under these conditions, how youth see themselves and are seen by peers can become linked to “campaigns for respect” organized around the capacity to repel or commit violence (Anderson, 1999; Jones, 2010). Strong neighborhood identities can lodge such campaigns in the defense of “turf” by youth groups and gangs, which escalates violence collectively, leaving urban spaces as “danger zones” of zealously protected territories (Harding, 2010, p. 44).

In these contexts, parents still can play important roles, but youth (especially those of color) have to navigate a street reality that often models and supports violence, and a broader society where they must contend with racialized stereotypes of criminality (Eberhardt, Goff, Purdie, & Davies, 2004). As a consequence, parenting youth who are embedded in a violent street context can be particularly challenging, and even the type of parenting that typically promotes healthy development might not be sufficient to protect against youth violence (De Coster, Heimer, & Wittrock, 2006).

Mental Illness

When school shootings occur, the shooters are often portrayed in the media as having some form of severe mental illness. Indeed the available evidence suggests that some are at the onset of what may become a serious disorder if they survive (Newman et al., 2004; Rocque, 2012; Moore et al., 2003). Although severe mental illness is linked with somewhat higher risk of violent acts, only 4% of violent acts are attributable to severe mental illness (Appelbaum, 2013). Of these acts, few involve guns (Appelbaum & Swanson, 2010). In fact, a lifetime diagnosis of a severe mental illness may add little additional risk of violence, especially if the individual is in remission or is receiving treatment (Appelbaum & Swanson, 2010). The factors predictive of future violence among the severely mentally ill are similar to those that predict violence in the general population (e.g., Van Dorn, Volavka, & Johnson, 2012).

Despite these caveats regarding mental illness as a cause of violence, some forms of mental illness that characterize either rampage or street shooters could be targeted for prevention purposes. Early identification of suicidal youth in schools and other settings could be a target of intervention for school shooters (Cooper, Clements, & Holt, 2011). This is especially true if suicidal thoughts are expressed in conjunction with intense hostility toward others. For street shooters, heavy exposure to violence in the home and neighborhood predisposes youth to post-traumatic stress disorder (PTSD) and substance use disorder, both of which could be



Ann S. Masten

targeted especially among youth already involved in the criminal justice system (Schubert & Mulvey, 2014).

Preventing Youth Violence

The evidence suggests that a variety of intervention programs can reduce some forms of youth violence (David-Ferdon & Simon, 2014; Lösel & Farrington, 2012). However, careful evaluations are needed to identify what programs work, and for whom (Mihalic, Fagan, Irwin, Ballard, & Elliott, 2004; Piquero, Farrington, Welsh, Tremblay, & Jennings, 2009).

Self-Control Skills

Although some early risk factors related to youth violence are difficult to alter, others are more amenable to change. Evidence is growing that self-regulation skills are malleable in children, beginning in early childhood (e.g., Diamond & Lee, 2011). Self-control training delivered directly to children can increase self-control and decrease delinquency. For example, a meta-analytic review of 34 studies involving randomized controlled experimental designs with participants up to age 10 and with posttest measures of self-control and child behavior problems for both experimental and control groups, found that the majority of effect sizes were positive, with small to moderate increases in self-control ($d = 0.28$ to 0.61), and small to moderate improvement ($d = 0.09$ to 0.30) in self-control on delinquency reduction (Piquero, Jennings, & Farrington, 2010).

Social Competence Skills

The likelihood of violence also may be reduced by interventions focused on developing social-cognitive and be-

havioral skills intended to increase empathy, social problem-solving, perspective taking, the effective management of interpersonal conflict, anger management, and alternative ways of interpreting social cues and coping with rejection and disappointment. Schools have successfully implemented universal preventive classroom interventions that improve conduct and reduce risks for violence, such as the Good Behavior Game (e.g., Kellam et al., 2011). Programs that start in first grade and continue into adolescence, that intervene with parents and schools, and that target social competence skills and other risk factors, can reduce the risk for youth violence (e.g., Conduct Problems Prevention Research Group, 2011). Effective preschool programs for disadvantaged children that engage parents and promote school readiness can also reduce later repeated involvement with the criminal justice system by as much as 75% (Heckman, 2013).

Strengthen Effective Parenting and Family-Based Protective Factors

Prevention studies targeting risk and protective factors among children at high risk for antisocial behavior provide corroborative evidence that improving parenting and family management can reduce aggression and violence in youth (Piquero et al., 2009; Welsh et al., 2012). One meta-analysis reviewed randomized, controlled experiments that included pre-post evaluations of family programs (excluding qualitative studies), with families that had children under age 5, for which child behavioral delinquency outcomes were obtained and parent training was part of the program studied (including, but not limited to home visitation programs) and for which sufficient data were available to calculate effect sizes. Among the 55 studies meeting these criteria, they calculated a weighted mean effect size of $d = 0.35$ on postprogram measures of childhood delinquency and/or antisocial problems (Piquero et al., 2009). The Child-Parent Center Preschool Program in Chicago, Illinois, for example, implemented in early childhood, reduced risk for violent arrests by 40% by age 18 (Reynolds, Temple, Robertson, & Mann, 2001). However, it is not yet clear how effective even well-validated prevention programs may be for preventing specific and contrasting forms of youth violence, including street violence, school shootings, and violent forms of bullying.

Minimizing Violent Media Effects

With regards to violent media, “the train has left the station,” so to speak, as children invest considerable amounts of time with media (e.g., Common Sense Media, 2013). However, parents can reduce the negative impact of violent media on their children. Typically, parental interventions are placed in one of three groups: (a) instructive



Calvin Morrill

mediation, (b) restrictive mediation, and (c) social covieing (Valkenburg, Krmar, Peeters, & Marseille, 1999). Instructive mediation, which involves parents talking to their children about violent media content (e.g., alternative means of solving conflict besides aggression, why it is unrealistic, why guns are dangerous), can reduce the harmful effect of violent media on children (e.g., Nathanson, 2004). Restrictive mediation involves restricting access to violent media (Valkenburg et al., 1999). Parents can use filtering devices to restrict violent content on TV sets and computers. Parents can also restrict the sheer amount of media exposure. The American Academy of Pediatrics recommends that parents limit their children's overall screen time for entertainment purposes and establish "screen-free" zones at home by making sure that there are no televisions, computers, or video games in children's bedrooms (Committee on Public Education, 2001, Council on Communications and Media, 2011). Social covieing involves parents consuming violent media with their children without discussing it; this approach can backfire because children may assume that violent media must not be harmful if their parents watch it with them and do not say anything bad about it (Nathanson, 1999).

We recommend establishing an easy-to-understand universal ratings system for all forms of media, with ratings assigned by child development experts rather than the industry. In the United States, however, the rating system is like alphabet soup, with different forms of media using different letters (e.g., TV-MA for TV, R for movies, Ao for video games), and different content codes (e.g., FV, V, S, L, D, AC, AL, GL, MV, V, GV, BN, N, SSC, RP). Parents do not always understand these ratings. For example, only 3%

of parents surveyed knew that FV meant "fantasy violence," and some even thought it meant "family viewing" (Kaiser Family Foundation, 1999). In addition, ratings are assigned by the industry. The Netherlands uses age-based ratings (e.g., 12+ for children 12 and older) and easy to understand symbols for content-based ratings (e.g., a fist for violence) for TV programs, movies, and video games, with ratings assigned by child development experts rather than the industry—called *Kijkwijzer* ("viewing guidelines" in English; for a review, see Valkenburg, Beentjes, Nikken, & Tan, 2002). In 2006, a version of *Kijkwijzer* was also introduced in Turkey. Media literacy programs can also help children become more intelligent and critical media consumers (e.g., Bickham & Slaby, 2012), and can even help reduce aggression and violence in youth. In one study, for example, middle school students who were randomly assigned to participate in a violent media literacy program were 2.16 less likely to push or shove another student and were 2.32 times less likely to threaten to hit or hurt someone in comparison to control students (Fingar & Jolls, 2014).

Reduce Youth Access to Guns

Approximately two thirds of U.S. homicides are committed with guns (Federal Bureau of Investigation, 2013). Although one can certainly kill people with other weapons (e.g., knives), one can kill more people much faster with guns than with other weapons. For example, the same day of the lethal Newtown shootings, a man stabbed 22 children in China, but none of them died (Associated Press, 2012). Guns also increase the physical and psychological distance between the killer and the victims, which makes killing easier (e.g., Baumeister, 1997).

A broader body of research suggests that high standards for legal gun ownership and certain policies to deter transfers of guns to prohibited persons (e.g., universal background checks, permit-to-purchase laws) reduce gun availability to criminals and reduce violence (Webster & Wintemute, 2015). However, few studies have examined the effects of these policies or of youth-focused firearm restrictions on juvenile's access and criminal misuse of guns. Reducing firearm access to youth by legally requiring or encouraging gun owners to lock up guns to keep them from underage youth reduces suicides and unintentional shootings (Webster, Vernick, Zeoli, & Manganello, 2004; Hepburn, Azrael, Miller, & Hemenway, 2006; Grossman et al., 2012). However, the impact such laws have on rampage or street shootings is unknown.

Policing strategies designed to detect and deter illegal gun carrying in high-risk settings have consistently been shown to reduce gun violence (Koper & Mayo-Wilson, 2006). Youth report that their awareness of these police practices curtail their gun carrying (Freed, Webster, Longwell, Carrese, & Wilson, 2001). Targeted initiatives with relatively



Daniel B. Neill

small and well-trained police units have proven to be effective in reducing gun violence and often have community support (Shaw, 1995; McGarrell, Chermak, Wilson, & Corsaro, 2006). Broader initiatives such as “stop and frisk” in New York City, New York, have proven to be very contentious because they are vulnerable to racial bias in their application (e.g., Gelman, Fagan, & Kiss, 2007). If these approaches lead to harassment and racial profiling, they could decrease community trust of police officers.

College age rampage shooters who are at least age 21 are often able to acquire guns from licensed gun dealers or from unlicensed private sellers who they find online or at gun shows (Newman & Fox, 2009). Federal gun laws and the laws in most U.S. states prohibit a relatively small number of individuals with mental illnesses (i.e., those who, through a legal proceeding, were found to represent a serious threat to themselves or others as a result of a mental illness) from possessing guns. The records for these mental health disqualifications often are not made available to law enforcement agencies conducting pre-gun-sale background checks. As a result, in the case of college shooters, individuals who were known on campus to have significant mental and emotional problems can access guns from licensed gun dealers, usually legally (Newman & Fox, 2009).

Although gun safety is an important part of prevention, it is critical not to place too much confidence in this strategy. Some rampage school shooters took blowtorches to safes or found cable cutters to slice through security devices to gain access to guns (Newman et al., 2004). A very dedicated killer can be difficult to deter via gun control alone. However, many people are not quite that dedicated. They are ambivalent, and anything that

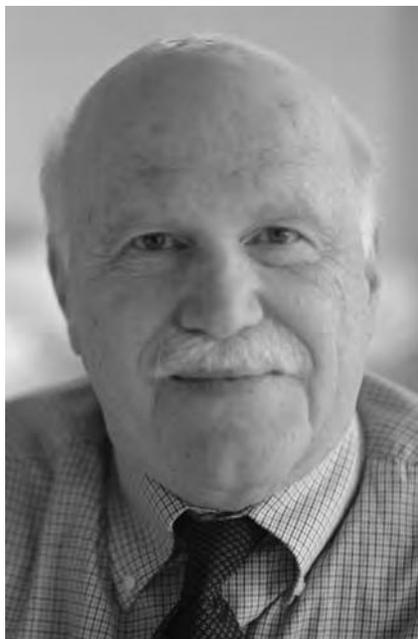
raises the stakes and makes it harder for them to access guns can be an effective part of prevention strategies. In sum, gun laws are helpful but not sufficient for deterring gun violence in youth.

Reduce Alcohol and Substance Abuse in Youth

Findings discussed above linking alcohol and substance abuse to aggression and violence among youth suggest that interventions to reduce substance use by youth would also lower risk for violence in subgroups of high-risk youth (David-Ferdon & Simon, 2014). Findings from the Pittsburgh Youth Study suggest that it may also be important to simultaneously address contextual influences, because they found that increases in alcohol use within individuals were more strongly linked to increases in aggression among boys with attitudes favoring violence and living in high-crime neighborhoods (White, Fite, Pardini, Mun, & Loeber, 2013). Changing alcohol-related policies can also help reduce youth violence rates. For example, surveillance data analyzed by researchers at the Clark-Hill Institute for Positive Youth Development found that single-serve alcohol beverages were associated with increased violence rates. Local policymakers used these data to develop a new alcohol licensing policy, and found that violence-related ambulance pick-ups in the community where the intervention took place decreased from 19.6 per 1,000 youth 15–24 years, in the 18 months prior to the intervention to 0 per 1,000 in the 18 months after the intervention. The study included an 18-month baseline period, a 6-month intervention period, and an 18-month postintervention period. Another study found that reducing the density of alcohol outlets and sales significantly reduced violence rates (e.g., Elder et al., 2010).

Improving School Climates

General efforts in schools should focus on creating climates where students feel engaged and feel a sense of belonging. Of particular importance is the development of mechanisms that can build social trust between youth and adults, both in schools and in communities, for social trust has been demonstrated to be an important aspect of school climates that leads away from peer violence (Williams & Guerra, 2011). On campuses, ensuring that culturally diverse students have access to all academic and extracurricular opportunities can break down negative stereotypes among groups and create trust among peers (Carter, 2012). There is also a need to recognize and cultivate informal practices of peer conflict management that youth use to solve problems in nonaggressive ways that are supported and reinforced by an inclusive and trusting climate (Morrill & Musheno, *in press*). School police forces emphasizing suspension and expulsion of



Daniel Romer

youth exhibiting behavioral difficulties (e.g., “zero tolerance” or some forms of “safe schools” policies) can undermine positive school climates, marginalizing already challenged children, even propelling them on a trajectory toward prison (Bahena, Cooc, Currie-Rubin, Kuttner, & Ng, 2012). Moreover, a Department of Education report based on statistics from 72,000 schools in 7,000 school districts across the country found that although African American students accounted for 35% of those suspended once and 39% of all expulsions, they made up only 18% of those enrolled (Gregory, Skiba, & Noguera, 2010; Koon, 2013).

Restorative justice programs represent one increasingly popular movement intended to improve school climates, thereby reducing peer violence and aggression (Morrison, 2007). Restorative justice generally refers to processes through which “stakeholders affected by an injustice have an opportunity to discuss how they have been affected . . . and what should be done to repair harm” (Braithwaite, 2004, p. 28). This approach has been translated into schools via a number of practices, including peer juries, problem solving, peer discussion circles, family group conferencing, and victim–offender, peer mediation. Advocates suggest that school-based restorative justice programs signal a caring and safe climate organized around forgiveness, respectful dialogue, responsibility, and community participation (Braithwaite, 1999). Although there is some evidence that restorative justice can reduce serious assaults and other forms of violence in individuals already involved in the criminal justice system (Strang, Sherman, Mayo-Wilson, Woods, & Ariel, 2013; Bergseth & Bouffard, 2007), the type of randomized trials needed to establish the effective-

ness of this approach in reducing school based-violence has not yet been undertaken.

Data Mining: Can It Predict Youth Violence?

The advent of tools that make it possible to search large quantities of online data through computer algorithms has raised new possibilities for predicting youth violence. In particular, because social media data such as Facebook and Twitter are often publicly available, data mining algorithms provide a means for sifting through these data to predict events and identify user characteristics (Han, Kamber, & Pei, 2011). For example, recent approaches using Twitter data can provide advance prediction of civil unrest events (Chen & Neill, 2014), and can identify users with PTSD and other mental conditions (Coppersmith, Harman & Dredze, 2014). Data mining techniques have multiple potential uses for providing early warnings of youth violence. However, some of these uses create not only technical challenges, but also raise privacy concerns and other serious ethical issues.

Predicting Street Violence

Researchers have successfully developed techniques for predicting geographic “hotspots” of violent crime in U.S. cities such as Chicago; Los Angeles, California; and New York City (Cohen, Gorr, & Olligschlaeger, 2007; Eck, Chainey, Cameron, Leitner, & Wilson, 2005; Mohler, Short, Brantingham, Schoenberg, & Tita, 2011; Neill & Gorr, 2007). Most of these techniques rely on data that is often publicly available, such as aggregate counts of crimes, de-identified crime offense reports, and 911 emergency telephone calls. These techniques can achieve high predictive accuracy because urban crime often follows regular patterns (e.g., escalating conflicts between street gangs), and place-based interventions such as targeted police patrols can reduce the overall level of street violence. For example, a meta-analysis of 19 studies found that hot spots policing produced significant, positive effect sizes for reductions in drug offenses ($d = 0.25$), violent crimes ($d = 0.18$), and disorder offenses ($d = 0.15$; Braga, Papachristos, & Hureau, 2014).

A complementary approach to prediction of street violence analyzes social network ties, using social media or other data sources (e.g., co-offending data) to identify individuals at high risk of being victims or perpetrators of street violence (Papachristos & Wildeman, 2014). For example, the Chicago Police Department uses social media data (e.g., Facebook profiles) to map the relationships between Chicago’s most active gang members. The police use the inferred social network for prediction of homicides and development of interventions targeted at the individuals at highest risk for involvement in a homicide. Another example of individual-based crime prediction is the software used in Baltimore,



Daniel W. Webster

Maryland; Philadelphia, Pennsylvania; and Washington, DC, to predict those individuals on probation or parole most likely to murder or commit other crimes (Berk, Sherman, Barnes, Kurtz, & Ahlman, 2009). This approach relies on detailed information collected about each offender’s life history and criminal record, and thus will not help predict first-time offenders.

Predicting Rampage Shootings

Individual-based surveillance to predict rampage shootings is inherently much more difficult than place-based surveillance, for three reasons. First, rampage shootings are extremely rare. Even if features are identified that increase an individual’s probability of committing violence by several orders of magnitude, huge numbers of individuals displaying these factors will never perpetrate violence. Second, there may be wide discrepancies in the amount and types of data available for each individual (e.g., some potentially dangerous individuals may not use online communication or may not reveal anything predictive). Third, there are large risks to individual privacy that are difficult to mitigate, which raise both moral and legal concerns. Because of these concerns and the likelihood of an unacceptably high false positive rate, mining of social network data should be used to provide secondary rather than primary evidence for deciding whether and how to intervene in the event of received threats or warnings related to a specific individual.

Social network data may also identify hostile social environments that can lead to violent behavior (Spivak & Prothrow-Stith, 2001), including carrying a weapon and physical fighting (Nansel, Overpeck, Haynie, Ruan, & Scheidt, 2003). For example, network data may track messages involving *cyberbullying*, which refers to the use of digital media to bully others, such as “flaming” (i.e., hostile and insulting interaction between people online), online gossip or rumors, teasing, reputation destruction, and cyberostracism (Hinduja & Patchin, 2009). The use of social

Table 1
Some Major Descriptive Differences Between Street Shootings and School Shootings

Street shootings	School shootings
Less rare	Extremely rare
Concentrated in inner cities	Concentrated in rural towns and suburbs
Non-White offenders overrepresented	Mostly White offenders
Guns usually obtained from illegal gun market	Guns often obtained from family members who purchased them legally
Preferred weapon is a handgun	Often multiple guns used, including semiautomatic rifles with high capacity magazines
Many recidivist violent offenders	Uncommon recidivist violent offenders
History of discipline problems common	History of discipline problems uncommon
Co-offending typical	Solo offending typical
Prior criminal victimization common	Prior criminal victimization uncommon
Suicide combined with homicide uncommon	Suicide and homicide very common
Victims mostly of same sex and race (often African American males)	Mixed-sex male and female but same race
Victimization of family members highly unusual	Victimization of family members can occur prior to the school shooting
Mostly from low income families	Mostly from middle class families
Substance use common	Substance use uncommon
Treatment of mental illness uncommon	Treatment of mental illness uncommon, but some symptoms of mental illness may be present
Generally below average in academic achievement	Generally average, or above, in intellectual functioning and academic achievement
Generally personally know someone who has killed or been killed before	Generally do not personally know anyone who has killed before
Avoid media attention for shootings because they don’t want to be caught and prosecuted	Seek media attention for shootings

This document is copyrighted by the American Psychological Association or one of its allied publishers. This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

media for cyberbullying creates opportunities to study online transcripts of bullying events called “bullying traces” (Xu, Jun, Zhu, & Bellmore, 2012). Bullying traces may also reveal when youth resist cyberbullying or even intervene to stop it (Marwick & Boyd, 2011).

Preventing Shootings in Schools and Communities

Rampage shootings. Programs and strategies to prevent rampage shootings are not well developed. The most efficacious form of prevention lies in ensuring that information that “something terrible is about to happen” is brought to trusted adults who have the knowledge to respond effectively. This requires encouraging the recipients of warnings, threats, and other forms of advanced notice to come forward (Newman et al., 2004). Media attention to shootings provokes a spike in reporting threats, which can lead to an increase in the interceptions of shooters before they carry out their plans (Newman et al., 2004).

Efforts to alert schools to the potential for hostile action by students have been implemented in some U.S. states and other countries (e.g., Cornell, Sheras, Gregory, & Fan, 2009; Endrass et al., 2011). Although school shooters often “leak” their intentions to others in the community (Fein et al., 2002), these messages are typically not taken seriously by their peers. However, the establishment of tip lines and other mechanisms for reporting such threats appear to uncover potential threats and avert threats to school safety (Cornell et al., 2009). These programs are similar in intent to efforts to identify youth at risk for suicide in schools (Cooper et al., 2011). Students, parents, and school staff are educated about the warning signs of suicidal behavior and encouraged to help potential victims to get treatment.

Encouraging youth to come forward must be tempered by the understanding that the vast majority of the time they will be reporting false positives. The language of threat is simply too common to assume it always means something. But when threats become more specific (in terms of targets, timing, preparation, etc.), the only real protection is to foster the conditions of trust and confidentiality that will signal to members of the social cliques where they hear threats to come forward and report the threats (Newman et al., 2004).

Zero tolerance policies need to be reconsidered, at least for speech (though weapon possession should never be tolerated). When school systems react to verbal comments with automatic sanctions, the practice can dissuade students who hear threats from coming forward to report their concerns out of fear of overreaction in a climate of a high level of false positives (Newman et al., 2004). Shutting down this information pipeline leaves us in a very vulnerable position

because interruption of plots is essential to prevention (Newman et al., 2004).

Although trying to predict which specific students will turn into shooters is futile, schools should focus attention on students who show signs of disturbance or broadcast an intention to do harm (Newman et al., 2004). More generally, schools should ensure that informal and formal control systems operate in tandem to respond robustly to both actual and potential bullying and physical violence (Morrill & Musheno, *in press*).

Postvention for school shootings. School shootings are devastating, especially to the communities in which they occur. Based on the available evidence, scholars have offered general suggestions about what to do in the aftermath of a school shooting (Newman et al., 2004). Media attention often creates a major problem for school authorities. Schools should insist that news organizations pool their resources and send one representative, rather than multiple reporters to cover rampage school shootings. Media also provide a stage for antisocial youth to become a “star” through extreme acts of violence, such as rampage shootings. Their access to attention through media should be minimized.

Communities should develop postshooting crisis plans that provide mental health services on a widespread basis. Educators need to be both well informed about the symptoms of trauma and open with parents about the importance of counseling. Special attention should also be paid to the needs of teachers and staff in the wake of a school shooting. They are often expected to step into the role of counselor or comforter when they are also suffering from trauma and in need of support. Mental health resources should be available in schools at all times, not just in the aftermath of a school shooting (see Newman et al., 2004).

Schools have a legitimate need to reassure the public that security has been restored in the wake of a school shooting. Different schools have taken different approaches, such as searching student bags for weapons, adding locks and security personnel at the school entrance, and building fences around the school property. Although such measures can reassure students and parents in the short-term, they can also undermine social trust in the long-term and must be accompanied with other efforts to rebuild trust and meaningful relational ties on school campuses (see Newman et al., 2004).

Prevention of street shootings. Street shootings involve an extremely difficult set of both individual and contextual influences that require a complex set of multilevel interventions (e.g., Ingoldsby, Shelleby, Lane, & Shaw, 2012; Tolan, Gorman-Smith, & Henry, 2003). One scholar, for example, points toward the importance of a “rich” organizational life of on-the-ground community organizations as mechanisms for increasing social trust in

neighborhoods, which is associated with lower rates of youth violence (Sampson, 2012, p. 312). But how these abstract ideas translate into specific interventions is unclear. There is recent evidence that high-quality (i.e., low-conflict, high-emotional-closeness) relationships between children and care givers can reduce conduct problems, including peer violence, years later even holding constant family income, children's earlier conduct problems, and parenting styles (Ingoldsby, Shelleby, Lane, & Shaw, 2012). Summer employment mentoring programs may have the same effects prior to serious offending (Heller, 2014). Nevertheless, reducing the forces that encourage youth violence will require concerted efforts by police, parents, and other adults to avoid the debilitating effects of involvement with the juvenile justice system that treats poor and minority youth harshly and ensnares them (Rios, 2011). The effort currently underway to reform the juvenile justice system by engaging youth through education and treatment (rather than punishment) is a strategy that could bear fruit (Models for Change, 2014). Similarly, support for successful reentry of incarcerated youth and young adults into their communities has the potential to reduce future violence. Of particular importance is the removal of unnecessary obstacles to gaining employment and returning to school.

Research conducted with serious youth offenders in urban centers such as Chicago indicates that youth with substance use problems are more than 50% more likely to experience recidivism after release into the community than other offenders (Schubert & Mulvey, 2014). Other research (also in Chicago) indicates that nearly all youth detained in the juvenile justice system have experienced traumatic events often leading to PTSD and comorbid disorders (Abram et al., 2013). Such conditions are treatable, but current practice in juvenile detention does not deliver these treatments in a consistent manner, leaving many youth at risk for further offending (Schubert & Mulvey, 2014), and high risk for gun violence upon return to their communities (Teplin et al., 2014).

A novel approach to prevention of violence in high-risk school-age male youth in Chicago employs a combination of strategies both during and after school (Heller, Pollack, Ander, & Ludwig, 2013). The program, called *Becoming a Man*, employs community organizations that train various forms of impulse control and strategies to negotiate interpersonal conflicts. It also encourages greater attachment to school and the value of persisting toward graduation. Results from a large randomized trial indicate a 44% reduction in arrests for violent behavior during the program year and subsequent increases in school performance ($d = 0.19$). Improvements in school attendance and graduation appear to make the program cost effective.

Directions for Future Research

In our charge from the NSF to write about what we know and do not know about youth violence, it immediately became apparent that although there is a developed literature on the topic, there is much that we still do not know. In this section, we describe some of the most urgent directions for future research.

Guns

More research is needed on youths' perceptions and behaviors as potential consumers of handguns, and how those perceptions and behaviors are affected by contextual factors such as state regulations over gun sales, law enforcement practices directed at deterring youth acquisition and carrying of guns, and street outreach prevention programs. A huge challenge to initiatives is that many youth are willing to loan their guns to friends and family members. More research is needed on how to discourage gun sharing practices. There are many gaps in gun policy research (Webster & Wintemute, 2015). For example, there has been little research on the effects of minimum age restrictions on handgun purchases, and if those effects depend on regulations to prevent illegal diversion (e.g., comprehensive background check).

Media Violence

Previous research has shown that when exposed to movie characters that smoke, many youth are more likely to start smoking themselves (e.g., Dal Cin, Stoolmiller, & Sargent, 2012); the same is true for characters that drink (e.g., Wills, Sargent, Gibbons, Gerrard, & Stoolmiller, 2009). Future research should test whether youth are more interested in acquiring and using guns after exposure to movie characters that use guns. Research could also examine the extent to which media can decrease the perceived desirability of guns, in an environment when media tend to glorify them. Future research should examine what types of individuals are most susceptible to violent media effects, such as youth with certain mental illnesses, youth with poor self-control, youth who possess guns, and youth who do not understand the morals of plots and the motives of characters that contain violent content. Future research should also investigate what types of settings facilitate violent media effects (e.g., cooperative vs. competitive vs. alone gameplay; immersive technologies).

The rampage shootings in Newtown and, more recently, in Santa Barbara, California, have drawn attention to online communities that youth may join to communicate with others who share and support their violent interests and hostile ideologies (e.g., Report of the Office of the Child Advocate for the State of Connecticut, 2014). Research is needed to understand how involvement with online social

groups facilitates the translation of hostile grudges into violent action. Prior research suggests that online communities operate like other social groups in ways that influence real-life behavior (McKenna & Bargh, 1998).

Mental Health, Suicide, and Homicide Ideation

Future research could examine the intersection of hostile and suicidal ideation in youth as a marker for youth who are at risk for murder-suicide, a common characteristic of rampage shootings (Everytown for Gun Safety, 2014; Vossekul et al., 2002). Considerable research has been conducted to understand suicidal ideation in youth (Evans, Hawton, & Rodham, 2004). More should be done to learn about risk factors for homicidal and suicidal ideation and to understand the circumstances under which such co-occurring ideation becomes linked to plans to use violence to gain the status and recognition that is perceived to be lacking.

Because existing studies of youth who engage in rampage shootings have focused mainly on middle and high school students (e.g., Newman et al., 2004), it is important to establish whether college-age rampage shooting show any distinctive pattern of mental health or social adjustment difficulties. In particular, the transition to independent living, or even its possibility, might exacerbate serious social and emotional difficulties of the sort that characterize some of the college-age rampage shooters and potentially trigger in them extreme reactions. This possibility is suggested in the *Report of the Office of the Child Advocate for the State of Connecticut (2014)* on the Newtown shooter, but needs to be examined in other cases. More generally, research is needed to establish how mental health services can be effectively harnessed to support youth experiencing these difficulties, with special attention to those making the transition to independent living.

Family Environment

Family function appears to play a multitude of roles in generating or mitigating risk for youth violence, yet there are numerous gaps in the literature. More knowledge is needed on differential predictors of specific forms of violence, particularly given that family backgrounds of rampage shooters often do not fit the typical markers of street shooters. For rampage shooters, interactions of individual vulnerabilities and contextual influences arising in peer groups, schools, and communities may play critical roles.

In the case of street shootings that are heavily concentrated in high-poverty neighborhoods, parents may have little trust in the police, and peer influences are often driven by gang membership and other turf identities (Goffman, 2014; Harding, 2010). Nevertheless, parents and schools may have some effect in reducing involvement in violence (Fauth, Roth, & Brooks-Gunn, 2007;

Ingoldsby et al., 2012; Tolan et al., 2003). Expanded research is needed on effective interventions to reduce youth violence in this context.

Research also is needed on the role of early childhood experiences in the family and caregiving environment on risk for youth violence, including the prenatal environment. There is a need to identify best practices to support healthy development of children in vulnerable families. In addition, it is important for communities, policymakers, and scientists to join together and identify the resources needed for family members with a child or youth who demonstrates signs of preoccupation with violence. Research is needed on the best strategies and developmental timing for helping parents to teach and monitor children effectively in regard to promoting positive child uses of media, good self-control skills, safe behavior around guns, healthy peer relationships, and other potential protective factors against violence. It is also important to improve child welfare systems intended to promote positive child development, such as foster care and juvenile justice systems, that may inadvertently function as “violence feeder systems.”

Whereas our focus has been on the formative role of early family experiences on later violence, it is also important to consider the role of families during adolescence and, perhaps especially, early adulthood in the lives of youth with serious social and emotional difficulties of the sort that characterize some of the school shooters. These difficulties may hinder parents’ ability to engage in constructive ways, prompting them to give up or give in. Yet, for these youth, the transition (or even its possibility) from the family home to independent living may be deeply threatening and destabilizing and prompt extreme reactions because it removes invisible supports on which they depend (e.g., *Report of the Office of the Child Advocate for the State of Connecticut, 2014*). Research is needed to establish how to access mental health services that can support families of youth experiencing these difficulties.

School and Community Climate

Research is needed to understand how the ways in which schools deal with challenging behavior may contribute to the risk of violence. For example, a suspension may result in a child being left without any adult supervision if the parent is working. Greater insight is needed about interpersonal peer conflict in school, especially the roles played by social trust, interpersonal relationships, and peer hierarchies in creating the conditions that lead youth away from or toward peer aggression (Morrill & Musheno, in press). Efforts along these lines could be devoted to basic research and assessing the efficacy of school-level approaches, such as restorative justice programs, that seek to facilitate alternative ways of resolving peer conflict without exclusion or violence.

A growing body of theory and evidence implicates the role of neighborhood-level factors for youth violence in urban areas characterized by persistent and concentrated poverty, gang violence, and low levels of social trust among residents (e.g., Sampson, 2012). However, neighborhood-level strategies to reduce youth violence and promote youth success have produced conflicting results, pointing to the need to distinguish how different aspects as adolescents' social environment influence their ongoing development (Sampson, 2012).

Conclusions

Rampage school shootings are rare. Schools remain the safest place for children—far safer than crossing the street. Even so, the shock that follows from the murders of innocent children is so threatening to our sense of social order that it calls out for explanation and intervention so that it does not happen again. It is unlikely that we will ever understand the depth of alienation or desires for social status motivating an individual shooter, nor will we be able to restore peace of mind to the families and communities that have experienced these tragedies.

Street shootings take the lives of far more people in 1 year than all the school rampage shootings put together. While addressing the critical need to understand rampage school shootings, we must not lose sight of the fact that in terms of the sheer social cost, the violence that bedevils the nation's poorest neighborhoods is far more costly in terms of human life, family disruption, and the destabilization of communities engendered by chronic fear and trauma.

Whether we focus on rare or ubiquitous forms of violence, it is crucial to recognize that gun violence in the United States is far higher than in any other high-income country. It is also important to recognize that the causes of violence are complex. Evidence on the risk and protective processes for youth violence is increasing. However, it is clear that additional and more nuanced knowledge is needed on both causes and effective solutions for different forms of youth violence in different contexts. In the aftermath of Newtown and the many other tragedies in schools and streets that preceded and followed this tragic event, it is also clear that understanding and preventing youth violence should be a national priority.

References

- Abram, K. M., Teplin, L. A., King, D. C., Longworth, S. L., Emanuel, K. M., Romero, E. G., . . . Olson, N. D. (2013). *Juvenile justice bulletin: PTSD, trauma, and comorbid psychiatric disorders in detained youth* (NCJ 239603). Washington, DC: U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention. Retrieved from <http://www.ojjdp.gov/pubs/239603.pdf>
- Anderson, E. (1999). *Code of the street: Decency, violence, and the moral life of the inner city*. New York, NY: Norton.
- Andreou, E. (2004). Bully/victim problems and their association with Machiavellianism and self-efficacy in Greek primary school children. *British Journal of Educational Psychology*, 74, 297–309. <http://dx.doi.org/10.1348/000709904773839897>
- Appelbaum, P. (2013). Public safety, mental disorders and guns. *JAMA Psychiatry*, 70, 565–566.
- Appelbaum, P. S., & Swanson, J. W. (2010). Law & psychiatry: Gun laws and mental illness: How sensible are the current restrictions? *Psychiatric Services*, 61, 652–654. <http://dx.doi.org/10.1176/ps.2010.61.7.652>
- Associated Press. (2012, December 14). Man stabs 22 children in China. *New York Times*. Retrieved from http://www.nytimes.com/2012/12/15/world/asia/man-stabs-22-children-in-china.html?_r=0
- Bahena, S., Cooc, N., Currie-Rubin, R., Kuttner, P., & Ng, M. (Eds.). (2012). *Disrupting the school-to-prison pipeline*. Cambridge, MA: Harvard Education Press.
- Baumeister, R. F. (1997). *Evil: Inside human violence and cruelty*. New York, NY: Freeman.
- Baumeister, R. F., Smart, L., & Boden, J. M. (1996). Relation of threatened egotism to violence and aggression: The dark side of high self-esteem. *Psychological Review*, 103, 5–33. <http://dx.doi.org/10.1037/0033-295X.103.1.5>
- Baumeister, R. F., & Sommer, K. L. (1997). What do men want? Gender differences and two spheres of belongingness: Comment on Cross and Madson (1997). *Psychological Bulletin*, 122, 38–44. <http://dx.doi.org/10.1037/0033-2909.122.1.38>
- Bergseth, K. J., & Bouffard, J. A. (2007). The long-term impact of restorative justice programming for juvenile offenders. *Journal of Criminal Justice*, 35, 433–451. <http://dx.doi.org/10.1016/j.jcrimjus.2007.05.006>
- Berk, R. A., Sherman, L., Barnes, G., Kurtz, E., & Ahlman, L. (2009). Forecasting murder within a population of probationers and parolees: A high stakes application of statistical learning. *Journal of the Royal Statistical Society Series A (General)*, 172, 191–211. <http://dx.doi.org/10.1111/j.1467-985X.2008.00556.x>
- Betancourt, T. S., Agnew-Blais, J., Gilman, S. E., Williams, D. R., & Ellis, B. H. (2010). Past horrors, present struggles: The role of stigma in the association between war experiences and psychosocial adjustment among former child soldiers in Sierra Leone. *Social Science & Medicine*, 70, 17–26. <http://dx.doi.org/10.1016/j.socscimed.2009.09.038>
- Bickham, D. S., & Slaby, R. G. (2012). Effects of a media literacy program in the U.S. on children's critical evaluation of unhealthy media messages about violence, smoking, and food. *Journal of Children and Media*, 6, 255–271. <http://dx.doi.org/10.1080/17482798.2012.662031>
- Blumstein, A., & Cork, D. (1996). Linking gun availability to youth gun violence. *Law and Contemporary Problems*, 59, 5–24. <http://dx.doi.org/10.2307/1192207>
- Bourgeois, P. (1996). *In search of respect*. Cambridge, United Kingdom: Cambridge University Press.
- Bradshaw, C. P., Waasdorp, T. E., Goldweber, A., & Johnson, S. L. (2013). Bullies, gangs, drugs, and school: Understanding the overlap and the role of ethnicity and urbanicity. *Journal of Youth and Adolescence*, 42, 220–234. <http://dx.doi.org/10.1007/s10964-012-9863-7>
- Braga, A. A., Papachristos, A. V., & Hureau, D. M. (2014). The effects of hot spots policing on crime: An updated systematic review and meta-analysis. *Justice Quarterly*, 31, 633–663. <http://dx.doi.org/10.1080/07418825.2012.673632>
- Braithwaite, J. (1999). Restorative justice: Assessing optimistic and pessimistic accounts. *Crime and Justice*, 25, 1–127. <http://dx.doi.org/10.1086/449287>
- Braithwaite, J. (2004). Restorative justice and de-professionalization. *The Good Society*, 13, 28–31. <http://dx.doi.org/10.1353/gso.2004.0023>
- Bushman, B. J. (2002). Does venting anger feed or extinguish the flame? Catharsis, rumination, distraction, anger and aggressive responding. *Personality and Social Psychology Bulletin*, 28, 724–731. <http://dx.doi.org/10.1177/0146167202289002>

- Bushman, B. J., & Baumeister, R. F. (1998). Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: Does self-love or self-hate lead to violence? *Journal of Personality and Social Psychology*, *75*, 219–229. <http://dx.doi.org/10.1037/0022-3514.75.1.219>
- Bushman, B. J., & Baumeister, R. F. (2002). Does self-love or self-hate lead to violence? *Journal of Research in Personality*, *36*, 543–545. [http://dx.doi.org/10.1016/S0092-6566\(02\)00502-0](http://dx.doi.org/10.1016/S0092-6566(02)00502-0)
- Bushman, B. J., Baumeister, R. F., & Stack, A. D. (1999). Catharsis, aggression, and persuasive influence: Self-fulfilling or self-defeating prophecies? *Journal of Personality and Social Psychology*, *76*, 367–376. <http://dx.doi.org/10.1037/0022-3514.76.3.367>
- Bushman, B. J., & Huesmann, L. R. (2006). Short-term and long-term effects of violent media on aggression in children and adults. *Archives of Pediatrics & Adolescent Medicine*, *160*, 348–352. <http://dx.doi.org/10.1001/archpedi.160.4.348>
- Bushman, B. J., & Huesmann, L. R. (2010). Aggression. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), *Handbook of social psychology* (5th ed., pp. 833–863). New York, NY: Wiley. <http://dx.doi.org/10.1002/9780470561119.socpsy002023>
- Bushman, B. J., Newman, K., Calvert, S., Downey, G., Dredze, M., Gottfredson, M., . . . Webster, D. (2013, 1–2 February). *Youth violence: What we need to know. Report of the Subcommittee on Youth Violence of the Advisory Committee to the Social, Behavioral and Economics Sciences directorate*. Arlington, VA: National Science Foundation.
- Carter, P. L. (2012). *Stubborn roots: Race, culture and inequality in U.S. and South African schools*. New York, NY: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780199899630.001.0001>
- Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., . . . Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, *297*, 851–854. <http://dx.doi.org/10.1126/science.1072290>
- Caspi, A., Moffitt, T., Silva, P., Stouthamer-Loeber, M., Krueger, R., & Schmutte, P. (1994). Are some people crime-prone? Replications of the personality-crime relationship across countries, genders, races and methods. *Criminology*, *32*, 163–196. <http://dx.doi.org/10.1111/j.1745-9125.1994.tb01151.x>
- Centers for Disease Control and Prevention (CDC). (2012). Surveillance for violent deaths: National violent death reporting system, 16 states, 2009. *Morbidity and Mortality Weekly Report*, *61*, 1–43. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss6106a1.htm>
- Centers for Disease Control and Prevention (CDC). (2014). *School-associated violent death study*. Retrieved from <http://www.cdc.gov/ViolencePrevention/youthviolence/schoolviolence/SAVD.html>
- Chen, F., & Neill, D. (2014). Non-parametric scan statistics for event detection and forecasting in heterogeneous social media graphs. *Proceedings of the 20th ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (pp. 1166–1175). New York, NY: Association for Computing Machinery.
- Cohen, J., Gorr, W. L., & Olligschlaeger, A. M. (2007). Leading indicators and spatial interactions: A crime forecasting model for proactive police deployment. *Geographical Analysis*, *39*, 105–127. <http://dx.doi.org/10.1111/j.1538-4632.2006.00697.x>
- Committee on Public Education. (2001). Media violence. *Pediatrics*, *108*, 1222–1226. <http://dx.doi.org/10.1542/peds.108.5.1222>
- Common Sense Media. (2013, Fall). *Zero to eight: Children's media use in America in 2013*. Retrieved from <http://www.common SenseMedia.org/research/zero-to-eight-childrens-media-use-in-america-2013>
- Conduct Problems Prevention Research Group. (2011). The effects of the fast track preventive intervention on the development of conduct disorder across childhood. *Child Development*, *82*, 331–345. <http://dx.doi.org/10.1111/j.1467-8624.2010.01558.x>
- Cooper, G. D., Clements, P. T., & Holt, K. (2011). A review and application of suicide prevention programs in high school settings. *Issues in Mental Health Nursing*, *32*, 696–702. <http://dx.doi.org/10.3109/01612840.2011.597911>
- Coppersmith, G., Harman, C., & Dredze, M. (2014). Measuring post-traumatic stress disorder in Twitter. *International Conference on Weblogs and Social Media (ICWSM)*. Retrieved from http://www.cs.jhu.edu/~mdredze/publications/2014_icwsm_ptsd.pdf
- Cornell, D., Evans, A. C., Guerra, N. G., Kinscherff, R., Mankowski, E., Randazzo, M. R., . . . Webster, D. W. (2013). *Gun violence: Prediction, prevention, and policy: APA panel of experts report*. Washington, DC: American Psychological Association.
- Cornell, D., Sheras, P., Gregory, A., & Fan, X. (2009). A retrospective study of school safety conditions in high schools using the Virginia threat assessment guidelines versus alternative approaches. *School Psychology Quarterly*, *24*, 119–129. <http://dx.doi.org/10.1037/a0016182>
- Council on Communications and Media. (2011). Media use by children younger than age 2. *Pediatrics*, *128*, 1040–1045.
- Dahl, G., & DellaVigna, S. (2009). Does movie violence increase violent crime? *The Quarterly Journal of Economics*, *124*, 677–734.
- Dal Cin, S., Stoolmiller, M., & Sargent, J. D. (2012). When movies matter: Exposure to smoking in movies and changes in smoking behavior. *Journal of Health Communication*, *17*, 76–89. <http://dx.doi.org/10.1080/10810730.2011.585697>
- David-Ferdon, C., & Simon, T. R. (2014). *Preventing youth violence: Opportunities for action*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.
- De Coster, S., Heimer, K., & Wittrock, S. (2006). Neighborhood disadvantage, social capital, street context, and youth violence. *The Sociological Quarterly*, *47*, 723–753. <http://dx.doi.org/10.1111/j.1533-8525.2006.00064.x>
- Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, *333*, 959–964. <http://dx.doi.org/10.1126/science.1204529>
- Dodge, K. A. (2009). Mechanisms of gene-environment interaction effects in the development of conduct disorder. *Perspectives on Psychological Science*, *4*, 408–414. <http://dx.doi.org/10.1111/j.1745-6924.2009.01147.x>
- Dodge, K. A., Greenberg, M. T., Malone, P. S., & the Conduct Problems Prevention Research Group. (2008). Testing an idealized dynamic cascade model of the development of serious violence in adolescence. *Child Development*, *79*, 1907–1927. <http://dx.doi.org/10.1111/j.1467-8624.2008.01233.x>
- Downey, G., Lebolt, A., Rincón, C., & Freitas, A. L. (1998). Rejection sensitivity and children's interpersonal difficulties. *Child Development*, *69*, 1074–1091. <http://dx.doi.org/10.1111/j.1467-8624.1998.tb06161.x>
- Eberhardt, J. L., Goff, P. A., Purdie, V. J., & Davies, P. G. (2004). Seeing black: Race, crime, and visual processing. *Journal of Personality and Social Psychology*, *87*, 876–893. <http://dx.doi.org/10.1037/0022-3514.87.6.876>
- Eck, J. E., Chainey, S., Cameron, J. G., Leitner, M., & Wilson, R. E. (2005). *Mapping crime: Understanding hot spots*. National Institute of Justice. Retrieved from <http://discovery.ucl.ac.uk/11291/1/11291.pdf>
- Elder, R. W., Lawrence, B., Ferguson, A., Naimi, T. S., Brewer, R. D., Chattopadhyay, S. K., . . . the Task Force on Community Preventive Services. (2010). The effectiveness of tax policy interventions for reducing excessive alcohol consumption and related harms. *American Journal of Preventive Medicine*, *38*, 217–229. <http://dx.doi.org/10.1016/j.amepre.2009.11.005>
- Eliason, S. (2009). Murder-suicide: A review of the recent literature. *Journal of the American Academy of Psychiatry and the Law*, *37*, 371–376.
- Endrass, J., Rossegger, A., Urbaniok, F., Laubacher, A., Pierce, C. S., & Moskvitin, K. (2011). Procedures for preventing juvenile violence in Switzerland: The Zurich model. *New Directions for Youth Development*, *2011*, 79–87. <http://dx.doi.org/10.1002/yn.388>

- Erickson, W. H. (2001). *The report of Governor Bill Owens' Columbine Review Commission*. Retrieved from http://www.securitymanagement.com/archive/library/Columbine_report0801.pdf
- Evans, E., Hawton, K., & Rodham, K. (2004). Factors associated with suicidal phenomena in adolescents: A systematic review of population-based studies. *Clinical Psychology Review, 24*, 957–979. <http://dx.doi.org/10.1016/j.cpr.2004.04.005>
- Everytown for Gun Safety. (2014). *Analysis of recent mass shootings*. Retrieved from <http://everytown.org/mass-shootings/>
- Fagan, J., & Wilkinson, D. L. (1998). Guns, youth violence, and social identity in inner cities. *Crime and Justice, 24*, 105–188. <http://dx.doi.org/10.1086/449279>
- Fast, J. (2008). *Ceremonial violence: A psychological explanation of school shootings*. New York, NY: The Overlook Press.
- Fauth, R. C., Roth, J. L., & Brooks-Gunn, J. (2007). Does the neighborhood context alter the link between youth's after-school time activities and developmental outcomes? A multilevel analysis. *Developmental Psychology, 43*, 760–777. <http://dx.doi.org/10.1037/0012-1649.43.3.760>
- Federal Bureau of Investigation. (2013). *Uniform Crime Reports*. Washington, DC: U. S. Government Printing Office.
- Fein, R., Vossekuil, B., Pollack, W., Borum, R., Modzeleski, W., & Reddy, M. (2002). *Threat assessment in schools: A guide to managing threatening situations and to creating safe school climates*. Washington, DC: U. S. Secret Service and Department of Defense.
- Fingar, K. R., & Jolls, T. (2014). Evaluation of a school-based violence prevention media literacy curriculum. *Injury Prevention, 20*, 183–190. <http://dx.doi.org/10.1136/injuryprev-2013-040815>
- Fleegler, E. W., Lee, L. K., Monuteaux, M. C., Hemenway, D., & Mannix, R. (2013). Firearm legislation and firearm-related fatalities in the United States. *Journal of the American Medical Association Internal Medicine, 173*, 732–740. <http://dx.doi.org/10.1001/jamainternmed.2013.1286>
- Freed, L. H., Webster, D. W., Longwell, J. J., Carrese, J., & Wilson, M. H. (2001). Factors preventing gun acquisition and carrying among incarcerated adolescent males. *Archives of Pediatrics & Adolescent Medicine, 155*, 335–341. <http://dx.doi.org/10.1001/archpedi.155.3.335>
- Frick, P. J., Ray, J. V., Thornton, L. C., & Kahn, R. E. (2014). Can callous-unemotional traits enhance the understanding, diagnosis, and treatment of serious conduct problems in children and adolescents? A comprehensive review. *Psychological Bulletin, 140*, 1–57. <http://dx.doi.org/10.1037/a0033076>
- Frick, P. J., & Viding, E. (2009). Antisocial behavior from a developmental psychopathology perspective. *Development and Psychopathology, 21*, 1111–1131. <http://dx.doi.org/10.1017/S0954579409990071>
- Geen, R. G., & Quanty, M. B. (1977). The catharsis of aggression: An evaluation of a hypothesis. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10, pp. 1–37). New York, NY: Academic Press.
- Gelman, A., Fagan, J., & Kiss, A. (2007). An analysis of the New York City police department's "stop-and-frisk" policy in the context of claims of racial bias. *Journal of the American Statistical Association, 102*, 813–823. <http://dx.doi.org/10.1198/016214506000001040>
- Gentile, D. G., & Bushman, B. J. (2012). Reassessing media violence effects using a risk and resilience approach to understanding aggression. *Psychology of Popular Media Culture, 1*, 138–151. <http://dx.doi.org/10.1037/a0028481>
- Glenn, A. L., & Raine, A. (2014). Neurocriminology: Implications for the punishment, prediction and prevention of criminal behaviour. *Nature Reviews Neuroscience, 15*, 54–63. <http://dx.doi.org/10.1038/nrn3640>
- Goffman, A. (2014). *On the run: Fugitive life in an American city*. Chicago, IL: University of Chicago Press. <http://dx.doi.org/10.7208/chicago/9780226136851.001.0001>
- Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*, 493–503. <http://dx.doi.org/10.1037/0003-066X.54.7.493>
- Gottfredson, M. (2005). The empirical status of control theories in criminology. In F. Cullen, J. P. Wright, & K. R. Blevins (Eds.), *Taking stock: The empirical status of theory in criminology* (pp. 77–100). New Brunswick, NJ: Transaction.
- Gregory, A., Skiba, R. J., & Noguera, P. A. (2010). The achievement gap and the discipline gap: Two sides of the same coin? *Educational Researcher, 39*, 59–68. <http://dx.doi.org/10.3102/0013189X09357621>
- Grossman, D. C., Stafford, H. A., Koepsell, T. D., Hill, R., Retzer, K. D., & Jones, W. (2012). Improving firearm storage in Alaska native villages: A randomized trial of household gun cabinets. *American Journal of Public Health, 102*, S291–S297. <http://dx.doi.org/10.2105/AJPH.2011.300421>
- Han, J., Kamber, M., & Pei, J. (2011). *Data mining: Concepts and techniques* (3rd ed.). Burlington, MA: Morgan Kaufmann.
- Harcourt, B. E. (2006). *Language of the gun: Youth, crime, and public policy*. Chicago, IL: University of Chicago Press. <http://dx.doi.org/10.7208/chicago/9780226316079.001.0001>
- Harding, D. J. (2010). *Living the drama: Community, conflict, and culture among inner-city boys*. Chicago, IL: University of Chicago Press. <http://dx.doi.org/10.7208/chicago/9780226316666.001.0001>
- Heckman, J. J. (2013). *Giving kids a fair chance*. Cambridge, MA: MIT Press.
- Heller, S. B. (2014). Summer jobs reduce violence among disadvantaged youth. *Science, 346*, 1219–1223. <http://dx.doi.org/10.1126/science.1257809>
- Heller, S., Pollack, H. A., Ander, R., & Ludwig, J. (2013). Preventing youth violence and dropout: A randomized field experiment. NBER Working Paper No. 19014. Retrieved from <http://www.nber.org/papers/w19014>
- Hepburn, L., Azrael, D., Miller, M., & Hemenway, D. (2006). The effect of child access prevention laws on unintentional child firearm fatalities, 1979–2000. *The Journal of Trauma, 61*, 423–428. <http://dx.doi.org/10.1097/01.ta.0000226396.51850.fc>
- Herrenkohl, T. I., Lee, J., & Hawkins, J. D. (2012). Risk versus direct protective factors and youth violence: Seattle social development project. *American Journal of Preventive Medicine, 43*, S41–S56. <http://dx.doi.org/10.1016/j.amepre.2012.04.030>
- Hinduja, S., & Patchin, J. W. (2009). *Bullying beyond the schoolyard: Preventing and responding to cyberbullying*. Thousand Oaks, CA: Sage (Corwin Press).
- Huesmann, L. R., Moise-Titus, J., Podolski, C. L., & Eron, L. D. (2003). Longitudinal relations between children's exposure to TV violence and their aggressive and violent behavior in young adulthood: 1977–1992. *Developmental Psychology, 39*, 201–221.
- Ingoldsby, E. M., Shelleby, E., Lane, T., & Shaw, D. S. (2012). Extrafamilial contexts and children's conduct problems. In V. Maholmes & R. B. King (Eds.), *The Oxford handbook of poverty and child development* (pp. 404–422). New York, NY: Oxford University Press.
- Jones, N. (2010). *Between good and ghetto: African American girls and inner-city violence*. New Brunswick, NJ: Rutgers University Press.
- Kaiser Family Foundation. (1999). Parents and the V-chip: A Kaiser Family Foundation survey. Retrieved from <http://eric.ed.gov/?id=ED445365>
- Keegan, J. (1993). *A history of warfare*. New York, NY: Knopf.
- Kellam, S. G., Mackenzie, A. C. L., Brown, C. H., Poduska, J. M., Wang, W., Petras, H., & Wilcox, H. C. (2011). The good behavior game and the future of prevention and treatment. *Addiction Science and Clinical Practice, 6*, 73–84.
- Kimmel, M. S., & Mahler, M. (2003). Adolescent masculinity, homophobia, and violence: Random school shootings, 1982–2001. *American Behavioral Scientist, 46*, 1439–1458. <http://dx.doi.org/10.1177/0002764203046010010>

- Koon, S.-V. D. (2013). *Exclusionary school discipline: An issue brief and review of the literature*. Berkeley, CA: The Chief Justice Earl Warren Institute on Law and Policy, University of Berkeley, Berkeley School of Law.
- Koper, C. S., & Mayo-Wilson, E. (2006). Police crackdowns on illegal gun carrying: A systematic review of their impact on gun crime. *Journal of Experimental Criminology*, 2, 227–261. <http://dx.doi.org/10.1007/s11292-006-9005-x>
- Langman, P. F. (2009). *Why kids kill: Inside the minds of school shooters*. New York, NY: Palgrave, MacMillan.
- Loeber, R., & Farrington, D. P. (1998 (Eds.)). *Serious and violent juvenile offenders: Risk factors and successful interventions*. Thousand Oaks, CA: Sage.
- Loeber, R., & Farrington, D. P. (Eds.). (2012). *From juvenile delinquency to adult crime: Criminal careers, justice policy, and prevention*. New York, NY: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780199828166.001.0001>
- Lösel, F., & Farrington, D. P. (2012). Direct protective and buffering protective factors in the development of youth violence. *American Journal of Preventive Medicine*, 43, S8–S23. <http://dx.doi.org/10.1016/j.amepre.2012.04.029>
- Lupien, S. J., McEwen, B. S., Gunnar, M. R., & Heim, C. (2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Reviews Neuroscience*, 10, 434–445. <http://dx.doi.org/10.1038/nrn2639>
- Marwick, A., & Boyd, D. (2011). *The drama! Teen conflict, gossip, and bullying in networked publics*. Paper presented at the Oxford Internet Institute's "A Decade in Internet Time: Symposium on the Dynamics of the Internet and Society," Oxford, England.
- McGarrell, E. F., Chernak, S., Wilson, J. M., & Corsaro, N. (2006). Reducing homicide through a "lever-pulling" strategy. *Justice Quarterly*, 23, 214–231. <http://dx.doi.org/10.1080/07418820600688818>
- McKenna, K. Y. A., & Bargh, J. A. (1998). Coming out in the age of the Internet: Identity "demarginalization" through virtual group participation. *Journal of Personality and Social Psychology*, 75, 681–694.
- Mihalic, S., Fagan, A., Irwin, K., Ballard, D., & Elliott, D. (2004). Blueprints for violence prevention. *National Criminal Justice Reference Service*. Retrieved from www.colorado.edu/cspv/blueprints/
- Miller, M., Hemenway, D., & Azrael, D. (2007). State-level homicide victimization rates in the U.S. in relation to survey measures of household firearm ownership, 2001–2003. *Social Science & Medicine*, 64, 656–664. <http://dx.doi.org/10.1016/j.socscimed.2006.09.024>
- Mischel, W., & Ayduk, O. (2004). Willpower in a cognitive-affective processing system: The dynamics of delay of gratification. In R. F. Baumeister & K. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 99–129). New York, NY: Guilford Press.
- Models for Change. (2014). Systems reform in juvenile justice. A program of the John D. and Catharine T. MacArthur Foundation. Retrieved from <http://www.modelsforchange.net/index.html>
- Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., . . . Caspi, A. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *PNAS Proceedings of the National Academy of Sciences of the United States of America*, 108, 2693–2698. <http://dx.doi.org/10.1073/pnas.1010076108>
- Mohler, G. O., Short, M. B., Brantingham, P. J., Schoenberg, F. P., & Tita, G. E. (2011). Self-exciting point process modeling of crime. *Journal of the American Statistical Association*, 106, 100–108. <http://dx.doi.org/10.1198/jasa.2011.ap09546>
- Moon, B., & Alarid, L. F. (2015). School bullying, low self-control, and opportunity. *Journal of Interpersonal Violence*, 30, 839–856. <http://dx.doi.org/10.1177/0886260514536281>
- Moore, M. H., Petrie, C. V., Braga, A. A., & McLaughlin, B. L. (Eds.). (2003). *Deadly lessons: Understanding lethal school violence*. Washington, DC: National Academies Press.
- Morrill, C., & Musheno, M. (in press). *Youth conflict: Trust and control in a high-poverty school*. Chicago, IL: University of Chicago Press.
- Morrison, B. (2007). Schools and restorative justice. In G. Johnstone & D. W. van Ness (Eds.), *Handbook of restorative justice* (pp. 325–350). Portland, OR: Wilan Publishing.
- Nansel, T. R., Overpeck, M. D., Haynie, D. L., Ruan, W. J., & Scheidt, P. C. (2003). Relationships between bullying and violence among U.S. youth. *Archives of Pediatrics & Adolescent Medicine*, 157, 348–353. <http://dx.doi.org/10.1001/archpedi.157.4.348>
- Nathanson, A. I. (1999). Identifying and explaining the relationship between parental mediation and children's aggression. *Communication Research*, 26, 124–143. <http://dx.doi.org/10.1177/009365099026002002>
- Nathanson, A. I. (2004). Factual and evaluative approaches to modifying children's responses to violent television. *Journal of Communication*, 54, 321–336. <http://dx.doi.org/10.1111/j.1460-2466.2004.tb02631.x>
- National Center for Injury Prevention and Control. (2011). *Web-based injury statistics and query and reporting system, fatal injury reports, 1999–2011*. Atlanta, GA: Centers for Disease Control and Prevention. Retrieved from http://webappa.cdc.gov/sasweb/ncipc/mortrate10_us.html
- National Research Council. (2005). *Firearms and violence: A critical review*. Washington, DC: The National Academies Press.
- Neill, D. B., & Gorr, W. L. (2007). Detecting and preventing emerging epidemics of crime. *Advances in Disease Surveillance*, 4, 13. Retrieved from <http://www.isdsjournal.org/articles/1945.pdf>
- Newman, K. S., & Fox, C. (2009). Repeat tragedy: Rampage school shootings 2002–2008. *American Behavioral Scientist*, 52, 1286–1308. <http://dx.doi.org/10.1177/0002764209332546>
- Newman, K. S., Fox, C., Harding, D., Mehta, J., & Roth, W. (2004). *Rampage: The social roots of school shootings*. New York, NY: Basic Books.
- Ogden, C. L., Mofitt, T. E., Broadbent, J. M., Dickson, N., Hancox, R. J., Harrington, H., . . . Caspi, A. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology*, 20, 673–716. <http://dx.doi.org/10.1017/S0954579408000333>
- Paik, H., & Comstock, G. (1994). The effects of television violence on antisocial behavior: A meta-analysis. *Communication Research*, 21, 516–546. <http://dx.doi.org/10.1177/009365094021004004>
- Papachristos, A. V., & Wildeman, C. (2014). Network exposure and homicide victimization in an African American community. *American Journal of Public Health*, 104, 143–150. <http://dx.doi.org/10.2105/AJPH.2013.301441>
- Paulhus, D. L., & Williams, K. M. (2002). The dark triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, 36, 556–563. [http://dx.doi.org/10.1016/S0092-6566\(02\)00505-6](http://dx.doi.org/10.1016/S0092-6566(02)00505-6)
- Piquero, A., Farrington, D., Welsh, B., Tremblay, R., & Jennings, W. (2009). Effects of early family/parent training programs on antisocial behavior and delinquency. *Journal of Experimental Criminology*, 5, 83–120. <http://dx.doi.org/10.1007/s11292-009-9072-x>
- Piquero, A., Jennings, W., & Farrington, D. (2010). On the malleability of self-control: Theoretical and policy implications regarding a general theory of crime. *Justice Quarterly*, 27, 803–834. <http://dx.doi.org/10.1080/07418820903379628>
- Report of the Office of the Child Advocate for the State of Connecticut. (2014). *Shooting at Sandy Hook Elementary School*. Retrieved from <http://www.ct.gov/oca/lib/oca/sandyhook11212014.pdf>
- Resnick, M. D., Ireland, M., & Borowsky, I. (2004). Youth violence perpetration: What protects? What predicts? Findings from the National Longitudinal Study of Adolescent Health. *The Journal of Adolescent Health*, 35, 424.e1–424.e10. <http://dx.doi.org/10.1016/j.jadohealth.2004.01.011>
- Reynolds, A. J., Temple, J. A., Robertson, D. L., & Mann, E. A. (2001). Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15-year follow-up of low-income

- children in public schools. *JAMA: Journal of the American Medical Association*, 285, 2339–2346. <http://dx.doi.org/10.1001/jama.285.18.2339>
- Richardson, E. G., & Hemenway, D. (2011). Homicide, suicide, and unintentional firearm fatality: Comparing the United States with other high-income countries, 2003. *The Journal of Trauma*, 70, 238–243. <http://dx.doi.org/10.1097/TA.0b013e3181dbaddf>
- Rios, V. M. (2011). *Punished: Policing the lives of black and Latino boys*. New York, NY: New York University Press.
- Rocque, M. (2012). Exploring school rampage shootings: Research, theory, and policy. *The Social Science Journal*, 49, 304–313. <http://dx.doi.org/10.1016/j.soscij.2011.11.001>
- Romer, D., Jamieson, P., & Jamieson, K. H. (2006). Are news reports of suicide contagious? A stringent test in six U.S. cities. *Journal of Communication*, 56, 253–270. <http://dx.doi.org/10.1111/j.1460-2466.2006.00018.x>
- Sampson, R. J. (2012). *Great American city: Chicago and the enduring neighborhood effect*. Chicago, IL: University of Chicago Press. <http://dx.doi.org/10.7208/chicago/9780226733883.001.0001>
- Savage, J., & Yancey, C. (2008). The effects of media violence exposure on criminal aggression: A meta-analysis. *Criminal Justice and Behavior*, 35, 772–791. <http://dx.doi.org/10.1177/0093854808316487>
- Schubert, C. A., & Mulvey, E. P. (2014). *Juvenile justice bulletin: Behavioral health problems, treatment, and outcomes in serious youthful offenders* (NCJ 242440). Washington, DC: U. S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention. Retrieved from <http://www.ojjdp.gov/publications/pubresults.asp>
- Shaw, J. W. (1995). Community policing against guns: Public opinion of the Kansas City gun experiment. *Justice Quarterly*, 12, 695–710. <http://dx.doi.org/10.1080/07418829500096251>
- Slater, M. D., Henry, K. L., Swaim, R. C., & Anderson, L. L. (2003). Violent media content and aggressiveness in adolescents: A downward spiral model. *Communication Research*, 30, 713–736. <http://dx.doi.org/10.1177/0093650203258281>
- Snyder, H. N. (2011). *Arrests in the United States, 1980–2009. Patterns and trends* (NCJ 234319). Washington, DC: U. S. Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice. Retrieved from <http://www.bjs.gov/content/pub/pdf/aus8009.pdf>
- Spivak, H., & Prothrow-Stith, D. (2001). The need to address bullying—an important component of violence prevention. *JAMA: Journal of the American Medical Association*, 285, 2131–2132. <http://dx.doi.org/10.1001/jama.285.16.2131>
- Stack, S. (1989). The effect of publicized mass murders and murder-suicides on lethal violence, 1968–1980: A research note. *Social Psychiatry and Psychiatric Epidemiology*, 24, 202–208.
- Steinberg, L. (2008). A social neuroscience perspective on adolescent risk-taking. *Developmental Review*, 28, 78–106. <http://dx.doi.org/10.1016/j.dr.2007.08.002>
- Stoddard, S. A., Whiteside, L., Zimmerman, M. A., Cunningham, R. M., Chermack, S. T., & Walton, M. A. (2013). The relationship between cumulative risk and promotive factors and violence behavior among urban adolescents. *American Journal of Community Psychology*, 51, 57–65. <http://dx.doi.org/10.1007/s10464-012-9541-7>
- Strang, H., Sherman, L. W., Mayo-Wilson, E., Woods, D., & Ariel, B. (2013). Restorative justice conferencing (RJC) using face-to-face meetings of offenders and victims: Effects on offender recidivism and victim satisfaction. A systematic review. *Campbell Systematic Reviews*, 9(12). Retrieved from <http://campbellcollaboration.org/lib/project/63/>
- Teplin, L. A., Jakubowski, J. A., Abram, K. M., Olson, N. D., Stokes, M. L., & Welty, L. J. (2014). Firearm homicide and other causes of death in delinquents: A 16-year prospective study. *Pediatrics*, 134, 63–73. <http://dx.doi.org/10.1542/peds.2013-3966>
- Tolan, P. H., Gorman-Smith, D., & Henry, D. B. (2003). The developmental ecology of urban males' youth violence. *Developmental Psychology*, 39, 274–291. <http://dx.doi.org/10.1037/0012-1649.39.2.274>
- Valkenburg, P. M., Beentjes, H., Nikken, P., & Tan, E. (2002). Kijkwijzer: The Dutch rating system for audiovisual productions. *Communications*, 27, 79–102. <http://dx.doi.org/10.1515/comm.27.1.79>
- Valkenburg, P. M., Krckmar, M., Peeters, A. L., & Marseille, N. M. (1999). Developing a scale to assess three styles of television mediation: “Instructive mediation,” “restrictive mediation,” and “social co-viewing.” *Journal of Broadcasting & Electronic Media*, 43, 52–66. <http://dx.doi.org/10.1080/08838159909364474>
- Van Dorn, R., Volavka, J., & Johnson, N. (2012). Mental disorder and violence: Is there a relationship beyond substance use? *Social Psychiatry and Psychiatric Epidemiology*, 47, 487–503. <http://dx.doi.org/10.1007/s00127-011-0356-x>
- van Geel, M., Vedder, P., & Tanilon, J. (2014). Bullying and weapon carrying: A meta-analysis. *Journal of the American Medical Association Pediatrics*, 168, 714–720. <http://dx.doi.org/10.1001/jamapediatrics.2014.213>
- Veenema, A. H. (2009). Early life stress, the development of aggression and neuroendocrine and neurobiological correlates: What can we learn from animal models? *Frontiers in Neuroendocrinology*, 30, 497–518. <http://dx.doi.org/10.1016/j.yfme.2009.03.003>
- Vossekuil, B., Fein, R. A., Reddy, M., Borum, R., & Modzeleski, W. (2002). *The final report and findings of the safe school initiative: Implications for the prevention of school attacks in the United States*. Washington, DC: U. S. Secret Service and Department of Education.
- Webster, D. W., Freed, L. H., Frattaroli, S., & Wilson, M. H. (2002). How delinquent youths acquire guns: Initial versus most recent gun acquisitions. *Journal of Urban Health*, 79, 60–69. <http://dx.doi.org/10.1093/jurban/79.1.60>
- Webster, D. W., Meyers, J. S., & Buggs, S. (2014, December 18–19). Youth acquisition and carrying of firearms in the United States: Patterns, consequences, and strategies for prevention. Proceedings of Means of Violence Workshop, Forum of Global Violence Prevention, Institutes of Medicine of the National Academies, Washington, DC.
- Webster, D. W., Vernick, J. S., & Bulzacchelli, M. T. (2009). Effects of state-level firearm seller accountability policies on firearm trafficking. *Journal of Urban Health*, 86, 525–537. <http://dx.doi.org/10.1007/s11524-009-9351-x>
- Webster, D. W., Vernick, J. S., Zeoli, A. M., & Manganello, J. A. (2004). Effects of youth-focused firearm laws on youth suicides. *JAMA: Journal of the American Medical Association*, 292, 594–601. <http://dx.doi.org/10.1001/jama.292.5.594>
- Webster, D. W., & Wintemute, G. J. (2015). Effects of policies designed to keep firearms from high-risk individuals. *Annual Review of Public Health*, 36, 21–37. <http://dx.doi.org/10.1146/annurev-publhealth-031914-122516>
- Welsh, B. C., Lipsey, M. W., Rivara, F. P., Hawkins, J. D., Aos, S., & Hollis-Peel, M. E. (2012). Promoting change, changing lives: Effective prevention and intervention to reduce serious offending. In R. Loeber & D. P. Farrington (Eds.), *From juvenile delinquency to adult crime: Criminal careers, justice policy, and prevention* (pp. 245–277). New York, NY: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780199828166.003.0009>
- White, H. R., Fite, P., Pardini, D., Mun, E. Y., & Loeber, R. (2013). Moderators of the dynamic link between alcohol use and aggressive behavior among adolescent males. *Journal of Abnormal Child Psychology*, 41, 211–222. <http://dx.doi.org/10.1007/s10802-012-9673-0>
- Whiteside, L. K., Ranney, M. L., Chermack, S. T., Zimmerman, M. A., Cunningham, R. M., & Walton, M. A. (2013). The overlap of youth violence among aggressive adolescents with past-year alcohol use: A latent class analysis: Aggression and victimization in peer and dating violence in an inner city emergency department sample. *Journal of*

- Studies on Alcohol and Drugs*, 74, 125–135. <http://dx.doi.org/10.15288/jsad.2013.74.125>
- Williams, K. R., & Guerra, N. G. (2011). Perceptions of collective efficacy and bullying perpetration in schools. *Social Problems*, 58, 126–143. <http://dx.doi.org/10.1525/sp.2011.58.1.126>
- Wills, T. A., Sargent, J. D., Gibbons, F. X., Gerrard, M., & Stoolmiller, M. (2009). Movie exposure to alcohol cues and adolescent alcohol problems: A longitudinal analysis in a national sample. *Psychology of Addictive Behaviors*, 23, 23–35. <http://dx.doi.org/10.1037/a0014137>
- Xu, J.-M., Jun, K. S., Zhu, X., & Bellmore, A. (2012). Learning from bullying traces in social media. In *2012 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies* (pp. 656–666). Montreal, Canada: Association for Computational Linguistics. Retrieved from [http://](http://delivery.acm.org/10.1145/2390000/2382139/p656-xu.pdf?ip=73.132.105.218&id=2382139&acc=OPEN&key=4D4702B0C3E38B35%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35%2E6D218144511F3437&CFID=702027930&CFTOKEN=86263369&__acm__=1439316426_8c982f7eb8c880c4481963e734565d53)
- Zheng, Y., & Cleveland, H. H. (2013). Identifying gender-specific developmental trajectories of nonviolent and violent delinquency from adolescence to young adulthood. *Journal of Adolescence*, 36, 371–381. <http://dx.doi.org/10.1016/j.adolescence.2012.12.007>

Received February 5, 2014

Revision received May 29, 2015

Accepted June 8, 2015 ■

EXHIBIT 12



ACTIVE SHOOTER

RECOMMENDATIONS AND ANALYSIS
FOR RISK MITIGATION

2016 EDITION AS RELEASED BY THE NEW YORK CITY
POLICE DEPARTMENT

James P. O'Neill

Police Commissioner

John J. Miller

Deputy Commissioner of
Intelligence and
Counterterrorism

James R. Waters

Chief of Counterterrorism

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	2
EXECUTIVE SUMMARY	3
RECENT TRENDS	6
TRAINING & AWARENESS CHALLENGE RESPONSE	6
THE TARGETING OF LAW ENFORCEMENT & MILITARY PERSONNEL: IMPLICATIONS FOR PRIVATE SECURITY	7
ATTACKERS INSPIRED BY A RANGE OF IDEOLOGIES PROMOTING VIOLENCE	8
SOCIAL MEDIA PROVIDES POTENTIAL INDICATORS, SUPPORTS RESPONSE	9
THE POPULARITY OF HANDGUNS, RIFLES, AND BODY ARMOR NECESSITATES SPECIALIZED TRAINING	10
BARRICADE AND HOSTAGE-TAKING REMAIN RARE OCCURRENCES IN ACTIVE SHOOTER EVENTS	10
RECOMMENDATIONS	11
POLICY	12
PROCEDURE	12
SYSTEMS	13
TRAINING	13
ANALYSIS OF ACTIVE SHOOTER INCIDENTS: 1966-2016	15
ANALYTIC METHODOLOGY	20
ADDITIONAL ACTIVE SHOOTER RESOURCES	22
APPENDIX: COMPENDIUM OF ACTIVE SHOOTER INCIDENTS	24
BY LOCATION	26
OFFICE BUILDINGS	26
OPEN COMMERCIAL	35
FACTORIES AND WAREHOUSES	53
SCHOOLS	61
OTHER	81
SELECTED INTERNATIONAL ATTACKS	104
SELECTED FOILED PLOTS (1966-2012)	126

ACKNOWLEDGEMENTS

The 2016 Edition of the *Active Shooter: Recommendations and Analysis for Risk Mitigation* was prepared by the Counterterrorism Bureau of the New York City Police Department (NYPD), led by Deputy Commissioner John J. Miller and Chief James R. Waters, with significant collaboration from the Data Analytics Unit, led by Assistant Commissioner Dr. Evan Levine. The 2016 edition was overseen by Deputy Chief John O'Connell and Inspector Kevin Williams of the Counterterrorism Division and Director Meghann Teubner and Deputy Director Naureen Kabir of the Terrorism Threat Analysis Group. Authors and subject matter experts include Lieutenant Brian Eriksen, Sergeant Eddie O'Brien, Detective Raymond McPartland, Police Officer Jason Mazeski and Intelligence Research Specialists Katherine Dowling and Morgan Hitzig.

Both the 2012 and 2010 Editions of *Active Shooter: Recommendations and Analysis for Risk Mitigation* were prepared by the Counterterrorism Bureau of the New York City Police Department (NYPD), led by former Deputy Commissioner Richard Daddario and Chief James R. Waters. The drafting of these reports was a collaborative effort. The various authors and subject-matter experts include: Sergeant Richard Alvarez, Detective John Andersen (retired), Sergeant Christopher Biddle (retired), Deputy Chief Michael Blake (retired), former Intelligence Research Specialist Thomas Brennan, Lieutenant Stephenie Clark (retired), Detective Joseph Cotter, Administrative Program Manager Ryan Merola, Director Courtney MacGregor, Detective Peter Montella (retired), Intelligence Research Specialist Peter Patton, Deputy Inspector Michael Riggio (retired), and former Intelligence Research Specialist Gregory Schwartz. In addition, former Intelligence Research Specialist Aviva Feuerstein, former Intelligence Research Specialist Nathaniel Young, Detective Raymond McPartland, and Assistant Commissioner Dr. Evan Levine made extraordinary contributions to this report; the completion of this work is due largely to their efforts. *Active Shooter: Recommendations and Analysis for Risk Mitigation* was printed by the NYPD Printing Section. The project was overseen by Deputy Commissioner Jessica Tisch.

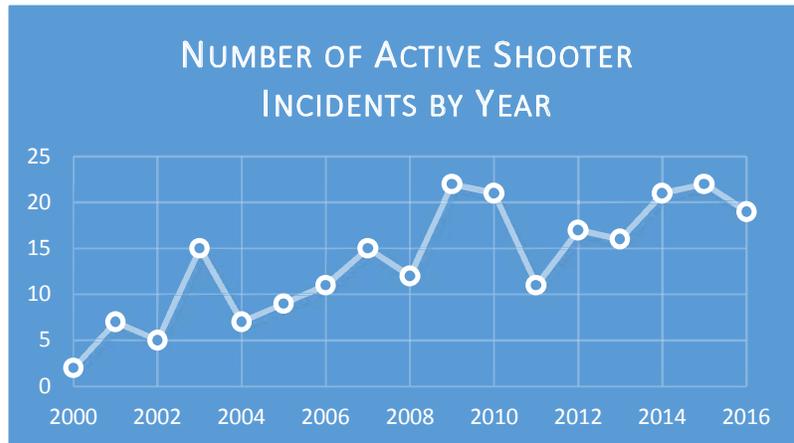
EXECUTIVE SUMMARY

Given the tragic prevalence of active shooter incidents in recent years, Americans have become increasingly familiar with the significant impact they have on communities across all 50 states. Within the past four years, a number of high-profile cases have demonstrated that active-shooters target a wide range of victims and are driven by a diverse set of narratives, to include personal grievances, political motivations, and the influence of international terrorism. On June 12, 2016 the shooting at the Pulse nightclub in Orlando, Florida—which left 49 people dead—was not only a tragic

terrorist attack, but also the deadliest mass shooting in U.S. history, surpassing the Virginia Tech shooting in 2007 that left 33 people dead. Attacks like the Orlando shooting illustrate the importance of and need for constantly-refined definitions, procedures, systems, and training designed to diminish the risks from a diverse set of active shooters motivated by a broad range of ideologies. As such, the NYPD has developed mitigation recommendations, tailored to private security personnel, based on an analysis of past active shooter attacks and a careful review of previous studies. For the private security community, our analysis shows that business locations—including office buildings, malls, nightclubs, and restaurants—are among the most frequent sites targeted by active shooters, highlighting a clear and legitimate threat.

The 2016 Edition of the New York City Police Department’s (“NYPD”) *Active Shooter: Recommendations and Analysis for Risk Mitigation* demonstrates that during the period studied, from 1966 to 2016, 308 active shooter incidents took place in the United States, resulting in at least 930 killed and 1200 wounded. The analysis section presents descriptive statistics of all the incidents between 1966 and 2016, with details on the number of casualties, the resolution of the incidents, and a breakdown of the locations of the incidents; the analysis also describes the characteristics of each attacker, including their age, gender, and relationship to the victim(s). The report incorporates an additional 78 incidents that occurred in the four-year period since the release of the 2012 Edition. The 2012 edition contained information and analysis of active shooter incidents from 1966 to 2012.

The NYPD has performed statistical analysis to identify common characteristics among active shooter attacks. Data about the attacks and attackers was collected from previous scholarship, open source government reports, and media accounts. The NYPD did not use special-access government sources to compile the cases in the Compendium; all information is open-source and publicly available. As a result, the cases included in the data set may demonstrate a sampling bias. For attacks that occurred between 2000 and 2016, the Compendium is a nearly comprehensive account of active shooter incidents—to include



TO HIGHLIGHT THE IMPORTANCE OF ACTIVE SHOOTER PREPAREDNESS, ACCORDING TO STATISTICS COMPILED BY THE NYPD, OVER 40% OF ACTIVE SHOOTER INCIDENTS ANALYZED OCCURRED IN BUSINESS LOCATIONS, INCLUDING OFFICE BUILDINGS, OPEN COMMERCIAL LOCATIONS, AND WAREHOUSES.

those categorized as terrorist attacks—that attracted news coverage. For attacks that occurred prior to 2000, the Compendium may not be comprehensive because the attacks pre-date widespread internet news reporting.

Definition of an ‘Active Shooter’ Incident

Active shooter incidents are a specific type of emergency situation necessitating preparatory response protocols by both the public and law enforcement. The Department of Homeland Security (DHS) defines an active shooter as “a person(s) actively engaged in killing or attempting to kill people in a confined and populated area.” In its definition, DHS notes that, “in most cases, active shooters use firearm(s) and there is no pattern or method to their selection of victims.” The NYPD has limited this definition to include only cases that spill beyond an intended victim to involve others, including bystanders and collateral casualties.¹ The NYPD excludes: gang-related shootings, shootings that solely occurred in domestic settings, robberies, drive-by shootings, attacks that did not involve a firearm, and attacks categorized primarily as hostage-taking incidents.

Trends

This report highlights trends in active shooter data over the last four years that inform the recommendations put forth by our subject matter experts. Out of the 78 cases analyzed between 2013 and 2016:



24% of attackers demonstrated tactical training and awareness.



17% of attackers targeted law enforcement or military personnel.



At least 23% of attackers were inspired by previous active shooter situations or ideologies that espoused violent shootings as a means of support for their movement.

¹ E.g., a case of a grievance against an employer leads to an attack targeting not only the direct supervisor but also others in the workplace.



At least 15% of attackers indicated an imminent attack on any of their social media networks, including but not limited to Facebook, Twitter, blogs, forums, and YouTube.



42% of attackers carried more than one weapon. Overall, attackers preferred the use of handguns over other weapons.



19% of attackers used body armor during their attack.



6% of attacks led to a barricade situation, and in only 4% of cases did the attacker take hostages.

Recommendations for Your Organization

Because active shooter attacks are dynamic events and often conclude in the first 10-15 minutes of the incident, preparation is key to mitigating the impact of an attack. To this end, the NYPD has developed recommendations based on an analysis of past active shooter incidents and careful review of previous studies.ⁱ Unlike other works on active shooter attacks, this guide provides recommendations tailored to private sector security policy, procedure, systems, and training.

The drivers of active shooter incidents are unpredictable, which means that the NYPD cannot put forward a single set of best-practices for private security response to such incidents; however, the NYPD has compiled a list of recommendations for building security personnel to mitigate the risks from active shooter attacks.ⁱⁱ The type of police response to an active shooter attack depends on the unique circumstances of the incident. In the event of such an attack, private security personnel are advised to follow the instructions of first-responders.²

² The NYPD developed these recommendations based on a close analysis of active shooter incidents from 1966 to 2016. This Compendium of cases, presented in the Appendix, includes 308 active shooter incidents as well as a number of foiled plots and international incidents. The compendium is organized chronologically by type of facility targeted and is broken down into office buildings, open commercial areas, factories and warehouses, schools, and other settings.

TRENDS

While many longstanding trends have held true from earlier studies, NYPD analysis for the 2016 edition of this report highlights several key trends from the 2013-2016 data set, including: (1) the employment of advanced tactics, (2) the targeting of law enforcement and military personnel, (3) the inspiration of attackers by radical narratives, (4) the use of social media as a helpful tool both for attackers and law enforcement, (5) the choice of weaponry and body armor use, and (6) the devolvement of an active shooter situation into a negotiation with law enforcement.



Training & Awareness Challenge Response

The trend of active shooters who have received some weapons training, and/or have conducted research on a range of tactics and targeting methods, is important to

note for individuals in the private sector community because sophisticated attackers are more adept both at drawing in security personnel and rapidly adapting to situations as they unfold, which will likely increase the number of civilian and law enforcement casualties in active shooter attacks. This metric tracked the number of cases in which an attacker demonstrated tactical awareness during the course of the attack, to include:

- Training received by members of the military, law enforcement, and private security organizations.
- Knowledge gleaned from prior individual training, including repeated training with firearms and self-study of tactics.³
- The use of tactics to stall responders (including the use of barricades), prevent victims from fleeing (including blocking doors or setting fires near exits), and provide the attacker with a tactical advantage (including the use of sniper tactics and high vantage points).

Of the 78 cases analyzed, 19 involved a shooter who demonstrated a degree of tactical training and awareness (24 percent). The four highest casualty cases in the 2013-2016 timeframe were carried out by attackers with advanced knowledge of tactics.

Statistics 1966-2016



³ Cases in which the attacker carried out prior, non-professional training were not included unless open source media reports indicated that their attacks were carried out with an uncommon level of tactical sophistication or ability.

- On July 7, 2016, Micah Johnson killed five police officers and injured six others during a Black Lives Matter protest. Johnson, a military veteran who served in a non-combat role in Afghanistan, employed shoot and move tactics, leading law enforcement to believe there were multiple shooters firing from different locations. The attack is considered the deadliest assault on law enforcement since 9/11.
- On June 12, 2016, Omar Mateen, a 29-year-old former private security guard, killed 49 individuals and wounded 53 others at the Pulse nightclub in Orlando, Florida. Mateen reportedly became proficient with firearms, receiving near-perfect scores during his range-administered firearms tests.
- On December 2, 2015, Syed Rizwan Farook and Tashfeen Malik carried out a shooting attack on a San Bernardino County Department of Public Health event, causing 14 deaths and 24 injuries. The couple wore tactical clothing and planted three explosive devices meant to target first responders at the scene.
- On May 23, 2014, Elliot Rodger killed six people and injured 14 others near the campus of the University of California, Santa Barbara. According to a manifesto he posted online, Rodger conducted a significant amount of preoperational planning, meticulously researching his attack venue, victims, and date of the attack in order to minimize law enforcement interference and maximize casualties.

Anecdotally, many failed attacks were planned by attackers wishing to utilize advanced tactics, with a particular aim of stalling responders and preventing victims from fleeing. Several shooters in disrupted or prematurely-ended attacks noted that they considered chaining doors at attack locations and laying spike strips in order to hinder law enforcement response and contain victims.⁴



The Targeting of Law Enforcement & Military Personnel: Implications for Private Security

Between 2013 and 2016, 13 active shooter incidents targeted law enforcement and military personnel (17 percent). This metric focuses only on cases in which law enforcement and military personnel were the intended target, rather than attacks in which members of law enforcement were injured or killed when responding to an active shooter situation.

- On July 17, 2016, Gavin Eugene Long killed three police officers and injured three others in Baton Rouge, Louisiana in the wake of the shooting of Alton Sterling. Long identified himself as a sovereign citizen and posted online about his hatred for law enforcement several times ahead of conducting his attack.
- On November 22, 2014, Curtis Wade Holley killed one and injured one other after he lit his house on fire to lure law enforcement officers to his home in order for him to conduct an ambush. Holley

⁴ For example, in his June 2014 attack outside the Forsyth County Courtroom in Georgia, Dennis Marx dropped homemade spike strips and used “smoke devices” in order to prevent law enforcement officers from disrupting his attack. In Oregon in 2016, a 17-year-old Newberg High School student planned to kill “at least 100 people” in his high school after isolating them within a chain-locked “kill zone.”

had been approached by law enforcement four times in the four days prior to conducting the attack.

Private sector security personnel are not targeted as frequently as law enforcement and the military, both of which are likely viewed as hard targets by attackers. Security personnel are typically targeted when encountered by shooter, as they potentially pose a threat to the shooter's ability to carry out an attack. In instances where only security personnel are killed, the ability to assess both intent and target are limited.

- On August 21, 2015, 68-year-old Kevin Downing walked into the federal office building at 201 Varick Street in New York City—his former place of employment—and shot a security officer before committing suicide.⁵
- On April 29, 2014, Geddy Lee Kramer walked into the Federal Express sorting facility at which he was employed, shot an unarmed security guard at the entrance to the facility, and opened fire on coworkers. No one was killed in the attack; however six were injured, including the security guard.
- On September 16, 2013, Aaron Alexis carried out a shooting attack on the headquarters of the Naval Sea Systems Command (NAVSEA) at the Washington Navy Yard in Washington D.C. As he progressed through the site of the attack, he fired upon security officer Richard Ridgell, killed him, and took his pistol. He fired at another security officer later in his attack, missed him, and fled from the officer. Alexis was a former Petty Officer Third Class, who received basic weapons training at the U.S. Navy Recruit Training Command in Great Lakes, Illinois.



Attackers Inspired by a Range of Ideologies Promoting Violence

In 2015, the *New York Times* conducted a survey with the Police Executive Research Forum of 382 U.S. law enforcement agencies and found that 74 percent of participating law enforcement agencies reported anti-government extremism as one of the top three terrorist threats in their jurisdiction while 39 percent listed extremism connected with Islamic terrorist organizations. These figures suggest a range of threats across the ideological spectrum that inspire people to commit acts of violence, including active shooter attacks. 23 percent of attackers highlighted in the 2012-2016 data set were either inspired by another active shooter or an ideology (18 cases).

- The most common incident claimed as inspiration for ideologically-motivated attacks in the NYPD data set was the Columbine shooting in 1999; however, other recent high-profile attacks such as the 2012 movie theater attack in Aurora, Colorado and Dylann Roof's 2015 attack on a church in Charleston, South Carolina were cited by 2013-2016 attackers as inspiration.
- Attacks in this metric also included those inspired by ideologies that promoted violence, including foreign terrorist organizations, white supremacist groups, and the Sovereign Citizens Movement.

A number of domestic extremists have recently evoked Dylann Roof—whose white supremacist ideology led him to murder nine African Americans and injure one other in Charleston, South Carolina on June 17, 2015—as inspiration to plan or conduct violent attacks, including mass shootings against minority

⁵ This case was not included in the cases for analytical review, as it did not meet criteria for inclusion due to its premature end.

populations in the United States, a trend that may continue for those looking to carry out attacks against ethnic, religious, and other minorities.

- In 2016, a number of anonymous threats inspired by Dylann Roof’s violence targeted the minority community in Charleston, South Carolina. A Charleston woman received a post card in July 2016 warning “Charleston – the sequel – coming soon to a mosque near you.” As many as eight Charleston businesses received threatening anonymous letters during the week of November 6, 2016, with one specifically referencing Roof. The letter stated, “Every one of the nine lives sacrificed by his greatness, Mr. Dylann S. Roof, is one less I will need to sacrifice.”
- In July 2016, John Russell Houser shot and killed two people and wounded nine others at a movie theater in Louisiana before turning the gun on himself. Police found a note Houser left behind that twice referenced Roof, saying explicitly, “Thank you for the wake-up call, Dylann.”



Social Media Provides Potential Indicators, Supports Response

In a number of cases the attacker had indicators of an imminent attack on at least one of their social media networks, including, but not limited to, Facebook, Twitter, blogs, forums, and YouTube. Of the 78 cases analyzed, news media reported social media indicators prior to the attack in 12 instances (15.4 percent). This number may underestimate the number of cases with online indicators since many social media outlets allow their posters anonymity and many social media profiles are only accessible by a select private audience.

- Prior to his attack on Baton Rouge police officers on July 17, 2016, Gavin Eugene Long had a long trail of online postings documenting his interest in “black separatism” and fury at police shootings of African American males.
- Prior to his 2015 attack on the Emmanuel African Methodist Episcopal Church, Dylann Roof posted repeatedly to his website, including a copy of his attack manifesto which detailed his white supremacist views and his rationale for choosing the Charleston church.
- Prior to killing six people and injuring 14 others near the campus of the University of California, Santa Barbara in 2014, Elliot Rodger uploaded a video to YouTube entitled “Elliot Rodger’s Retribution” in which he detailed his rationale for the attack. In the video, he revealed that he wished to punish women for rejecting him, that he envied sexually active men, and that he hated women, racial minorities, and interracial couples.

Social media has also been used successfully for both rescue and intelligence gathering during active shooter incidents. Many of the shooting cases detailed in the NYPD’s analysis involved social media messages to the public by both law enforcement and private institutions. As seen in *Figure 1*, at the outset of the 2016 Pulse nightclub shooting, staff members posted on Facebook for individuals to flee the club. Law enforcement was able to glean live intelligence transmitted through text messages and social media posts from individuals held hostage in the bathroom.



Figure 1: Social media post by an employee during the Pulse nightclub shooting.



The Popularity of Handguns, Rifles, and Body Armor Necessitates Specialized Training



The 2013-2016 data set demonstrates that handguns remain the most prevalently used weapon in this timeframe, followed by rifles. 75 percent of attacks in the 2013-2016 data set employed handguns to conduct their attacks (59 cases). Training responders in the management of incidents in which handguns and rifles are used remains a priority for both law enforcement and security personnel. Beyond taking into account different types of weaponry, security personnel should remain cognizant of other factors which would affect their ability to respond to an active shooter event, including the amount of ammunition carried by the shooter, and whether the attacker is wearing body armor.

In cases where this information has been reported accurately—though this information is limited and typically only available in high-profile attacks or disruptions—the quantities of ammunition correlates with the demonstrated or stated intent to carry out a large-scale, mass casualty attack. Incidents with reporting on large quantities of ammunition include the 2016 Pulse nightclub attack (264 rounds used), the 2015 Garland Texas attack (1,500 unspent rounds found), and the 2014 Isla Vista attack (548 unspent rounds found). The use of body armor in active shooter attacks has consistently trended slightly upwards in recent years. Of the 78 cases in the 2013-2016 data set, there were 15 attacks in which body armor was used by the attacker (19 percent). The quality of this body armor ranges from homemade vests to high-end market tactical gear. In the 2015 shooting of a Colorado Planned Parenthood location, Robert Lewis Dear Jr. wore a homemade ballistic vest made out of silver coins and duct tape. Private security personnel may find their guns ineffective in an active shooter event in which the shooter is wearing body armor.



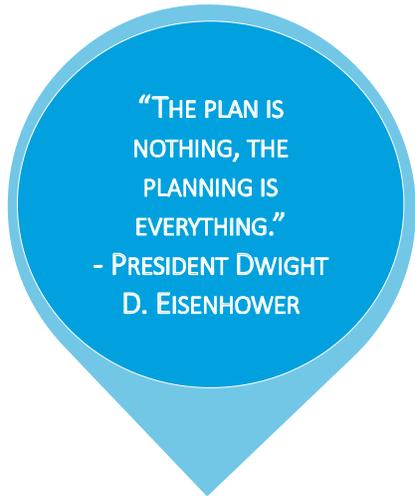
Barricade and Hostage-Taking Remain Rare Occurrences in Active Shooter Events

In only five cases did the active shooter barricade himself or herself from law enforcement during the course of the attack. Of these five cases, the attacker was killed in four of them and committed suicide in the fifth case. In three of the cases, the attacker took hostages.

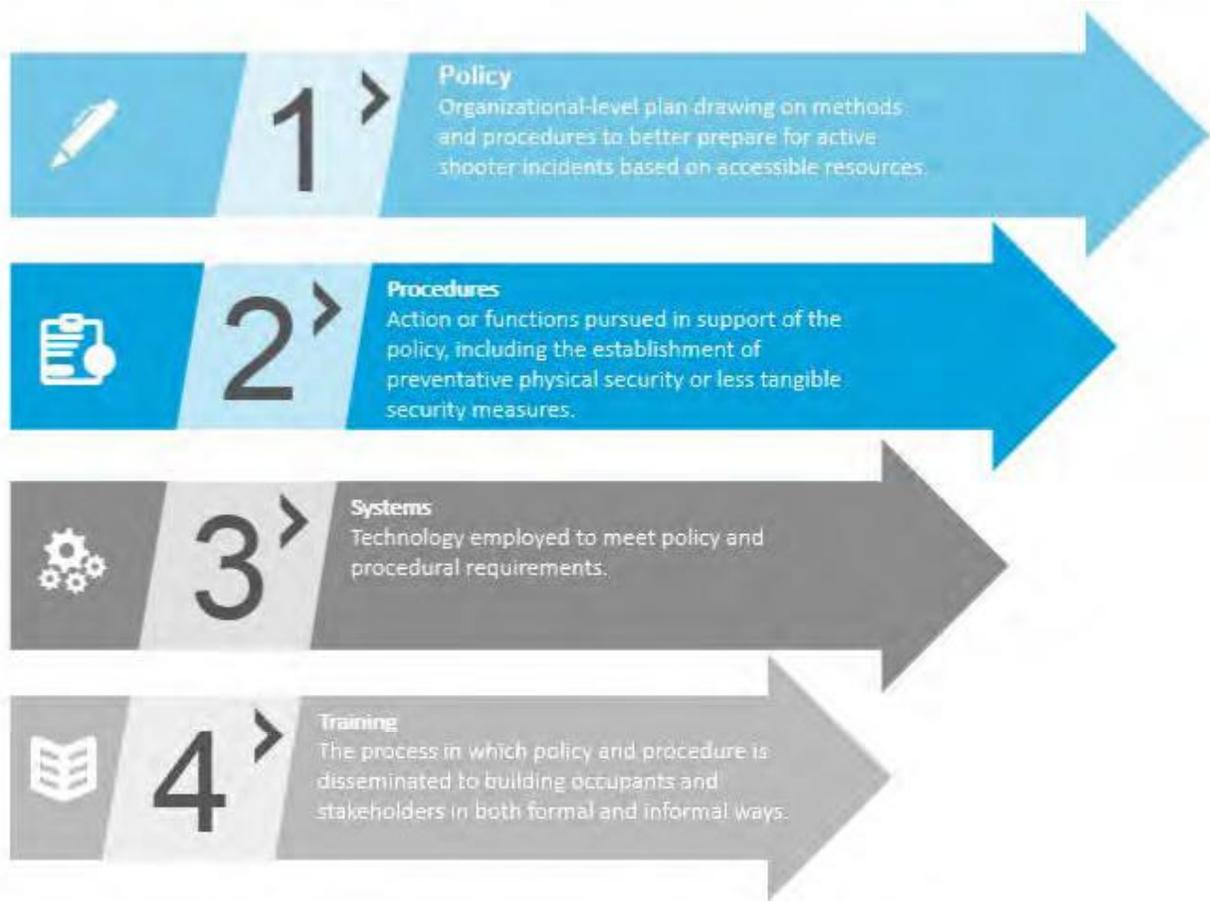
- Omar Mateen was able to barricade himself in a bathroom of the Pulse nightclub in the final stage of his June 12, 2016 attack. Police were able to break through the bathroom wall with the use of a BearCat vehicle.
- In the 2015 Colorado Planned Parenthood attack, which left three dead and nine injured, Robert Lewis Dear Jr. barricaded himself within the Planned Parenthood building with several hostages for three hours. Police were able to evacuate the majority of individuals trapped within the facility.

RECOMMENDATIONS

Based on a review and analysis of 50 years' worth of active shooter case data, the NYPD compiled a list of recommendations to mitigate the risks from active shooter attacks and improve the response to such incidents.ⁱⁱⁱ The goal of this guide is to provide recommendations tailored to private sector security plans and personnel. In the 2016 edition of this book the NYPD has organized its recommendations into four categories: policy, procedure, systems, and training. The recommendations section has been expanded to include a focus on policy, which will provide the foundation for organizational response to active shooter incidents; this section was not included in previous editions.



Private sector organizations should consider the following recommendations when developing an active shooter program:



POLICY

Policy refers to an organizational-level plan drawing on methods and procedures to better prepare for active shooter incidents based on accessible resources. Recommendations include:

- Implement an active shooter preparedness plan and update the plan yearly.
- Institute a workplace violence policy that offers zero tolerance towards workplace violence and an avenue to report threatening behavior.
- Human Resource-sponsored Employee Assistance Programs (EAP) should include a threat assessment team to help identify at risk employees prior to an event.
- In addition to the preparedness plan, a strong EAP should supplement the establishment of active shooter policies and procedures.
- Implement a communications / media liaison plan for an active shooter event for the designated public affairs officer.
- Establish a recovery policy that includes a transitional plan to resume normal operations after the event, even as an investigation is ongoing.
- Establish a reunification policy for building occupants during and after an active shooter event.

PROCEDURES

Procedure is a particular action or function that accomplishes the policy, including the establishment of preventative physical security measures like a camera system or conceptual measures like the incorporation of active shooter drills into the overall procedural plan.

- Incorporate an active shooter drill into the organization's emergency preparedness procedures.
- Conduct a realistic security assessment to determine the facility's vulnerability to an active shooter attack.
- Install certain hardening fixtures, such as bullet resistant windows.
- Identify multiple evacuation routes and practice evacuations under varying conditions; post evacuation routes in conspicuous locations throughout the facility; ensure that evacuation routes account for individuals with special needs and disabilities.
- Designate safe rooms with thick walls, solid doors with locks, minimal interior windows, first-aid emergency kits, communication devices, and duress alarms.
- Designate a point-of-contact with knowledge of the facility's security procedures and floor plan to liaise with police and other emergency agencies in the event of an attack.
- Vary security guards' patrols and patterns of operation.

ASSEMBLE EMERGENCY RESPONSE RESOURCE KIT CONTAINING:

- ACCESS CONTROL DEVICES (E.G. KEYS, FOBs, SECURITY SYSTEM PASS CODES)
- FLOOR PLANS
- HAND-HELD RADIOS WITH ACCESS TO FREQUENCY USED BY SECURITY PERSONNEL
- MOBILE CLOSED-CAPTION TELEVISION (CCTV) FEED ACCESS (E.G. TABLET WITH REMOTE ACCESS)

- Limit access to blueprints, floor plans, and other documents containing sensitive security information, but ensure these documents are available to law enforcement responding to an incident.
- Establish a central command station for building security.
- Identify and implement a lock-down (threat inside) or lockout (threat outside) procedure as soon as possible.

SYSTEMS

Systems refers to the technology employed to meet policy and procedural requirements, to include the implementation of the following:

- Credential-based access control systems that provide accurate attendance reporting, limit unauthorized entry, and do not impede emergency egress and entrance.
- Closed-circuit television (CCTV) systems that provide domain awareness of the entire facility and its perimeter; ensure that video feeds are viewable from a central command station and consider installing a remote access portal for first responders.
- Standardized public address system announcement for active shooter events.
- Communications infrastructure that allows for facility-wide, real-time messaging and include access for first responders.
- Elevator systems that may be controlled or locked down from a central command station.

TRAINING

Training is the process through which policy and procedure is disseminated to building occupants and stakeholders in both formal and informal ways.

- Train building occupants on how to identify indicators associated with threatening behavior and provide a method to report the incident to authorities.
- Train building occupants on response options outlined by the NYPD Shield Unit's Active Shooter training program when an active shooter is in the vicinity:^{iv}
 - **Avoid:** Building occupants should evacuate the facility if safe to do so; evacuees should leave behind their belongings, visualize their entire escape route before beginning to move, and avoid using elevators or escalators.
 - **Barricade:** If evacuating the facility is not possible, building occupants should hide in a secure area (preferably a safe room), lock the door, barricade the door with heavy furniture, cover all windows, turn off all lights, silence any electronic devices, lie on the floor, and remain silent.
 - **Confront:** If evacuating the facility or seeking shelter is not possible, building occupants should attempt to disrupt and/or incapacitate the active shooter by using improvised weapons, using aggressive force, and yelling.
- Provide building personnel with guidance on developing their own personal response plan.

- Train building occupants to call 911 as soon as it is safe to do so and provide the following information to the operator (*Figure 3*):
- Train building occupants on how to respond when law enforcement arrives on scene:
 - Follow all official instructions
 - Remain calm
 - Keep hands empty and visible at all times
 - Avoid making sudden or alarming movements
 - Avoid stopping or approaching responding officers during self-evacuation

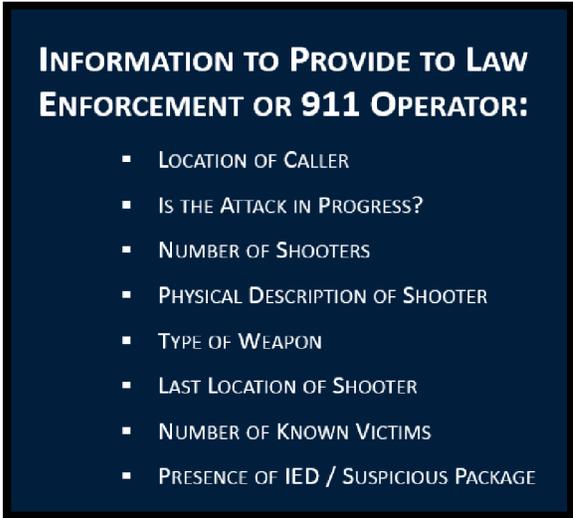


Figure 3

- Initial first responders arriving at the scene may not stop to aid injured persons.
- Train building occupants in basic hemorrhage control, self-help, and first aid. This training may include the use of commercially available tourniquets and hemorrhage control devices.
- Develop a comprehensive training program within the organization to commit stakeholders and employees to improve security and safety, conduct organizational assessments, and prepare to take action in the event of an active shooter (*Figure 4*).
- At a minimum, yearly exercises should be conducted to test the effectiveness of all active shooter policies and procedures while evaluating the procedural competency of building occupants. The following are recommended exercise techniques:
 - Tabletop Exercises – Conducted in a controlled environment, these exercises allow executives to use critical thinking and resource allocation to mitigate an active shooter scenario.
 - Active Shooter Drills – A kinesthetic training event in which stakeholders, building occupants, other staff members, and emergency response services create a simulated active shooter event at the location. Similar to a fire drill, these drills evaluate the effectiveness of policy, procedure, systems, and training implemented at a given location. Drills MUST be communicated to building occupants and first responders prior to commencement.
- The psychological effects of an active shooter event may produce the need for a psychological first aid training program to compliment the active shooter training.
- All training programs implemented must take into consideration those occupants with disabilities and be in accordance with The Americans with Disabilities Act of 1990, The Rehabilitation Act of 1973, EO 12196, and EO 13347.



Figure 3

ANALYSIS

The NYPD identified a subset of the active shooter cases included in the Compendium and ran statistical analyses of the data set (see Part IV for an explanation of the analytic methodology).⁶ In total, the 2016 version of the active shooter data set includes 308 cases, an increase of 78 cases from the previous number of 230 cases analyzed in the 2012 edition.

Although this analysis identified some common characteristics among active shooters, the NYPD found a large degree of variation in attacker profiles in regards to: age of the attacker, attack planning, targets, number of casualties, location of the attack, weapons used, and attack resolution. However, there was little variation in both the sex of the attacker and number of attackers.

Sex of Attacker

The NYPD's analysis demonstrates that active shooters are an overwhelmingly male group. Only 11 out of 308 cases (3%) in the active shooter data set involved female attackers. Taking into account reporting biases—for example, the possibility that the relative rarity of female attackers leads to increased attention paid to those attacks—the actual percentage of female attackers may be even lower.

Age of Attacker

The NYPD's analysis demonstrates that the median age of active shooters in the active shooter data set is 33-34; however, this median conceals a more complicated, yet unsurprising distribution, depicted in Figure 5. The distribution of ages is bimodal, with a first peak for shootings at schools by 15-19 year-olds and a second peak in non-school facilities by 35-44 year-olds. These findings are essentially unchanged from the earlier editions of this report.

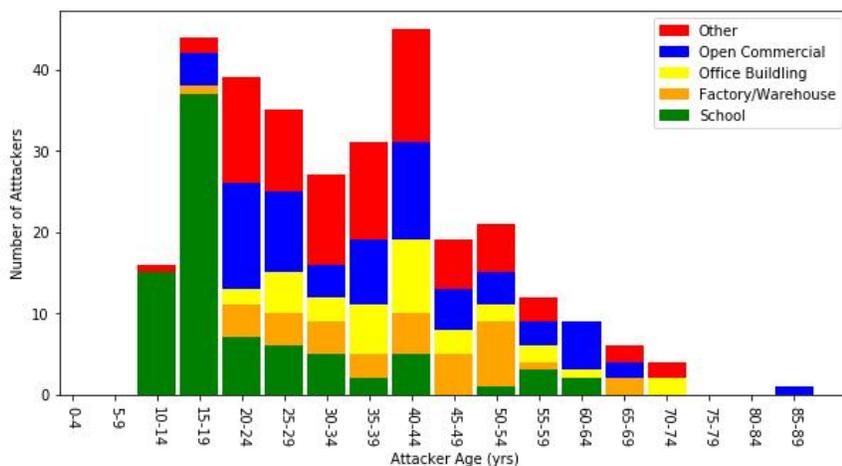


Figure 4: Attacker Ages by Number of Attackers

⁶). The following analysis includes all cases in the Compendium, except: 1) those that occurred outside of the United States; 2) those that did not result in casualties of either victims or attackers; and 3) those that were foiled before the attack occurred.

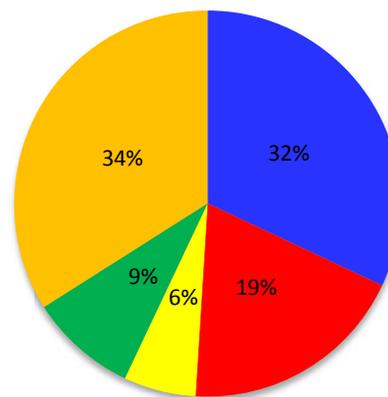
Number of Attackers

The NYPD's analysis demonstrates that 97 percent of active shooter incidents in the active shooter data set were carried out by a single attacker. These findings are not statistically different from the 2010 and 2012 editions of this report.

Targets

The NYPD organized relationships between attackers and victims in the active shooter data set into five categories: professional, academic, familial, other, and none.^v

The NYPD's analysis demonstrates that active shooters are often members of the communities they target. Figure 6 shows that the majority of active shooter attacks in the data set occurred when the perpetrator had either a professional, academic, or familial relationship with at least one of the victims.^{vi} However, 34 percent of active shooter attacks in the active shooter data set occurred when the active shooter had no prior relationship to the victims, demonstrating that active shooter attacks can occur even without any prior altercation or grievance with the specific victim(s).



■ Professional ■ Academic ■ Familial ■ Other ■ None

Figure 5: Attacker's Relationship to Victims

Moreover, of the 98 attacks that involved professional relationships, many were perpetrated by individuals who were still employed by the organization at the time of the attack, implying that the threat from active shooter attacks is not limited to terminated employees. In many cases, active shooter attacks resulted from disagreements among current employees of the organization.

Number of Casualties

Determining the typical number of casualties in an active shooter attack is complex because the active shooter data set includes a small number of attacks with a large number of casualties; these cases inflate the average. For this reason, the median is a better measure of the typical number of casualties than the average.

The NYPD's analysis demonstrates that the median number of deaths in cases included in the active shooter data set is 2, and the average is 3.0. In the 2012 edition of this book, the average was 3.1; this change is not statistically significant. The majority of attacks included in the active shooter data set resulted in 0 to 5 deaths.

The median number of wounded is 2, and the average is 3.9. These statistics are unchanged from the 2012 edition of this book.

The NYPD’s analysis demonstrates that the distribution of the number of wounded is similar to the distribution of the number of dead. The distributions differ slightly in that there are a few more attacks with large numbers of wounded than there are attacks with large numbers of dead.

Figures 7 and 8 shows the distributions of the number of attacks by casualty count for both dead and wounded. These distributions demonstrate that a typical active shooter attack results in 0-2 deaths and 0-2 wounded.

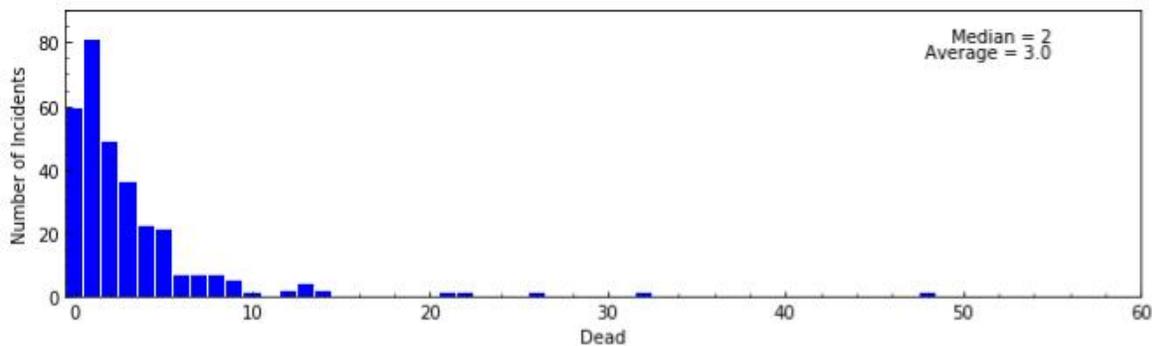


Figure 6: Number of Incidents by Number Wounded

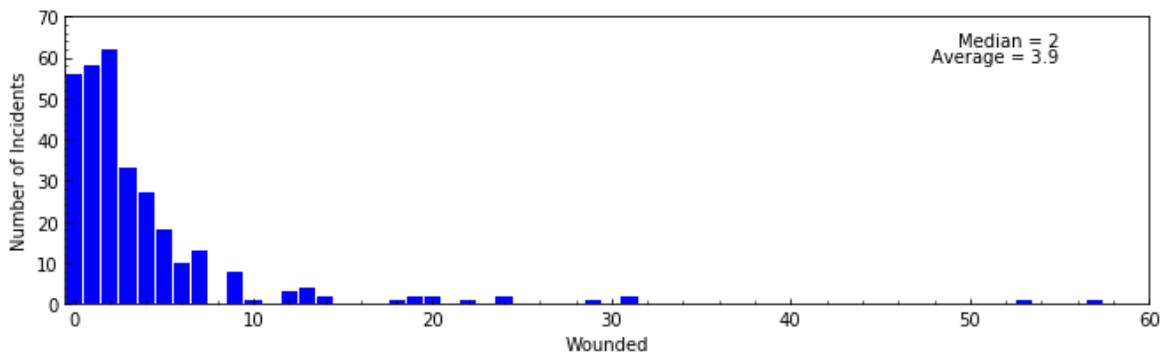


Figure 7: Number of Incidents by Number Killed

Location of Attack

The NYPD organized attack locations in the active shooter data set into five categories: office buildings, open commercial areas,^{vii} schools, factories and warehouses, and other facilities.^{viii}

The NYPD’s analysis demonstrates that less than 25% of attacks included in the active shooter data set took place at schools, and roughly 40% occurred at commercial facilities, such as office buildings, factories and warehouses, and open commercial areas. Moreover, Table 1 shows that attacks at restricted commercial facilities, such as office buildings, factories, and warehouses, occurred at approximately the same frequency as attacks at open commercial facilities, such as retail stores or restaurants.^{ix}

Location Type	Number of Incidents	Percentage
School	83	21%
Office Building	36	9%
Open Commercial	93	23%
Factory/Warehouse	38	10%
Other	147	37%
Total	397*	100%

Table 1: Number of Incidents by Location Type

* The 308 cases in the active shooter data set occurred at 397 locations because several attacks involved more than one location. The increase in incidents at “other” locations since the 2010 Edition is primarily due to the shootings in Wixom, Michigan, which occurred in at least 24 locations along a highway and the shootings in Isla Vista, California, which partly occurred along a street.

Weapons

The NYPD’s analysis demonstrates that 37% percent of active shooter attacks in the active shooter data set involved more than one weapon. This finding is unchanged from the 2012 edition of this report. In some instances, one of the weapons was a close combat weapon, such as a knife. In one case, a single attacker carried seven weapons, including a rifle, two shotguns, and four handguns.

In several cases, the attackers used firearms that they had stolen from relatives or friends. This pattern was most apparent in school-related shootings where attackers stole weapons from parents.

Reporting on weapons involved in active shooter attacks is often inconsistent and inaccurate. For some attacks, news reports state the exact make and model of the firearm involved; for other attacks, reports do not include specific information on weapons. Moreover, reports often refer to semi-automatic rifles as “machine guns” or “assault weapons;” neither term is particularly descriptive, and often times both terms are inaccurate. Additionally, in some cases, the make and model of a weapon is not enough information to fully decipher its capabilities, since aftermarket kits are available to convert certain firearms from semi-automatic to fully-automatic.

Attack Resolution

The NYPD organized attack resolutions in the active shooter data set into four categories: applied force, no applied force, suicide or attempted suicide, and attacker fled.

Table 2 shows that the vast majority of attacks in the active shooter data set ended violently, either by force applied by law enforcement, private security, bystanders, or the attackers themselves. Only 17

Resolution	Number of Incidents	Percentage
Applied Force	138	45%
No Applied Force	52	17%
Suicide/Attempted Suicide	117	38%
Attacker Fled	1	<1%
Total	308	100%

Table 2: Number of Incidents by Event Resolution

percent ended without applied force, such as by a negotiated surrender. In the 2012 edition of this report, the corresponding fraction was 16 percent; this change is not statistically significant.

Frequency

Using statistical analysis to make generalizations about the frequency of active shooter attacks is difficult due to sampling biases associated with how the active shooter data set was gathered (see Part IV for an explanation of the analytic methodology.) However, some conclusions can be drawn regarding incidents in recent years.

The NYPD has observed evidence of an increase in active shooter incidents in the U.S. since the early 2000's. From 2001-2005, the average number of active shooter attacks was 9; from 2006-2010 the average was 16; and from 2011-2015 the average was 17. There were 19 active shooter incidents in 2016; though, this number does not factor in a five year average.

There is also some anecdotal evidence that attacks have become more dangerous in recent years. The three deadliest attacks in the data set (Virginia Tech; Newton, Connecticut; and Orlando, Florida) and three of the four most injurious attacks in the data set (Aurora, Colorado; Fort Hood, Texas; and Orlando, Florida) all occurred since 2007. However, incidents with high casualty counts have also occurred in the more distant past, such as the shootings in Austin, Texas; Killeen, Texas; San Ysidro, California; and Stockdale, California (see Compendium).

ANALYTIC METHODOLOGY

The Compendium of active shooter incidents presented in the appendix includes a total of 417 entries. The incidents in the Compendium occurred between 1966 and December 31, 2016. The NYPD compiled these cases from internet news sources identified using online search. The NYPD did not use special-access government sources to compile the cases in the Compendium; all information is open-source and publicly available.

The NYPD included only those incidents carried out by attackers that met the DHS definition of an active shooter: “a person(s) actively engaged in killing or attempting to kill people in a confined and populated area.” In its definition, DHS notes that, “in most cases, active shooters use firearm(s) and there is no pattern or method to their selection of victims.” The NYPD has limited this definition to include only cases that spill beyond an intended victim to involve others (including bystanders and collateral casualties). The NYPD further restricted this definition to exclude: gang-related shootings, shootings that solely occurred in domestic settings, robberies, drive-by shootings, attacks that did not involve a firearm, and attacks categorized primarily as hostage-taking incidents.

The search technique used by the NYPD to identify the cases included in the Compendium had some limitations that resulted in sampling biases. First, since the NYPD gathered the data through an internet search, the Compendium has a strong sample bias towards recent incidents. For attacks that occurred between 2000 and 2016, the Compendium is a nearly comprehensive account of active shooter incidents that attracted news coverage. For attacks that occurred prior to 2000, the Compendium may not be comprehensive because the attacks pre-date widespread internet news reporting. Second, for incidents that occurred before 2000, the Compendium is biased towards attacks with higher casualty counts, which tended to attract greater media attention and were thus easier to find in news reports. The data in the Compendium are also sensitive to which incidents are covered by news organizations; if an active shooter incident with a relatively small casualty count did not attract any coverage, the NYPD would not realistically have awareness of the incident to include it in the data set. This would be particularly important if, as seems likely, in more recent years active shooter attacks have become more likely to receive coverage.

To facilitate the quantitative analysis, the NYPD organized the information about each case into categories. Some incidents were difficult to classify and required analyst judgment to resolve. For all cases, the Compendium includes a reference to the original source material that allows readers to obtain further detail or clarification.

Occasionally, multiple sources related to a single incident presented conflicting information about that attack. Generally, when the NYPD identified discrepancies between sources, the NYPD included the information presented in the more recent source; this is particularly relevant for the counts of dead and wounded, where later sources tend to be more accurate. In cases where the NYPD identified discrepancies between a government source and a news outlet, the NYPD included the information presented in the government source.

The NYPD prepared a subset of the Compendium cases suitable for quantitative analysis. The active shooter data set includes all cases in the Compendium, except: 1) those that occurred outside of the United States; 2) those that did not result in casualties of either victims or attackers; and 3) those that were foiled before the attack occurred. In total, the active shooter data set includes 308 cases, 78 of which are new for the 2016 Edition.

The NYPD chose to restrict quantitative analysis to cases that took place within the United States because the NYPD limited its internet searches to English-language sites, creating a strong sampling bias against international incidents. Table 4 presents the number of cases in the Compendium by country.

Table 4: Number of Incidents by Country

Country	Number of Incidents	Country	Number of Incidents
U.S.	350	Bosnia	1
Canada	9	Brazil	1
Germany	8	Denmark	1
Australia	5	Argentina	1
France	5	Greece	1
United Kingdom	4	Norway	1
Israel	3	Slovakia	1
Finland	2	Somalia	1
India	2	Spain	1
The Netherlands	2	Sweden	1
Belgium	2	Switzerland	1
Tunisia	2	Thailand	1
South Korea	2	Kenya	1
Italy	2	Yemen	1
Russia	1	Austria	1
Pakistan	1	Burkina Faso	1
Egypt	1		

The NYPD chose to restrict quantitative analysis to cases with one or more documented casualties to compensate for a strong sampling bias. Although the NYPD identified in the Compendium 40 foiled attacks and nine attacks resulting in zero casualties, this portion of the Compendium is not comprehensive, given the comparatively limited amount of news coverage these attacks received.^x

As a rule, the ability to make generalizations regarding a group of events improves as the number of events in the sample increases. Accordingly, it is difficult to make precise statistical judgments with limited data; for this reason, many research questions that would have been interesting to investigate, such as the average number of deaths in active shooter incidents in each state, cannot be answered with this data set.

ADDITIONAL ACTIVE SHOOTER RESOURCES

	<h1 style="margin: 0;">ACTIVE SHOOTER RESPONSE</h1>	
<div style="text-align: center; border: 2px solid black; padding: 5px; margin-bottom: 10px;"> CONTACT INFORMATION </div> <p>EMERGENCY:</p> <p style="text-align: center; font-size: 1.2em; font-weight: bold;">911</p> <p>POINT OF CONTACT FOR POLICE RESPONSE: _____</p> <p>SECURITY DIRECTOR: _____</p>	<div style="text-align: center; border: 2px solid black; padding: 5px; margin-bottom: 10px;"> LOCATION OF EMERGENCY RESPONSE RESOURCE KIT </div> <p>_____</p> <p>_____</p> <p>_____</p>	

	<h1 style="margin: 0;">CALL 911 WHEN IT IS SAFE TO DO SO</h1>	
<div style="text-align: center; border: 1px solid black; padding: 5px; margin-bottom: 5px;"> 1. AVOID </div> <ul style="list-style-type: none"> FOLLOW PLANNED ESCAPE ROUTE LEAVE BELONGINGS BEHIND KEEP HANDS VISIBLE <div style="text-align: center; border: 1px solid black; padding: 5px; margin-bottom: 5px;"> 2. BARRICADE </div> <ul style="list-style-type: none"> HIDE OUT OF SHOOTER VIEW BLOCK ENTRY TO HIDING PLACE SILENCE ELECTRONIC DEVICES <div style="text-align: center; border: 1px solid black; padding: 5px;"> 3. CONFRONT </div> <ul style="list-style-type: none"> ATTEMPT TO DISRUPT OR INCAPACITATE ATTACKER USE IMPROVISED WEAPONS, USE FORCE, AND YELL 	<div style="text-align: center; border: 1px solid black; padding: 5px; margin-bottom: 5px;"> INFORMATION TO PROVIDE TO LAW ENFORCEMENT OR 911 OPERATOR </div> <ul style="list-style-type: none"> LOCATION OF CALLER IS THE ATTACK IN PROGRESS? NUMBER OF SHOOTERS PHYSICAL DESCRIPTION OF SHOOTER TYPE OF WEAPON LAST LOCATION OF SHOOTER NUMBER OF KNOWN VICTIMS PRESENCE OF IED / SUSPICIOUS PACKAGE 	

ⁱ U.S. Department of Homeland Security, “Active Shooter: How to Respond”; U.S. Department of Homeland Security, “Planning and Response to an Active Shooter: An Interagency Security Committee Policy and Best Practices Guide”; University of California Police Department, University of California at Los Angeles, “Your Response to an Active Shooter: Safety Tips”; Federal Bureau of Investigation, US Department of Justice, “Workplace Violence; Issues in Response”; Hawaii Workplace Violence Working Group Committee, “Workplace Violence: Prevention, Intervention

and Recovery”; Department of Labor and Industry, State of Minnesota, “Workplace Violence Prevention: A Comprehensive Guide for Employers and Employees.”

ⁱⁱ U.S. Department of Homeland Security, “Active Shooter: How to Respond,” October 2008, http://www.lpinformation.com/Portals/0/DHS_ActiveShooter_FlipBook.pdf; University of California Police Department, University of California at Los Angeles, “Your Response to an Active Shooter: Safety Tips,” 2008, www.ucpd.ucla.edu/2008/activeshootersafetytips.pdf; US Secret Service, U.S. Department of the Treasury, “The Final Report and Findings of the Safe School Initiative: Implications for the Prevention of School Attacks in the United States,” May 2002, http://www.secretservice.gov/ntac/ssi_final_report.pdf; Federal Bureau of Investigation, US Department of Justice, “Workplace Violence; Issues in Response,” June 2002, <http://www.fbi.gov/publications/violence.pdf>; Hawaii Workplace Violence Working Group Committee, “Workplace Violence: Prevention, Intervention and Recovery,” October 2001, http://hawaii.gov/ag/cpia/quicklinks/workplace_violence/WVfull.pdf; Department of Labor and Industry, State of Minnesota, “Workplace Violence Prevention: A Comprehensive Guide for Employers and Employees,” <http://www.doli.state.mn.us/WSC/PDF/WorkplaceViolencePreventionGuide.pdf>.

ⁱⁱⁱ U.S. Department of Homeland Security, “Active Shooter: How to Respond”; U.S. Department of Homeland Security, “Planning and Response to an Active Shooter: An Interagency Security Committee Policy and Best Practices Guide”; University of California Police Department, University of California at Los Angeles, “Your Response to an Active Shooter: Safety Tips”; Federal Bureau of Investigation, US Department of Justice, “Workplace Violence; Issues in Response”; Hawaii Workplace Violence Working Group Committee, “Workplace Violence: Prevention, Intervention and Recovery”; Department of Labor and Industry, State of Minnesota, “Workplace Violence Prevention: A Comprehensive Guide for Employers and Employees.”

^{iv} U.S. Department of Homeland Security, “Active Shooter: How to Respond.”

^v The NYPD categorized attacks against significant others and former significant others as “Other.”

^{vi} In cases in which the attacker had multiple victims, the NYPD determined the relationship classification based on the attacker’s relationship to the “closest” victim. *E.g.*, In an active shooter incident in which an attacker shoots his spouse and his spouse’s coworker, the relationship classification is “familial.”

^{vii} The NYPD defines “Open Commercial” as commercial locations to which members of the public have open, unfettered access. *E.g.*, shopping malls, department stores, restaurants, etc.

^{viii} Several of the cases included in the “Other” category occurred at: airports, medical centers, and religious facilities. The NYPD chose not to break these types of locations out into their own categories because the number of attacks at each type of location did not exceed a 5% threshold.

^{ix} Classification of some events required analyst judgment.

^x Incidents in which the attacker was the only casualty may also suffer from limited news reporting, making this portion of the data set incomplete.

APPENDIX

ACTIVE SHOOTER

RECOMMENDATIONS AND ANALYSIS FOR RISK MITIGATION



TABLE OF CONTENTS

APPENDIX: COMPENDIUM OF ACTIVE SHOOTER INCIDENTS.....24
BY LOCATION 26
OFFICE BUILDINGS 26
OPEN COMMERCIAL..... 35
FACTORIES AND WAREHOUSES..... 53
SCHOOLS..... 61
OTHER 81
SELECTED INTERNATIONAL ATTACKS..... 104
SELECTED FOILED PLOTS (1966-2012)..... 126

Office Buildings

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
2 December 2015	1	Inland Regional Center in San Bernardino, California.	Syed Rizwan Farook (M/28); Tashfeen Malik (F/29)	14 dead; 24 wounded	5	2 rifles; 2 handguns; Other (explosive device)	Professional	Same day	Force
	<p>On December 2, 2015, Syed Rizwan Farook and Tashfeen Malik, a married couple dressed in combat gear, began shooting in the parking lot of the Inland Regional Center in San Bernardino, California. Once inside the building, the pair shot coworkers at a holiday party, reportedly fired 65-75 rounds before the fire alarm was triggered. After fleeing the scene, both attackers were killed during an exchange of gunfire with law enforcement hours later.ⁱⁱⁱ</p>								
26 October 2015	2	Syverud Law Office and Miller-Meier Limb and Brace, Inc near Davenport, Iowa	Robert Lee Mayes Jr. (M/40)	0 dead; 2 wounded	1	Handgun	Other	Same day	Suicide
	<p>On the afternoon on October 26, 2015, Robert Lee Mayes, Jr. targeted his estranged wife's workplace, Syverud Law Office in Davenport, Iowa prior to driving to his former father-in-law's place of business at Miller-Meier Limb and Brace, Inc. The shooter committed suicide after law enforcement arrived.^{iiiv}</p>								

10 January 2015	3	Northwestern Mutual Insurance, Arby's Restaurant, and the residence of the shooter's mother in Moscow, Idaho.	John Lee, aka Kane Grzebielski (M/29)	3 dead; 1 wounded	5	3 handguns; Shotgun; Rifle	Familial	Same day	No Force
Joe Lee, also known as Kane Grzebielski, began shooting in the first of three locations in Moscow, Idaho at 2:31p.m. on January 10. Lee first killed his landlord and wounded a bystander at Northwestern Mutual Insurance. He then drove to a nearby Arby's restaurant and killed another person. Finally, Lee drove to his adoptive mother's home and killed her before law enforcement arrived. The shooter was later apprehended by authorities after a car chase. ^y									
30 January 2013	2	DeConcini McDonald Yetwin & Lacy, P.C. law firm and the streets of Phoenix, Arizona	Arthur Douglas Harmon, III (70/M)	2 dead; 1 wounded	3	Handguns; Rifle (AR-15)	Professional	Same Day	Suicide
Arthur Douglas Harmon opened fire at the DeConcini McDonald Yetwin & Lacy Law Firm, killing two and wounding 1. While fleeing the scene, Harmon shot at a vehicle that attempted to follow him in order to retrieve his license plate number. No injuries resulted from that encounter. After a twelve hour manhunt, Harmon's body was discovered with self-inflicted gunshot wounds. Harmon had targeted two of his victims after being angered by the outcome of a meeting over a legal dispute. ^{vii,viii}									
27 September 2012	1	Accent Signage Systems in Minneapolis, Minnesota	Andrew Engeldinger (36/M)	5 dead; 3 wounded	1	Handgun (9-millimeter semi-automatic)	Professional	Same day	Suicide
Andrew Engeldinger opened fire at Accent Signage Systems in Minnesota, killing five coworkers and wounding three others. Engeldinger had been fired from Accent Signage Systems immediately prior to his attack. ^{ix}									

17 August 2010	1	Department of Public Safety in McKinney, Texas	Patrick Gray Sharp (29/M)	0 dead; 0 wounded	3	Rifle; Shotgun (12-gauge); Handgun (.45-caliber semi-automatic)	None	Same day	Suicide
Patrick Sharp opened fire outside the Department of Public Safety in McKinney, Texas. The attack resulted in zero casualties. Sharp began his attack by setting his truck on fire to lure people out of the building. He then retreated across the street and fired 100 rounds of ammunition on employees standing outside the building. Sharp was unsuccessful in attempting to ignite the trailer attached to his truck, which was filled with explosives. Prior to the attack, Sharp made references to his plot on a social networking site and expressed his desire to kill people in correspondence with a Facebook friend. ^{x xi}									
12 July 2010	1	Emcore Corp in Albuquerque, New Mexico	Robert Reza (37/M)	2 dead; 4 wounded	1	Handgun (.45-caliber semi-automatic)	Other	Same day	Suicide
Robert Reza opened fire at Emcore Corporation, where he was formerly employed, killing two people and wounding four others, including his ex-girlfriend. Reza began his attack outside the office building and then later forced his way inside the facility. Reports state that the attack occurred after Reza and his ex-girlfriend were involved in a domestic dispute. ^{xii xiii}									
4 March 2010	1	Pentagon in Arlington County, Virginia	John Patrick Bedell (36/M)	0 dead; 2 wounded	2	2 handguns (9-millimeter semi-automatic)	None	Same day	Force
John Bedell opened fire on Pentagon police officers after an officer asked him for his credentials at the security checkpoint of the Pentagon's main entrance. Three guards returned fire and fatally wounded the gunman. ^{xiv}									
10 November 2009	1	Legacy Metro Lab in Tualatin, Oregon	Robert Beiser (39/M)	1 dead; 2 wounded	3	Rifle; Shotgun; Handgun	Familial	Same day	Suicide
Robert Beiser opened fire in a drug-testing clinic where his wife was employed, killing her and injuring two of her co-workers. The attack came one week after Beiser's wife filed for divorce. ^{xv xvi}									

6 November 2009	1	Reynolds, Smith, & Hills in Orlando, Florida	Jason Rodriguez (40/M)	1 dead; 5 wounded	1	Handgun	Professional	Same day	No force
Jason Rodriguez opened fire at his former workplace, killing one employee and wounding five others. The assailant surrendered at his mother's apartment after a two hour manhunt. ^{xvii xviii}									
14 November 2008	1	SiPort Company offices in Santa Clara, California	Jing Hua Wu (47/M)	3 dead; 0 wounded	1	Handgun (9- millimeter)	Professional	Same day	Force
Jing Hua Wu opened fire at his former workplace, killing three people, including the CEO. Wu had been laid-off hours prior to the attack and returned to the office to request a meeting with company officials. Wu shot and killed all three victims during this meeting. ^{xix}									
4 October 2007	1	Giordano & Giordano Law Office in Alexandria, Louisiana	John Ashley (63/M)	2 dead; 3 wounded	Unknown	Unknown firearm	None	Same day	Force
John Ashley, a Baptist deacon, opened fire in a downtown law office, killing two people and injuring three others. Police shot and killed him. ^{xx xxii}									
30 August 2007	1	RiverBay Corporation in Brown, New York	Paulino Valenzuela (50/M)	1 dead; 2 wounded	1	Handgun	Professional	Same day	No force
Paulino Valenzuela, a terminated janitor, opened fire at his former workplace, killing his ex-supervisor and wounding two others. ^{xxiii xxiiii}									
9 April 2007	1	Gordon Advisors in Troy, Michigan	Anthony LaCalamita (38/M)	1 dead; 2 wounded	1	Shotgun	Professional	Same day	Force
Anthony LaCalamita opened fire at an accounting firm where he was formerly employed, killing one person and injuring two others. LaCalamita had been fired from the company prior to the attack. ^{xxv}									

13 February 2007	1	Philadelphia Naval Business Center in Philadelphia, Pennsylvania	Vincent J. Dortch (44/M)	3 dead; 1 wounded	2	Rifle (AK-47); Handgun (.40- caliber Glock)	Professional	Same day	Suicide
Vincent J. Dortch opened fire in a conference room at the Naval Business Center, killing three business executives and wounding a fourth. ^{xxv xxxvi}									
9 December 2006	1	Wood, Phillips, Katz, Clark, & Mortimer in Chicago, Illinois	Joseph Jackson (59/M)	3 dead; 1 wounded	3	Revolver; Knife; Other	Other	Same day	Force
Joe Jackson opened fire at a law firm, killing three people and wounding one other. Jackson forced a security guard, at gunpoint, to take him to the 38 th floor of the legal offices. He chained the office doors behind him. SWAT snipers fatally shot Jackson after a 45-minute standoff, during which he took a bystander hostage. Reports state that Jackson believed he had been cheated over an invention of a toilet designed for tractor-trailers. ^{xxvii xxviii xxx}									
21 October 2004	1	Beltservice Corporation Headquarters in Earth City, Missouri	Pelayo Errasti (48/M)	0 dead; 1 wounded	1	Shotgun	Professional	Same day	No force
Pelayo Errasti opened fire at the Beltservice Corporation Headquarters, injuring one employee. Reports state that Errasti, who had been fired from the company a year prior to the attack, intended to shoot his former boss.. ^{xxx xxxi}									
2 April 2004	1	Employment Security Commission office in Hendersonville, North Carolina	William Case (30/M)	1 dead; 1 wounded	1	Unknown firearm	Professional	Same day	Force
William Case opened fire at his workplace, killing his manager and wounding a co-worker. Reports state that Case had an argument with his manager about unemployment benefits prior to the attack. ^{xxxii}									

2 February 2004	1	Provo River Water Users Association in Pleasant Grove, Utah	Louis Darrel Kinyon (50/M)	1 dead; 0 wounded	1	Unknown firearm	Professional	Same day	Attempted suicide
Louis Darrell Kinyon opened fire at his workplace, killing his supervisor. He then attempted to commit suicide. The attack occurred one week after Kinyon was suspended for violating company policy. ^{xxxiii xxxiv}									
25 February 2003	1	Labor Ready Inc. in Huntsville, Alabama	Emanuel Burl Patterson (23/M)	4 dead; 1 wounded	1	Handgun (9- millimeter semi- automatic)	Other	Same day	No force
Emanuel Burl Patterson opened fire at a temporary employment agency, killing four people and injuring another. Reports state Patterson had argued with people who were waiting in line prior to the attack. ^{xxxv xxxvi}									
26 December 2000	1	Edgewater Technology in Wakefield, Massachusetts	Michael McDermott (42/M)	7 dead; 0 wounded	3	Rifle (AK-47); Shotgun; Handgun (semi- automatic)	Professional	Same day	Force
Michael McDermott opened fire at the Edgewater Technology firm, killing seven co-workers. At the end of his rampage, McDermott sat in the reception area and waited for law enforcement to arrive. ^{xxxvii xxxviii}									
2 November 1999	1	Xerox Engineering Systems in Iwilei, Hawaii	Bryan Uyesugi (40/M)	7 dead; 0 wounded	1	Handgun (9- millimeter)	Professional	Same day	Force
Bryan Koji Uyesugi opened fire at a Xerox facility, killing his supervisor and six co-workers. Uyesugi fled in a van and was arrested after a five-hour standoff with police. ^{xxxix}									
5 August 1999	2	Ferguson Enterprises and Post Airgas offices in Pelham, Alabama	Alan Eugene Miller (34/M)	3 dead; 0 wounded	1	Handgun	Professional	Same day	Force

	Alan Eugene Miller opened fire at a heating and air conditioning firm, killing two co-workers. Miller then shot and killed his former supervisor at another company. ^{xi}								
29 July 1999	2	Momentum Securities and the All-Tech Investment Group in Atlanta, Georgia	Mark O. Barton (44/M)	9 dead; 12 wounded	2	2 handguns (one 9-millimeter and one .45 caliber)	Professional	Same day	Suicide
	Mark Barton opened fire at two brokerage offices, including one where he was formerly employed, killing nine people and wounding 12 others. Prior to the attack, Barton killed his wife and two children at their home with a hammer. Reports state that he had lost more than \$400,000 on his investments shortly before the attacks. ^{xii}								
11 June 1999	1	Office of Dr. Bar-Levav in Southfield, Michigan	Joseph Brooks, Jr. (27/M)	2 dead; 4 wounded	1	Handgun	Professional	Same day	Suicide
	Joseph Brooks opened fire at his former psychiatrist's clinic, killing two people and injuring four others. Brooks then committed suicide. ^{xliii}								
18 March 1999	1	Goodin Law Office in Johnson City, Tennessee	Walter K. Shell (71/M)	2 dead; 0 wounded	1	Handgun (.22-caliber revolver)	Other	Same day	No force
	Walter Shell opened fire at his ex-wife's lawyer's law offices, killing the lawyer and one of the lawyer's clients. Reports state that Shell was upset that the lawyer excluded him from his ex-wife's will days before she died. ^{xliv}								
13 January 1999	1	Triad Center Office building in Salt Lake City, Utah	De-Kieu Duy (24/F)	1 dead; 1 wounded	1	Handgun (9-millimeter)	None	Same day	Force
	Di-Kieu Duy opened fire in the lobby of the KSL television station, wounding the building manager. Duy then shot an AT&T employee before being tackled by the victim's co-worker. Reports state that Duy, a diagnosed paranoid schizophrenic, believed she had been harassed by an employee of KSL-TV. ^{xlv xli}								

6 March 1998	1	Connecticut Lottery Headquarters in Newington, Connecticut	Matthew Beck (35/M)	4 dead; 0 wounded	2	Handguns (9-millimeter semi-automatic)	Professional	Same day	Suicide
Matthew Beck opened fire at the Connecticut Lottery, killing four of his supervisors. Reports state that Beck was unhappy about his salary and his failure to earn a promotion prior to the attack. ^{xvii}									
19 July 1995	1	C. Erwin Piper Technical Center in Los Angeles, California	Willie Woods (42/M)	4 dead; 0 wounded	1	Handgun (Glock, semi-automatic)	Professional	Same day	Force
Willie Woods opened fire at the C. Erwin Piper Technical Center in Los Angeles, killing four supervisors in their cubicles. ^{xviii}									
2 December 1993	1	California Employment Development Department in Oxnard and Ventura California	Alan Winterbourne (33/M)	4 dead; 4 wounded	4	Handgun; Shotgun; 2 rifles	Other	Same day	Force
Alan Winterbourne, an unemployed computer engineer, opened fire at a state unemployment center in Oxnard, killing four people and injuring four others. Winterbourne was fatally shot after he led responding officers on a car chase towards Ventura's unemployment center. Winterbourne concealed his weapons in a brown bag. ^{xix} i ii									
1 July 1993	1	Pettit & Martin Law Offices in San Francisco, California	John Luigi Ferri (55/M)	8 dead; 6 wounded	3	3 handguns (two semi-automatic TEC-9s and one .45-caliber semi-automatic)	Professional	Same day	Suicide
John Luigi Ferri opened fire at the Pettit & Martin law office, killing eight people and wounding six others. Reports state that Ferri was dissatisfied with the legal services he received. ⁱⁱⁱ iii									

18 June 1990	1	General Motors Acceptance Corporation office in Jacksonville, Florida	James E. Pough (42/M)	9 dead; 4 wounded	1	Rifle (.30-caliber)	None	June 19, 1990	Suicide
James Edward Pough opened fire at a General Motors Acceptance Corporation Office, killing nine people and wounding four others. ^{lv lv}									
16 February 1988	1	Electromagnetic Systems Lab Corp. in Sunnyvale, California	Richard Farley (40/M)	7 dead; 4 wounded	7	1 rifle; 2 shotguns; 4 handguns	Professional	Same day	No force
Richard Farley opened fire at his former workplace, killing seven people and injuring four others. Farley surrendered after a five-hour standoff with police officers. Reports state that prior to the attack, Farley was angry that a former co-worker rejected his advances. Farley was fired from the company in 1986 after threatening to kill that same co-worker. ^{lv lv}									

Open Commercial

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
28 November 2016	1	H-E-B Store in Palmview, Texas	Raul Lopez Saenz (M/25)	1 dead; 3 wounded	1	Handgun (9-millimeter)	Professional	Same day	No Force
		Around 3:15 a.m. on November 28, Raul Lopez Saenz opened fire on four coworkers. Lopez fired 15 shots at a break room window, killing one colleague and injuring three others. He fled the scene but later turned himself in to the Hidalgo County Sheriff's Office. ^{lviiiix}							
23 September 2016	1	Cascade Mall in Burlington, Washington	Arcan Cetin (M/20)	5 dead; 0 wounded	1	Rifle (Ruger .22-caliber)	None	Same day	No Force
		On September 23, Arcan Cetin, armed with a .22-caliber Ruger rifle, opened fire in the Macy's at a mall in Burlington, Washington. Cetin, who carried a 25 round magazine, admitted to carrying out the attack to detectives. Cetin committed suicide in his jail cell on 17 April 2017. Prior to this attack, Cetin had expressed his interest in the ISIS terror organization, and had posted pictures of serial killer Ted Bundy and ISIS leader Abu Bakr Baghdadi on his blog. ^{lxixi}							
17 July 2016	1	Airline Highway in Baton Rouge, Louisiana	Gavin Eugene Long (M/29)	3 dead; 3 wounded	1	Rifle	None	Same day	Force
		At approximately 8:40 a.m., three police officers were killed in Baton Rouge, Louisiana, allegedly by Gavin Long, a 29 year-old resident of Missouri and former marine. The Baton Rouge officers were responding to a call regarding a suspicious individual walking in public with an assault rifle and were ambushed when they arrived. At least three other officers were shot in the same incident. In at least one video posted to social media, Long mentions Alton Sterling, who was killed by police on Jul 5 in Baton Rouge. According to some reports, Long may have been affiliated with the Moorish sovereign citizens' movement. ^{lxixiixiii}							

12 June 2016	1	Pulse Nightclub in Orlando, Florida	Omar Mir Seddiqui Mateen (M/29)	49 dead; 53 wounded	2	Rifle (Sig Sauer MCX); Handgun (9mm Glock)	None	Same day	Force
	At approximately 2:00 a.m., Omar Mateen assaulted the Pulse nightclub, a dance club in Orlando, Florida. The shooter, armed with an assault rifle and one pistol, pledged allegiance to Abu Bakr al-Baghdadi while barricaded in the club's restroom. Police entered the club and killed the shooter. During this attack, Mateen pledged his allegiance to the ISIS terror organization. ^{lxv/lxv}								
6 May 2016	2	Westfield Montgomery Hall and Giant Food Supermarket in Bethesda, Maryland	Eulalio Tordil (M/62)	2 dead; 3 wounded	1	Handgun	None	Same day	No Force
	Eulalio Tordil began shooting at a Westfield Montgomery Mall parking lot in Bethesda, Maryland where he shot three people. Approximately 30 minutes later, Tordil shot and killed another person outside a Giant Food supermarket. The shooter, who was armed with a handgun, was wanted on a first-degree murder charge for shooting and killing his estranged wife outside their children's school the previous day. The suspect was apprehended by police in an outdoor parking lot near the supermarket. ^{lxvi/lxvii}								
4 May 2016	1	Knight Transportation Building in Harris County, Texas	Marion Guy Williams (M/65)	1 dead; 2 wounded	2	Shotgun; Handgun	Professional	Same day	Suicide
	Marion Guy William targeted the Knight Transportation building in Harris County, Texas. The shooter, armed with a shotgun and a handgun, shot and killed a former coworker before committing suicide. Williams had been fired from the company two weeks prior to his attack. ^{lxviii/lxix}								
23 July 2015	1	Movie theatre in Lafayette, Louisiana	John Russell Houser (59/M)	2 dead; 9 wounded	1	Handgun (.40 caliber)	None	Same day	Suicide

	<p>John Russell Houser opened fire in a movie theater in Lafayette, Louisiana killing two people and injuring nine others before committing suicide. Houser reportedly had a history of mental illness and posted radical and discriminatory views online. Police found a note Houser left behind that twice referenced Roof, saying explicitly, "Thank you for the wake-up call, Dylann." ^{lxxixxi}</p>								
<p>26 May 2015</p>	<p>1</p>	<p>Walmart in Grand Forks, North Dakota</p>	<p>Marcell Willis (21/M)</p>	<p>1 dead; 1 wounded</p>	<p>1</p>	<p>Handgun (9mm semi-automatic)</p>	<p>None</p>	<p>Same day</p>	<p>Suicide</p>
<p>14 March 2015</p>	<p>1</p>	<p>Dad's Sing Along Club in San Antonio, Texas</p>	<p>Richard Castilleja (29/M)</p>	<p>0 dead; 2 wounded</p>	<p>1</p>	<p>Handgun</p>	<p>None</p>	<p>Same day</p>	<p>Force</p>
<p>7 February 2015</p>	<p>Richard Castilleja opened fire outside a San Antonio, Texas karaoke bar, wounding two persons, after he and another person were ejected from the bar earlier that evening. Castilleja was fatally shot by a police officer. Reports state that Castilleja did not have a pre-existing relationship with the bar staff or patrons prior to the altercation earlier that day. ^{lxxiv lxxv}</p>								
<p>17 January 2015</p>	<p>1</p>	<p>Monroeville Mall in Pittsburgh, Pennsylvania</p>	<p>Tarod Thornhill (17/M)</p>	<p>0 dead; 3 wounded</p>	<p>1</p>	<p>Handgun (Pistol)</p>	<p>None</p>	<p>Same day</p>	<p>No Force</p>
	<p>Tarod Thornhill opened fire inside a Macy's in the Monroeville Mall in Pittsburgh, Pennsylvania, wounding three people. Police arrested him in the early hours of the following morning. ^{lxxvi lxxvii}</p>								
<p>17 January 2015</p>	<p>1</p>	<p>Scotto Pizza in the Melbourne Square Mall in Melbourne, Florida</p>	<p>Jose Garcia-Rodriguez (M/57)</p>	<p>1 dead; 1 wounded</p>	<p>3</p>	<p>Handguns</p>	<p>Familial</p>	<p>Same day</p>	<p>Suicide</p>

	Armed with three handguns, Jose Garcia-Rodriguez began shooting at his wife's workplace, Scotto Pizza, in Melbourne Square Mall in Melbourne, Florida. After wounding his wife, the shooter committed suicide before law enforcement arrived. ^{lxxviii lxxix}								
23 September 2014	1	United Postal Service (UPS) shipping facility in Birmingham, Alabama	Kerry Joe Tesney (M/45)	2 dead; 0 wounded	1	Handgun	Professional	Same day	Suicide
	On September 23, 2014, at 9:20 a.m., Kerry Joe Tesney, 45, armed with a handgun, began shooting in a UPS shipping facility in Birmingham, Alabama, from where he had recently been fired. Two supervisors were killed; no one was wounded. The shooter committed suicide before law enforcement arrived. ^{lxxx}								
2 August 2014	2	Highway and Hon-Dah Resort Casino and Conference Center in Pinetop, Arizona	Justin Joe Armstrong (M/28)	0 dead; 2 wounded	1	Rifle	None	Same day	Force
	On August 2, 2014, at 6:38 p.m., Justin Joe Armstrong, 28, armed with a rifle, began shooting in the parking lot of the Hon-Dah Resort Casino and Conference Center in Pinetop, Arizona. After wounding 2, the shooter moved to the middle of the nearby highway and began shooting at passing cars. No one was killed; 2 people were wounded, including the wounding of an unarmed security guard. The shooter was killed during an exchange of gunfire with law enforcement. ^{lxxxi}								
8 June 2014	2	CiCi's Pizza and a Walmart in Las Vegas, Nevada	Jerad Dwain Miller (31/M); Amanda Renee Miller (22/F)	3 dead; 0 wounded	7	4 handguns; Shotgun; 2 knives	None	Same Day	Suicide
	One male and one female attacker, Jerad and Amanda Miller, entered CiCi's Pizza in Las Vegas, Nevada and opened fire, killing two police officers who were eating lunch. They placed a "Don't Tread on Me" flag and a Nazi swastika on one of the officers and a note on the other officer that stated "This is the beginning of the revolution." The attackers then took the officers' weapons and ammunition and went to a nearby Walmart where they shot and killed another person inside the entrance. Amanda Miller committed suicide after her husband died from wounds caused by the police officers. The attackers are believed to hold a militia/white-supremacist and anti-law enforcement ideology. ^{lxxxii lxxxiii}								

25 January 2014	1	The Mall in Columbia in Columbia, Maryland	Darion Marcus Aguilar (19/M)	2 dead; 5 wounded	3	Shotgun (12-gauge); 2 explosive devices	None	Same Day	Suicide
Darion Aguilar used a 12-gauge shotgun to randomly kill two employees of Zumiez, a skateboard gear shop in the Mall in Columbia, before taking his own life. According to police reports, the shooter had an obsession with the Columbine High School shooting, which was ascertained through searches of his computer. ^{lxxxvi} ^{lxxxv}									
15 January 2014	1	Martin's Supermarket in Elkhart, Indiana	Shawn Walter Bair (22/M)	2 dead; 0 wounded	2	Handgun (.40-caliber semiautomatic); Knife	None	Same day	Force
Shawn Walter Bair entered the Martin's Supermarket in Elkhart shortly before 10 p.m. He walked around for approximately 20 minutes before shooting a 20-year-old store employee and 44-year-old customer. ^{lxxxvii} ^{lxxxviii}									
12 March 2013	3	John's Barber Shop, Mohawk, NY; Gaffey's Fast Lube and Car Wash, Herkimer, NY; Glory Days Bar, Herkimer, NY	Kurt Meyers (64/M)	4 dead; 2 wounded	1	Shotgun	None	14 March 2013	Force
Kurt Meyers opened fire at a barber shop in Mohawk, NY, killing two and wounding two. He then drove to a car wash in Herkimer, NY where he killed two and fled again. A manhunt ensued until Meyers was found in an abandoned bar called Glory Days, on Main Street in Herkimer. After an overnight standoff, an FBI team stormed the building. Meyers fired on the approaching team, killing an FBI dog, and was then shot and killed. ^{lxxxviii} ^{lxxxix} ^{xc} ^{xcxi}									
11 December 2012	1	Clackamas Town Center in Happy Valley, Oregon	Jacob Tyler Roberts (22/M)	2 dead; 1 wounded	1	Rifle (semi-automatic)	None	Same day	Suicide
Jacob Tyler Roberts, an employee at an Oregon shopping mall, opened fire at his workplace, killing two people and wounding one other before committing suicide. ^{xcii}									

21 October 2012	1	Azana Spa in Brookfield, Wisconsin	Radcliffe Haughton (45/M)	3 dead; 4 wounded	1	Handgun (.40 caliber semi- automatic)	Familial	Same day	Suicide
Radcliffe Haughton opened fire at the Azana Spa in Wisconsin, killing three people and injuring four others. Haughton, who was the estranged husband of an employee at the spa, left an improvised explosive device at the scene of the attack before committing suicide. ^{xciii}									
9 October 2012	1	M&M Salon in Casselberry, Florida	Bradford Baumet (36/M)	3 dead; 1 wounded	1	Handgun	Familial	Sam day	Suicide
Bradford Baumet opened fire in a beauty salon where his estranged girlfriend worked, killing three people and wounding another before committing suicide. ^{xciv xcv}									
31 August 2012	1	Pathmark Supermarket in Old Bridge, New Jersey	Terrence Tyler (23/M)	2 dead; 0 wounded	2	Rifle (AK-47); handgun	Professional	Same day	Suicide
Terrence Tyler opened fire in a Pathmark supermarket at which he worked, killing two co-workers before committing suicide. ^{xcvi}									
20 July 2012	1	Century 16 Movie Theater in Aurora, Colorado	James Holmes (24/M)	12 dead; 58 wounded	4	2 handguns (2 .40 caliber Glock 22s); rifle (semi- automatic);shotgu n (12-gauge)	None	Same day	No force
James Eagan Holmes opened fire in a Colorado movie theater at a midnight showing of "The Dark Knight Rises," killing 12 people and wounding 58 others. Reports state that Holmes planned the attack for months, stockpiling ammunition, purchasing firearms and body armor, and lacing his apartment with explosive devices. ^{xcvii}									
30 May 2012	2	Café Racer in Seattle, Washington	Ian Stawicki (40/M)	5 dead; 1 wounded	2	2 handguns (.45 caliber)	None	Same day	Suicide

	Ian Stawicki opened fire at the Café Racer coffee shop in Seattle, killing four people and wounding one other. Half an hour after the café shooting, Stawicki fatally shot a woman while hijacking her car. Reports state that Stawicki had been kicked out of the café several times in the weeks leading up to the shooting due to belligerent behavior. ^{xviii}								
1 December 2011	1	Winton Blount U.S. Post Office in Montgomery, Alabama	Arthur Lee Darby, Jr. (29/M)	0 dead; 0 wounded	2	2 handguns	Professional	Same day	No force
	Arthur Lee Darby Jr. opened fire at a post office in Alabama, where he was employed. The attack resulted in zero casualties. ^{xcix c}								
12 October 2011	1	The Salon Meritage in Seal Beach, California	Scott Evans Dekraai (41/M)	8 dead; 1 wounded	3	3 handguns (one 9- millimeter semi- automatic, one .44 magnum, one .45 caliber semi- automatic)	Familial	Same day	No force
	Scott Evans Dekraai opened fire at his ex-wife's workplace in California, killing eight people and wounding one other ^{ci}								
8 October 2011	1	IHOP restaurant in Durham, North Carolina	Jerry Lee Adams (21/M)	1 dead; 1 wounded	1	Unknown firearm	None	Same day	No force
	Jerry Lee Adams opened fire at an IHOP restaurant in North Carolina, killing one person and wounding one other. Adams conducted his attack after being told to leave the restaurant by two off-duty sheriffs ^{cii ciii}								
6 September 2011	1	IHOP restaurant in Carson City, Nevada	Eduardo Sencion (32/M)	4 dead; 7 wounded	3	Rifle (AK-47 variant); Rifle; Handgun	None	Same day	Suicide
	Eduardo Sencion opened fire at an IHOP in Nevada, killing four people and wounding seven others before committing suicide. Reports state that Sencion was a grocery store employee with a history of mental illness ^{civ}								

24 July 2011	1	Club Galaxy, Muckleshoot Casino in Auburn, Washington	Cesar Chaparro- Vielma (42/M)	0 dead; 7 wounded	1	Handgun (.40 caliber semi- automatic)	Familial	Same day	Force
Cesar Chaparro-Vielma opened fire in a casino in Washington, wounding seven people. Chaparro-Vielma shot his estranged wife, her boyfriend, her two sisters and several bystanders before being tackled by a security guard ^{cv} ^{vi} ^{cvi}									
26 June 2011	1	Genesis Tavern in Philadelphia, Pennsylvania	Wayne James (45/M)	1 dead; 5 wounded	1	Handgun	None	Same day	No force
Wayne James opened fire at a Pennsylvania bar, killing one person and wounding five others. Prior to the attack, James had been asked to leave the bar because he was smoking. ^{cviii} ^{cix}									
8 January 2011	1	Safeway parking lot in Tucson, Arizona	Jared Lee Loughner (22/M)	6 dead; 13 wounded	1	Handgun (9- millimeter semi- automatic)	None	Same day	Force
Jared Loughner opened fire into a crowd of people outside a Safeway supermarket where Representative Gabrielle Giffords was holding a constituent meeting, killing six people and wounding 13 others. Loughner, who posted many anti-government messages on the Internet and had a long record of disruptive behavior on his college campus, had a history of mental illness ^{cx}									
14 August 2010	1	City Grill in Buffalo, New York	Riccardo M. McCray (23/M)	4 dead; 4 wounded	1	Handgun (9- millimeter)	None	Same day	No force
Riccardo McCray opened fire in a crowded restaurant, killing four people and injuring four others ^{cxii}									
6 June 2010	1	Yoyito Restaurant in Hialeah, Florida	Gerardo Regalado (38/M)	4 dead; 3 wounded	1	Handgun (.45- caliber Glock)	Familial	Same day	Suicide
Gerardo Regalado opened fire outside the restaurant where his estranged wife was employed, killing four people and injuring three others. Regalado fled the scene and was found dead several blocks away. ^{cxiii} ^{cxiv} ^{cxv}									

12 January 2010	1	Penske Truck Rental in Kennesaw, Georgia	Jesse James Warren (60/M)	3 dead; 2 wounded	1	Handgun	Professional	Same day	Force
Jesse James Warren opened fire at his former workplace, killing three people and wounding two others. Warren was fired from the truck rental company several months prior to the attack. ^{cxvi cxvii cxviii}									
29 November 2009	1	Forza Coffee Shop in Lakewood, Washington	Maurice Clemmons (37/M)	4 dead; 0 wounded	1	Handgun (semi- automatic)	None	Same day	Force
Maurice Clemmons opened fire at a coffee shop, killing four uniformed Washington police officers who were working on their laptops. Clemmons was found and killed by a policeman following a two-day manhunt. Reports state that Clemmons had confided to a friend his plans to shoot police officers the night before his attack. ^{cxix cxx cxxi}									
20 November 2009	2	Kannat Tabla and Last Command Post Park in Saipan, Northern Maraiana Island (U.S. Commonwealt h)	Li Zhong Ren (42/M)	4 dead; 6-9 wounded	3	2 rifles (.223-caliber and .22-caliber Magnum); Shotgun (.410-caliber)	Professional	Same day	Suicide
Li Zhong Ren opened fire at a shooting range where he was employed, killing two adults and two children. Ren then drove to a park where he opened fire on a group of Korean tourists. Ren had left several suicide notes prior to the attack. ^{cxvii cxviii cxxiv}									
8 November 2009	1	Sandbar Sports Grill in West Vail, Colorado	Richard Moreau (63/M)	1 dead; 3 wounded	1	Handgun (.45 caliber)	Other	Same day	Force
Richard Moreau opened fire in a bar, killing one customer and injuring three others. Reports state that Moreau got into an argument inside the bar and was escorted out by employees prior to the attack. ^{cxv cxxvi cxvii}									

4 August 2009	1	L.A. Fitness in Collier Township, Pennsylvania	George Sodini (48/M)	3 dead; 9 wounded	4	4 handguns (two 9-millimeter semi-automatic, one .45-caliber semi-automatic revolver, and one .32-caliber semi-automatic)	None	Same day	Suicide
George Sodini opened fire on a L.A. Fitness dance class, killing three women and injured nine others. Reports state that Sodini was angry about being disrespected by women ^{xxxiii} ^{xxxix}									
9 September 2009	1	Independent Bar in Orlando, Florida	Todd Garland Buchanan (29/M)	0 dead; 3 wounded	1	Unknown	Other	Same day	No force
Todd Buchanan opened fire at a bar, wounding three people. Reports state that Buchanan was involved in a fight at the bar and was ejected prior to the attack. He was arrested in his home several hours after the shooting. ^{xxx} ^{xxxi} ^{xxxii}									
24 July 2009	1	Club LT Tranz in North Houston, Texas	Unknown	1 dead; 2 wounded	Unknown	Unknown	Other	Same day	Attacker fled
An unknown assailant opened fire at a nightclub, killing one employee and wounding two others. Reports state that the assailant had been ejected from the club following a disturbance prior to the attack. The gunman fled the scene. ^{xxxiii} ^{xxxiv}									
10 June 2009	1	United States Holocaust Memorial Museum in Washington D.C.	James W. von Brunn (88/M)	1 dead; 0 wounded	1	Rifle (.22 caliber)	None	Same day	Force
James W. Von Brunn opened fire at the United States Holocaust Memorial Museum, killing a security guard. Reports state that von Brunn was a white supremacist. ^{xxxv} ^{xxxvi}									

30 May 2009	1	Club 418 in Springfield, Massachusetts	Marcus J. Blanton (24/M)	1 dead; 4 wounded	2	Handgun; Knife	None	Same day	Force
Marcus J. Blanton opened fire at a strip club, killing one person and injuring four others. Blanton stabbed a sixth person before he was arrested on scene. ^{cxvii}									
3 April 2009	1	American Civil Association Immigration Center in Binghamton, New York	Jiverly Wong (41/M)	13 dead; 4 wounded	2	2 handguns (one 9-millimeter and one .45 caliber)	Other	Same day	Suicide
Jiverly Wong, a naturalized immigrant, opened fire at the American Civic Association Immigration Center in Binghamton, killing 13 people and injuring four others. Wong had been taking English classes at the Center prior to the attack. ^{cxviii cxvix}									
24 March 2009	1	Metropolitan Transit System in San Diego, California	Lonnie Glasco (47/M)	1 dead; 1 wounded	1	Handgun (.357 magnum)	Professional	Same day	Force
Lonnie Glasco, a veteran Metropolitan Transit System employee, opened fire at a bus depot complex, killing one co-worker and injuring another. ^{cxl cxli cxlii}									
24 February 2009	1	St. Charles Avenue in New Orleans, Louisiana	Unknown (unknown/unknown)	0 dead; 7 wounded	3	2 handguns (one 9-millimeter semi-automatic and one .40-caliber); Revolver	None	Same day	Force
An unknown gunman indiscriminately opened fire at a Mardi Gras parade, wounding seven people. ^{cxliii cxliv cxlv cxlvi}									
24 January 2009	1	The Zone in Portland, Oregon	Erik Salvador Ayala (24/M)	2 dead; 7 wounded	1	Handgun (9-millimeter)	None	Same day	Suicide
Erik Salvador Ayala opened fire outside a nightclub, killing two people and injuring 7 others. ^{cxlvii cxlviii}									

12 March 2008	1	Regions Bank in McComb, Mississippi	Robert Lanham (35/M)	3 dead; 0 wounded	1	Handgun (9- millimeter)	Familial	Same day	Suicide
Robert Lanham opened fire at the bank where his ex-wife worked, killing her, a customer and a bank manager. Reports state that Lanham was distraught over his recent divorce. ^{cxlix}									
3 March 2008	1	Wendy's in West Palm Beach, Florida	Alburn Blake (60/M)	1 dead; 5 wounded	1	Handgun (9- millimeter semi- automatic)	None	Same day	Suicide
Alburn Edward Blake opened fire in a Wendy's restaurant, killing a paramedic and wounding five other people. ^{cl}									
5 December 2007	1	Westroads Mall in Omaha Nebraska	Robert Hawkins (19/M)	8 dead; 5 wounded	1	Rifle (AK-47)	None	Same day	Suicide
Robert Hawkins opened fire at an Omaha mall, killing eight people and wounding 5 others. Reports state that Hawkins was angry about losing his job and breaking up with his girlfriend prior to the attack. ^{cli clii cliii}									
30 April 2007	1	Ward Parkway Shopping Center in Kansas City, Missouri	David W. Logsdon (51/M)	2 dead; 7 wounded	3	2 handguns; Rifle (.30-caliber carbine)	Other	Same day	Force
David Logsdon opened fire at a crowded Target parking lot, killing two people and wounding seven others. Logsdon was fatally shot by police following the attack. Reports state that Logsdon was unhappy over his termination from the Target store prior to the attack. Police believe the gunman was also responsible for the death of his neighbor earlier that day. ^{cliv clv clvi}									
12 February 2007	1	Trolley Square Mall in Salt Lake City, Utah	Sulejman Talovic (18/M)	5 dead; 4 wounded	2	Shotgun; Handgun (.38-caliber)	None	Same day	Force
Sulejman Talovic opened fire at Trolley Square Mall, killing five bystanders and wounding four others. ^{clvii clviii}									

18 April 2006	1	Finnerger's Catering in St. Louis, Missouri	Herbert Chambers Jr. (55/M)	2 dead; 1 wounded	1	Handgun (semi-automatic)	Professional	Same day	Suicide
Herbert Chalmers Jr. opened fire at his workplace, killing two people and wounding another. Chalmers launched his attack shortly after raping an ex-girlfriend and killing the mother of his child at separate locations. ^{clix clix clix}									
4 April 2006	1	Baker City Post Office in Baker City, Oregon	Grant Gallaher (41/M)	1 dead; 0 wounded	1	Handgun	Professional	Same day	No force
Grant Gallaher opened fire in the Baker City Post Office parking lot, killing his supervisor after initially striking him with his vehicle. Gallaher also intended to kill his postmaster. Reports state that Gallaher was upset about his supervisor's decision to add extra work to his delivery route. ^{clxi}									
13 February 2005	1	Hudson Valley Mall, Kingston, New York	Robert Bonelli (26/M)	0 dead; 2 wounded	1	Rifle (semi-automatic)	None	Same day	Force
Robert Bonelli opened fire at the Hudson Valley Mall, wounding two people. He was tackled by mall employees when he ran out of ammunition. ^{clxiii clxiv}									
8 December 2004	1	Alrosa Villa in Columbus, Ohio	Nathan Gale (25/M)	4 dead; 2 wounded	1	Handgun (9-millimeter Beretta)	None	Same day	Force
Nathan Gale, a former marine, opened fire at a nightclub, killing four people and wounding two others. Gale was shot by responding police officers after taking a hostage behind the stage. ^{clxv clxvi}									
18 November 2004	1	RadioShack in St. Petersburg, Florida	Justin Cudar (25/M)	2 dead; 1 wounded	1	Handgun (.40-caliber Glock)	None	Same day	No force
Justin Cudar opened fire in a RadioShack store, killing two people =and wounding another. Cudar was being investigated for a road-rage incident and managed to evade police prior to the attack. ^{clxvii clxviii}									

29 August 2003	1	Electric Picture Co. in Nashville, Tennessee	Thomas Edgar Harrison (43/M)	1 dead; 0 wounded	1	Shotgun	Other	August 30, 2003	Suicide
<p>Thomas Edgar Harrison opened fire at his ex-girlfriend's workplace, killing one employee. Harrison was initially denied access to the workplace but returned shortly thereafter and began his attack. He engaged in an hour-long standoff with a SWAT team before committing suicide. Prior to the attack, Harrison raped and kidnapped his ex-girlfriend, who was then issued an order of protection against him.^{clxxx clxx}</p>									
28 July 2003	1	Gold Leaf Nursery in Boynton Beach, Florida	Andres Casarrubias (44/M)	2 dead; 1 wounded	1	Handgun (semi-automatic)	Familial	Same day	Force
<p>Andres Casarrubias opened fire at the nursery where his estranged wife worked, killing two employees, including his wife, and injuring another. Reports state that Casarrubias believed his wife was having an affair with a co-worker.^{clxxi}</p>									
23 July 2003	1	Century 21 office in San Antonio, Texas	Ron Thomas (unknown/M)	2 dead; 1 wounded	1	Handgun (.357-magnum)	Professional	Same day	Suicide
<p>Ron Thomas opened fire at the Century 21 real estate office where he was employed, killing two people and wounding another. Thomas committed suicide after engaging the police in a car chase.^{clxxii clxxiii}</p>									
20 March 2000	1	Mi-T-Fine Car Wash in Irving, Texas	Robert Wayne Harris (28/M)	5 dead; 1 wounded	1	Unknown firearm	Professional	Same day	Force
<p>Robert Wayne Harris opened fire at his former workplace, killing five employees and injuring another. Harris was fired three days prior to the attack.^{clxxiv}</p>									
20 December 1997	1	Milwaukee Post Office in Milwaukee, Wisconsin	Anthony Deculit (37/M)	1 dead; 2 wounded	1	Handgun (9-millimeter)	Professional	Same day	Suicide

	Anthony Deculit opened fire at his workplace, killing one employee and wounding two others, including his supervisor. Reports state that Deculit had been reprimanded by a supervisor for sleeping at work and rejected for a promotion prior to the attack. ^{clxxv}								
7 October 1997	1	ProtoCall retail store in San Antonio, Texas	Charles Lee White (42/M)	2 dead; 0 wounded	1	Rifle	Other	Same day	Suicide
2 September 1997	Charles Lee White opened fire at the ProtoCall store where his exgirlfriend worked, killing two people. White then fatally shot himself ^{clxxvi clxxvii}								
	1	Miami Beach Post Office, Florida	Jesus Antonio Tamayo (64/M)	0 dead; 2 wounded	1	Handgun	Familial	Same day	Suicide
	Jesus Antonio Tamayo open fired at a post office, wounding two women, including his ex-wife. ^{clxxviii}								
23 February 1997	1	Empire State Building in New York, New York	Ali Abu Kamal (69/M)	1 dead; 6 wounded	1	Handgun (.38-caliber Beretta)	None	Same day	Suicide
	Ali Abu Kamal opened fire at the Empire State Building's observation deck, killing one person and wounding six others. ^{clxxix}								
6 May 1993	1	Post Office in Dearborn, Michigan	Larry Jasion (unknown/M)	1 dead; 2 wounded	1	Handgun	Professional	Same day	Suicide
	Larry Jasion opened fire at a post office, killing one person and wounding two others. Reports state that Jasion, a postal worker, was angry over losing a promotion to a woman prior to the attack. ^{clxxx}								
6 May 1993	1	Dana Point Post Office in Dana Point, California	Mark R. Hilbun (38/M)	1 dead; 3 wounded	1	Handgun	Professional	Same day	No force
	Mark Hilbun opened fire at a post office, killing a co-worker and wounding three others. Reports state that Hilbun was fired prior to the attack for stalking a co-worker. ^{clxxxi clxxxii}								

14 November 1991	1	Royal Oak Post Office in Royal Oak, Michigan	Thomas McIlvane (31/M)	3 dead; 6 wounded	1	Rifle (sawed-off .22-caliber)	Professional	Same day	Suicide
Thomas McIlvane opened fire at a post office, killing three people and injuring six others. McIlvane had been fired from the post office prior to the attack. ^{cxxxiii}									
16 October 1991	1	Luby's Cafeteria in Killeen, Texas	George Jo Hennard (35/M)	22 dead; 20 wounded	1	Handgun (9-millimeter semi-automatic)	None	Same day	Suicide
George Jo Hennard opened fire in a restaurant during lunchtime, killing 22 people and wounding 20 others. ^{cxxxiv}									
10 October 1991	1	Ridgewood Post Office in Ridgewood, New Jersey	Joseph Harris (35/M)	2 dead; 0 wounded	4	Machine gun; 3 Others	Professional	Same day	Force
Joseph Harris opened fire at a post office, killing two former coworkers. The night before, Harris had killed his former supervisor with a three-foot samurai sword and fatally shot her fiancé in their home. During the post office attack, Harris was armed with several guns, hand grenades, and a samurai sword. ^{cxxxv}									
10 August 1989	1	Post Office in Orange Glen, California	John Merlin Taylor (52/M)	2 dead; 1 wounded	1	Handgun (semi-automatic .22-caliber)	Professional	Same day	Suicide
John Merlin Taylor opened fire at the post office where he was employed, killing two co-workers and injuring another. Prior to the attack, Taylor fatally shot his wife in their home. ^{cxxxvi}									
14 December 1988	1	New Orleans Post Office in New Orleans, Louisiana	Warren Murphy (39/M)	0 dead; 3 wounded	1	Shotgun	Professional	December 15, 1988	No force
Warren Murphy opened fire at the post office where he was employed, wounding two co-workers and his supervisor. Murphy surrendered after holding a female hostage for 13 hours. ^{cxxxvii cxxxviii}									

20 August 1986	1	Edmond Post Office in Edmond, Oklahoma	Patrick Henry Sherrill (44/M)	14 dead; 7 wounded	3	3 handguns (2 .45-caliber semi-automatic and 1 .22-caliber)	Professional	Same day	Suicide
Patrick Sherrill opened fire at the post office where he was employed, killing 14 people and injuring seven others. Reports state that prior to the attack, Sherrill believed he was going to be fired from his job. ^{cixxxx}									
6 March 1985	1	Atlanta Post Office in Atlanta, Georgia	Steven W. Brownlee (30/M)	2 dead; 1 wounded	1	Handgun	Professional	Same day	Force
Steven Brownlee opened fire at a post office, killing two co-workers and wounding a third. ^{cxix} ^{cxci}									
18 July 1984	1	McDonald's in San Ysidro, California	James Oliver Huberty (41/M)	21 dead; 19 wounded	3	Submachine gun (Uzi); Shotgun; Handgun	None	Same day	Force
James Huberty opened fire in a McDonald's restaurant, killing 21 people and injuring 19 others. Huberty was dressed in camouflage during his attack. ^{cxcii}									
2 December 1983	1	Anniston Post Office in Anniston, Alabama	James Howard Brooks (53/M)	1 dead; 1 wounded	1	Handgun (.38 caliber)	Professional	Same day	No force
James Howard Brooks opened fire at the post office where he was employed, killing one person and wounding another. He then surrendered to police. Reports state that Brooks was angry at having been criticized by his supervisor. ^{cxclii} ^{cxcliv}									
19 August 1983	1	Post office and convenience store in Johnston, South Carolina	Perry Smith (unknown/M)	1 dead; 2 wounded	1	Shotgun (12-gauge)	Professional	Same day	No force
Perry Smith opened fire at a post office, killing a co-worker and wounding two others. Reports state that Smith felt he was mistreated by co-workers after his son committed suicide. ^{cxclv} ^{cxclvi}									

20 August 1982	1	Bob Moore's Welding & Machine Services, Inc. in Miami, Florida	Carl Brown (51/M)	8 dead; 3 wounded	1	Shotgun	Other	Same day	Force
Carl Brown opened fire in a welding shop, killing eight people and injuring three others. Reports state that Brown was upset that the welding shop charged him \$20 for repairs on a lawnmower engine. ^{cxvii}									
1 January 1972	Multiple	Multiple locations in New Orleans, Louisiana	Mark James Robert Essex (23/M)	9 dead; 13 wounded	2	Rifle (.44-caliber Magnum); Handgun (.38-caliber Colt revolver)	None	January 7, 1972	Force
Mark Essex launched a series of attacks over the course of a week, killing nine people and wounding 13 others. In one attack Essex hid in a parking lot across the street from the New Orleans Police Department and randomly shot at officers. Essex then broke into various facilities shooting civilians and responding officers before being killed by police. ^{cxviii cxix}									

Factories & Warehouses

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
25 October 2016	1	FreightCar America Factory in Roanoke, Virginia	Getachew Fedeke (M/53)	1 dead; 3 wounded	1	Handgun (9mm)	Professional	Same day	Suicide
Getachew Fedeke, a former employee of FreightCar America, opened fire on his former place of business in Roanoke, Virginia. Fedeke reportedly quit his job after complaining about harassment from his coworker. ^{cccccitii}									
12 February 2015	1	ProTec Steel Mill in Lennox South Dakota	Jeffrey DeZeeuw (51/M)	1 dead; 2 wounded	1	Handgun	Professional	Same day	Suicide
Jeffrey DeZeeuw opened fire at ProTec, a location for Sioux Steel, in Lennox, South Dakota, killing one and wounding two others before committing suicide. DeZeeuw was an employee of ProTec and the victim he killed was his assignment supervisor. ^{cciiiiccv}									
30 June 2014	1	C&A Iron Works on 13th Street and Hamilton Place in Gowanus, Brooklyn, NYC	Cameron Waithe (54/M)	0 dead; 2 wounded	1	Handgun	None	Same Day	Suicide
A gunman walked into an iron mill in Brooklyn and asked to be hired for a job. When he was told to speak with a manager upstairs, he entered the manager's office and began firing in the building. He then threw a device with wires and a fuse which was later determined to be a lead pipe and preceded to then barricade himself in a storage room. Dialogue occurred between the attacker and a hostage negotiation team and the attacker ultimately killed himself. ^{ccvccvi}									

29 April 2014	1	Federal Express in Kennesaw, Georgia	Geddy Lee Kramer (19/M)	0 dead; 6 wounded	4	Shotgun; Knife; 2 others (Molotov cocktails)	Professional	Same Day	Suicide
Geddy L. Kramer opened fire at the security gate of the shipping warehouse where he worked, injuring the security guard. He then moved through the warehouse, wounding five more co-workers before committing suicide. ^{ccvii} ccviii									
6 November 2012	1	Valley Protein plant in Fresno, California	Lawrence Jones (42/M)	2 dead; 2 wounded	1	Handgun	Professional	Same day	Suicide
Lawrence Jones opened fire at a California chicken processing plant, killing two coworkers and wounding two others before committing suicide. ^{ccix} ccx									
13 January 2012	1	McBride Lumber Company in Star, North Carolina	Ronald Dean Davis (50/M)	3 dead; 1 wounded	1	Shotgun (12- Gauge)	Professional	Same day	Suicide
Ronald Davis opened fire at the McBride Lumber Company where he was employed, killing three coworkers and wounding another. ^{ccxi}									
5 October 2011	1	Lehigh Hanson's Permanente Cement Plant in Cupertino, California	Shareef Allman (47/M)	3 dead; 7 wounded	4	2 rifles (.223 Caliber); Shotgun; Handgun (.40 Caliber)	Professional	October 6, 2011	Suicide
Shareef Allman, a cement plant truck driver, opened fire at his workplace, killing three people and wounding six others. Allman then shot and wounded a 60-year-old woman while attempting to hijack her car. Allman committed suicide after a day-long manhunt. ^{ccxii} ccxiii									
9 September 2010	1	Kraft Food plant in Philadelphia, Pennsylvania	Yvonne Hiller (43/F)	2 dead; 1 wounded	1	Handgun (.357 Magnum)	Professional	Same day	Force

	Yvonne Hiller opened fire at her workplace, killing two people and wounding another. Hiller was suspended from her job and escorted off the premises ten minutes prior to the attack. She drove through a security barrier before entering the facility on foot. ^{ccxiv ccxv}						
3 August 2010	1	Hartford Distributors in Manchester, Connecticut	Omar Thornton (34/M)	8 dead; 2 wounded	2	2 handguns (9-millimeter)	Professional Same day Suicide
	Omar Thornton opened fire at his workplace, killing eight people and injuring two others. Thornton hid his weapons in a lunchbox. Reports state that he was angry after being asked to resign for stealing beer from the warehouse in which he worked. ^{ccxvi ccxvii ccxviii ccxix}						
7 January 2010	1	ABB Inc. in St. Louis, Missouri	Timothy Hendron (51/M)	3 dead; 5 injured	4	Rifle; Shotgun; Handguns	Professional Same day Suicide
	Timothy Hendron opened fire at the electrical equipment plant where he worked, killing three people and injuring five others. Hendron was in the midst of a 2006 lawsuit against his employer regarding the company's retirement plan. ^{ccxx ccxxi}						
1 August 2008	1	Simon & Schuster book warehouse in Bristol, Pennsylvania	Robert Diamond (32/M)	2 dead; 0 wounded	1	Handgun (.40-caliber Smith & Wesson)	Professional Same day No force
	Robert Diamond opened fire at a warehouse where he was formerly employed, killing two former co-workers ^{ccxxii ccxxiii}						
25 June 2008	1	Atlantis Plastics in Henderson, Kentucky	Wesley Neal Higdon (25/M)	5 dead; 1 wounded	1	Handgun (.45-caliber semi-automatic)	Professional Same day Suicide
	Wesley Neal Higdon opened fire at his workplace, killing five co-workers and wounding another. Reports state that Higdon had been reprimanded by a supervisor for having an argument with a co-worker prior to the attack. ^{ccxxiv}						
1 April 2008	1	Alloy Fabricators in Randolph, Massachusetts	Howard Trang (48/M)	0 dead; 1 wounded	1	Handgun (.45-caliber semi-automatic)	Professional Same day Suicide
	Howard Trang opened fire in a factory, injuring one co-worker. ^{ccxxv ccxxvi}						

19 March 2008	1	Black Road Auto wrecking yard in Santa Maria, California	Lee Isaac Bedwell Leeds (31/M)	4 dead; 0 wounded	1	Handgun (semi- automatic)	Familial	Same day	Force
Lee Isaac Bedwell Leeds opened fire at the Black Road Auto office, killing his father, a customer and two co-workers. His father owned the office. ^{ccxxvii} ^{ccxxviii}									
27 April 2007	1	Lode Street Wastewater Facility in Santa Cruz, California	Steven Harold Smith (50/M)	2 dead; 0 wounded	2	2 handguns	Familial	Same day	Suicide
Steven Harold Smith opened fire at the Lode Street Wastewater Facility where he was employed, killing his estranged wife and a supervisor. ^{ccxxix}									
5 March 2007	1	Kenyon Press plant in Signal Hill, California	Jose Mendez (68/M)	0 dead; 3 wounded	1	Handgun (semi- automatic)	Professional	Same day	Suicide
Jose Mendez opened fire at his workplace, wounding three co-workers. Reports state that Mendez was angry that his working hours had been reduced at the menu printing plant. ^{ccxxx}									
11 January 2007	1	Crossroads Industrial Services in Indianapolis, Indiana	Jason Burnman (24/M)	0 dead; 4 wounded	1	Handgun (.38- caliber)	Professional	Same day	Force
Jason Burnam opened fire at Crossroads Industrial Services, where he was employed, wounding three people in the cafeteria and one in an office of the factory. Reports state that Burnam had been taking medication for bipolar disorder and claimed that he launched the attack to gain respect. ^{ccxxxi}									
26 June 2006	1	Safeway Inc. in Denver, Colorado	Michael Julius Ford (22/M)	1 dead; 5 wounded	1	Handgun (.38 caliber)	Professional	Same day	Force
Michael Julius Ford opened fire at a Safeway warehouse, killing one coworker and wounding four other people, including a police officer. ^{ccxxxii} ^{ccxxxiii}									

21 April 2006	1	Tyson Foods, Inc. in Pine Bluff, Arkansas	Julian English (24/M)	0 dead; 1 wounded	2	2 handguns	Professional	Same day	Force
Julian English opened fire at a Tyson Foods Inc. poultry processing plant where he was employed, wounding a co-worker. English had been suspended from his job prior to the attack. ^{ccxxxiv}									
29 January 2006	1	Santa Barbara Processing and Distribution Center in Santa Barbara, California	Jennifer San Marco (44/F)	7 dead; 0 wounded	1	Handgun (9-millimeter)	Professional	Same day	Suicide
Jennifer San Marco opened fire at a postal facility, killing six people hours after killing her neighbor. San Marco then fatally shot herself. The assailant was a former postal worker at the facility she targeted and was on medical leave. Reports state that San Marco entered the facility gates by following closely behind another car and gained access through the front door by taking another employee's electronic identification badge at gunpoint. ^{ccxxxv ccxxxvi}									
23 November 2005	1	H&M Wagner and Sons food distribution office in Glen Burnie, Maryland	Joseph Allen Cobb (54/M)	0 dead; 2 wounded	1	Handgun	Professional	Same day	Suicide
Joe Cobb opened fire at a warehouse where he was formerly employed, wounding two supervisors. Cobb then committed suicide. ^{ccxxxvii ccxxxviii}									
27 September 2005	1	Verla International factory in New Windsor, New York	Victor M. Piazza (55/M)	1 dead; 2 wounded	1	Handgun (.38-Caliber)	Professional	Same day	Suicide
Victor M. Piazza opened fire at a nail polish factory where he was formerly employed, killing one supervisor and wounding two others. Piazza was fired from the company after child pornography charges were filed against him. ^{ccxxxix ccl cclii}									

21 February 2005	1	Northrop Grumman Ships Systems in Pascagoula, Mississippi	Alexander L. Lett (41/M)	0 dead; 2 wounded	1	Handgun (9- millimeter semi- automatic)	Professional	Same day	Force
Alexander L. Lett opened fire at his workplace, wounding two coworkers. The attack ended when Lett was detained by other employees. ^{ccxliii} ^{ccxliv}									
26 January 2005	1	Jeep Liberty Plant in Toledo, Ohio	Myles Meyers (54/M)	1 dead; 2 wounded	1	Shotgun (20-gauge, double-barrel)	Professional	Same day	Suicide
Myles Meyers opened fire at his workplace, killing one person and wounding two others. ^{ccxliii} ^{ccxliv}									
2 July 2004	1	ConAgra Foods Inc. plant in Kansas City, Kansas	Elijah Brown (21.M)	5 dead; 2 wounded	2	2 handguns	Professional	Same day	Suicide
Elijah Brown opened fire at the food plant where he was employed, killing five people and injuring two others. Brown then committed suicide. ^{ccxlv}									
9 December 2003	1	PrintXcel in Visalia, California	John Garder (45/M)	1 dead; 0 wounded	1	Unknown firearm	Professional	Same day	Suicide
John Gardner opened fire at the PrintXcel plant, killing one employee. He then set multiple fires in the plant. Gardner had been fired from the company prior to the attack. ^{ccxlvii}									
19 August 2003	1	Andover Industries in Andover, Ohio	Ricky Shadle (32/M)	1 dead; 2 wounded	4	4 handguns (1 10- millimeter)	Professional	Same day	Suicide
Ricky Shadle opened fire at his workplace, killing one co-worker and wounding two others. ^{ccxlviii}									

9 July 2003	1	Lockheed Martin assembly plant in Meridian, Mississippi	Doug Williams (48/M)	5 dead; 9 wounded	2	Shotgun (12-gauge); Rifle (.223-caliber)	Professional	Same day	Suicide
Douglas Williams opened fire at the Lockheed Martin assembly plant where he was employed, killing five people and injuring nine others. Williams then committed suicide. ^{ccxlx}									
1 July 2003	1	Modine Manufacturing Co. in Jefferson City, Missouri	Jonathan Russell (25/M)	3 dead; 5 wounded	1	Handgun (.40-caliber semi-automatic)	Professional	Same day	Suicide
Jonathon Russell opened fire at his workplace, killing three people and wounding five others. Russell committed suicide following a shootout with police. ^{ccli}									
6 December 2001	1	Nu-Wood Decorative Millwork factory in Goshen, Indiana	Robert Wissman (36/M)	1 dead; 6 wounded	1	Shotgun	Professional	Same day	Suicide
Robert Wissman opened fire at the Nu-Wood Decorative Millwork plant, killing one person and wounding six others. Reports state that prior to the attack, Wissman was involved in a dispute with his employer over his possible termination. ^{cclii ccliii ccliiii}									
5 February 2001	1	Navistar International plant in Melrose Park, Illinois	William D. Baker (66/M)	4 dead; 4 wounded	1	Rifle (AK-47)	Professional	Same day	Suicide
William Baker opened fire at the Navistar International factory where he was employed, killing four co-workers and wounding four others. Baker concealed his weapons in a golf bag. ^{ccliv}									
15 September 1997	1	R.E. Phelon Co. factory in Aikens County, South Carolina	Arthur Hastings Wise (43/M)	4 dead; 3 wounded	1	Handgun (semi-automatic)	Professional	Same day	Attempted Suicide

5 June 1997	Arthur Hastings Wise opened fire at his former workplace, killing four people and injuring three others, including a security guard. Wise had been recently fired from the company prior to the attack. Reports state that after Wise shot the security guard, he tore out the telephone lines in the guard station and then entered the building. ^{cciv ccvi ccvii}								
	1	Omni Plastic plant in Santa Fe Springs, California	Daniel S. Marsden (38/M)	2 dead; 4 wounded	1	Handgun (9-millimeter semi-automatic)	Professional	Same day	Suicide
3 April 1995	Daniel S. Marsden opened fire at his workplace, killing two co-workers and wounding four others. He committed suicide two hours later. Reports state that Marsden began his attack after retrieving a gun from his car following an argument with co-workers. ^{ccviii}								
	1	Walter Rossler Company in Corpus Christi, Texas	James Simpson (28/M)	5 dead; 0 wounded	2	2 handguns (one 9-millimeter semi-automatic, one .32-caliber semi-automatic revolver)	Professional	Same day	Suicide
14 March 1994	James Simpson opened fire at an oil refinery inspection plant where he was formerly employed, killing five workers. He then committed suicide. ^{cclix cclx}								
	1	Extron Electronic factory in Santa Fe Springs, California	Tuan Nguyen (29/M)	3 dead; 2 wounded	1	Handgun (.38-caliber)	Professional	Same day	Suicide
14 September 1989	Tuan Nguyen opened fire at his former workplace, killing three people and wounding two others. Nguyen was fired from the company shortly before the attack. ^{ccxvi ccxvii}								
	1	Standard Gravure Corporation plant in Louisville, Kentucky	Joseph T. Wesbecker (47/M)	8 dead; 12 wounded	6	4 handguns (two semi-automatic MAC-11s, one .38-caliber revolver, and one 9-millimeter); Rifle (AK-47); Other	Professional	Same day	Suicide
	Joseph T. Wesbecker opened fire in the printing plant where he was employed, killing eight people and wounding twelve others. Wesbecker was on disability leave for mental illness at the time of the attack. ^{ccxviii ccxiv}								

Schools

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
23 April 2016	1	Antigo High school in Antigo, Wisconsin	Jakob E. Wagner (M/18)	0 dead; 2 wounded	1	Rifle	Academic	Same day	Force
Jakob Wagner targeted a prom being held at his former school, Antigo High School in Antigo, Wisconsin. Police officers present for the event heard shots fired and immediately responded, wounding the shooter who later succumbed to his injuries in the hospital. <small>cc:lxvcdxvi</small>									
29 February 2016	1	Madison Junior/Senior High School in Middletown, Ohio	James Austin Hancock (M/14)	0 dead; 5 wounded	1	Handgun	Academic	Same day	No Force
At approximately 11:30 a.m. on February 29, 14-year-old Austin Hancock began shooting in the cafeteria of Madison Junior/Senior High School in Middletown, Ohio. He fled the scene, but was apprehended nearby with the help of a police K-9. <small>cc:lxvii cclxviii</small>									
1 October 2015	1	Umpqua Community College in Roseburg, Oregon	Christopher Harper-Mercer (26/M)	9 dead; 7 wounded	6	5 handguns; Rifle	Academic	Same day	Suicide
Christopher Harper-Mercer opened fire in a classroom at Umpqua Community College in Roseburg, Oregon killing nine people and wounding seven others before killing himself during gunfire exchange with responding police officers. Harper-Mercer was a student at Umpqua Community College. He reportedly posted online about other shootings and their infamous perpetrators. <small>cc:lxix cclxxx cclxvi cclxxii</small>									

20 November 2014	1	Florida State University in Tallahassee, Florida	Myron May (M/31)	0 dead; 3 wounded	1	Handgun (.38- caliber)	None	Same day	Force
Myron May began shooting in Strozier Library at Florida State University in Tallahassee, Florida, wounding three people. He was an alumnus of the university. The shooter was killed during an exchange of gunfire with campus law enforcement. ^{cclxxiii cclxxiv}									
24 October 2014	1	Marysville Pilchuck High School in Marysville, Washington	Jaylen Ray Fryberg (M/15)	4 dead; 3 wounded	1	Handgun (.40 caliber Beretta)	Familial	Same day	Suicide
Jaylen Ray Fryberg opened fire in the cafeteria of Marysville Pilchuck High School, killing four, and ultimately dying from a self-inflicted gunshot. Prior to the shooting, he texted several of his friends to meet him for lunch in the cafeteria, asking them to skip classes if they were able to. Also prior to the shooting, Fryberg texted his family and the families of his would-be victims, apologizing preemptively for his actions. ^{cclxxv cclxxvi}									
10 June 2014	1	Reynolds High School in Troutdale, Oregon	Jared Michael Padgett (15/M)	1 dead; 1 wounded	2	Handgun; Rifle	Academic	Same day	Suicide
A teenage gunman walked into the Reynolds High School in Troutdale, Oregon with a rifle. In the gymnasium, he shot and killed 14 year-old freshman Emilio Hoffman and wounded Todd Rispler, a teacher at the school. The gunman was later found dead having committed suicide in a school bathroom. ^{cclxxvii cclxxviii}									
5 June 2014	1	Seattle Pacific University in Seattle, Washington	Aaron Reyes Ybarra (26/M)	1 dead; 3 wounded	1	Shotgun	None	Same day	Force
Aaron Ybarra opened fire inside the Otto Miller Hall at Seattle Pacific University in Seattle, Washington, killing one student and wounding three. He was ultimately subdued by students. According to the attacker's journal, he had been planning the attack for weeks. ^{cclxxix cclxxx}									

14 January 2014	1	Berrendo Middle School In Roswell, New Mexico	Mason Andrew Campbell (M/12)	0 dead; 3 wounded	1	Shotgun (20 gauge)	Academic	Same day	No force
<p>Twelve-year-old Mason Andrew Campbell opened fire on a group of students in the school gym of Berrendo Middle School, wounding three. Investigators found a notebook in Campbell's home where he wrote that he was going to commit the shooting. He wrote that he considered using a handgun and knife to kill a school bully. Two students were critically wounded in the shooting, and one staff member sustained minor injuries. <small>cc:lxvxi cclxxxii</small></p>									
13 December 2013	1	Arapahoe High School in Centennial, Colorado	Karl Halverson Pierson (18/M)	1 dead; 0 wounded	5	Shotgun; Knife; 3 other (Molotov cocktails)	Academic	Same day	Suicide
<p>Karl Halverson Pierson opened fire in his high school library, wounding a fellow student. He then walked the halls looking for a specific teacher. Pierson was found by authorities in a classroom, having committed suicide. The wounded student later died. <small>cc:lxviii cclxxxv</small></p>									
21 October 2013	1	Sparks Middle School near Reno, Nevada	Jose Reyes (12/M)	1 dead; 2 wounded	1	Handgun (Ruger 9mm semiautomatic)	Academic	Same day	Suicide
<p>Twelve-year-old Jose Reyes came to school with his parents' gun and opened fire, killing a teacher and wounding two students. The teacher who was shot had attempted to convince Reyes to surrender the weapon before being killed. Reyes' family said he had been teased about a speech problem and investigators uncovered that Reyes had been playing a role playing video game based off of the 1999 Columbine shooting. <small>cc:lxvxi cclxxxvii</small></p>									
12 April 2013	1	New River Community College, inside the New River Valley Mall in Christiansburg, Virginia	Neil Allen MacInnis (18/M)	0 dead; 2 wounded	1	Shotgun (12-gauge)	Academic	Same Day	No Force
<p>Neil Allen MacInnis exited his car and opened fire on his college campus, wounding two women. Three minutes before the attack, MacInnis posted an announcement of the coming shooting on the website 4chan with a link to the New River Valley public safety scanner, inviting people to listen, and a picture of the front of the school. <small>cc:lxvxi cclxxxix</small></p>									

10 January 2013	1	Taft Union High School in Taft, California	Bryan Oliver (16/M)	0 dead; 2 wounded	1	Shotgun (12-gauge)	Academic	Same Day	No Force
Bryan Oliver opened fire during his first period science class at his high school, wounding two people. Oliver's science teacher was able to convince him to lay down his firearm. Oliver had plotted to target two students who had bullied him, one of whom was among the wounded. ^{ccxc ccoxI ccoxII}									
14 December 2012	1	Sandy Hook Elementary School in Newtown, Connecticut	Adam Lanza (20/M)	26 dead; 2 wounded	3	Rifle (.223 caliber Bushmaster rifle), 2 handguns (10-millimeter Glock, 9-millimeter Sig Sauer)	Academic	Same day	Suicide
Adam Lanza opened fire in Sandy Hook Elementary School, killing 26 people (including 20 children) and wounding two others before committing suicide. Prior to the school shooting Lanza fatally shot his mother in their Connecticut home. Lanza was a former student of Sandy Hook Elementary School. ^{ccxIII ccoxIV ccoxV}									
2 April 2012	1	Oikos University in Oakland, California	One L. Goh (43/M)	7 dead; 3 wounded	2	Handgun (.45 caliber semi-automatic)	Academic	Same day	No Force
One L. Goh opened fire at Oikos University, killing seven students and wounding three others. Reports state that Goh was a former student at the school and initially sought to target an administrator against whom he harbored a grudge. ^{ccxvi ccoxvii}									
27 February 2012	1	Chardon High School in Cleveland, Ohio	Thomas Lane (17/M)	3 dead; 3 wounded	1	Handgun (.22 caliber Ruger Revolver)	Academic	Same day	No Force
Thomas (also known as 'TJ') Lane opened fire in Chardon High School, killing three students and wounding three others. Lane attended a nearby school and was waiting for a bus at the Chardon campus prior to the attack. ^{ccxviii}									

5 January 2011	1	Millard South High School in Omaha, Nebraska	Robert Butler Jr. (17/M)	1 dead; 2 wounded	1	Handgun (.40 caliber Smith & Wesson)	Academic	Same day	Suicide
Robert Butler Jr. opened fire at Millard South High School, killing one person and injuring two others. Prior to the attack, Butler Jr. had been suspended from school for a trespassing violation. Butler Jr. used a handgun he stole from his father and had indicated his plans on Facebook prior to the attack. ^{ccxiix}									
14 December 2010	1	Bay District School Board meeting in Panama City, Florida	Clay A. Duke (56/M)	0 dead; 0 wounded	1	Handgun	Other	Same day	Suicide
Clay A. Duke opened fire at a Florida school board meeting. The attack resulted in zero casualties. Duke, who had an extensive criminal record, held the board members hostage at gunpoint and tried to shoot the superintendent. Duke committed suicide after a security guard shot him in the leg. Reports state that the assailant was unhappy about paying taxes and his wife being fired from her workplace. ^{ccc cccci}									
8 October 2010	1	Kelly Elementary School in San Diego, California	Brendan O'Rourke (41/M)	0 dead; 2 wounded	2	Handgun (.357 Magnum revolver)	None	Same day	Force
Brendan O'Rourke opened fire on the playground of Kelly Elementary School, wounding two girls. O'Rourke then walked to a second playground and shot and missed at three boys and a school aide. Three construction workers tackled O'Rourke while he was reloading his gun, and held him until police arrived. ^{cccii ccciii}									
27 September 2010	1	University of Texas in Austin, Texas	Colton Joshua Tooley (19/M)	0 dead; 0 wounded	1	Rifle (AK-47)	Academic	Same day	Suicide
Colton Joshua Tooley opened fire on the University of Texas in Austin campus. The attack resulted in zero casualties. Tooley, wearing a dark suit and ski mask, fired toward a campus church before entering the library where he committed suicide. The attack began near the University of Texas Tower, the site of Charles Whitman's deadly shooting rampage in 1966. ^{ccciv cccv}									

30 August 2010	1	Sullivan Central High School in Blountville, Tennessee	Thomas Richard Cowan (62/M)	0 dead; 0 wounded	2	2 handguns (one .38-caliber semi-automatic and one .25-caliber)	None	Same day	Force
<p>Thomas Cowan entered Sullivan Central High School, where his brother was employed as a custodian, and pointed a gun at the principal's head. A school officer intervened and urged Cowan to drop his weapon. Cowan lunged for the school officer's gun and a 13-minute standoff ensued until two deputies arrived and fatally shot him to death. The attack resulted in zero casualties. Reports state that Cowan repeatedly asked for the whereabouts of the school fire alarm, allegedly to lure students out of the building and into the line of fire. ^{cccvf cccvii}</p>									
9 March 2010	1	Maintenance building at Ohio State University	Nathaniel Brown (51/M)	1 dead; 1 wounded	2	Unknown	Professional	Same day	Suicide
<p>Nathaniel Brown opened fire in an Ohio State University facility, killing one co-worker and injuring another. He then committed suicide. Brown was an Ohio State University custodian who had recently been informed that he would be fired. ^{cccviii cccix}</p>									
26 February 2010	1	Birney Elementary School in Tacoma, Washington	Jed Waits (30/M)	1 dead; 0 wounded	1	Handgun (semi-automatic)	Other	Same day	Force
<p>Jed Waits open fired in the parking lot of Birney Elementary School, killing a special education teacher. Before he was killed by a deputy sheriff, Waits also shot at and missed a bystander who had witnessed the shooting. Reports state that the victim had obtained a civil anti-harassment order against Waits in 2008 after he had repeatedly stalked her beginning in 2003. ^{ccc}</p>									
23 February 2010	1	Deer Creek Middle School in Littleton, Colorado	Bruce Strongagle Eastwood(32/M)	0 dead; 2 wounded	1	Rifle	None	Same day	Force
<p>Bruce Strongagle Eastwood opened fire in the parking lot of Deer Creek Middle School, injuring two students. Eastwood was tackled by a math teacher who held him until police arrived. ^{cccxi cccxii}</p>									
12 February 2010	1	The University of Alabama in Huntsville, Alabama	Amy Bishop (42/F)	3 dead; 3 wounded	1	Handgun (9mm)	Professional	Same day	No Force

Amy Bishop, an assistant professor of biological science at the University of Alabama, opened fire in a faculty meeting, killing three people and wounding three others. Five of the victims were members of the faculty and the sixth was an employee of the university. Reports state that Bishop was angry after being denied tenure. ^{cccxi}									
26 April 2009	1	Hampton University in Hampton, Virginia	Odane Greg Maye	0 dead; 2 wounded	Unknown	Unknown	Academic	Same day	Attempted Suicide
Odane Greg Maye opened fire at a Hampton University dormitory, wounding a pizza delivery man and the dormitory manager. Before the shooting began, Maye, a former student at Hampton University, parked his car off campus to avoid a vehicle checkpoint. He then attempted to commit suicide. ^{cccxiiv cccxv}									
16 October 2008	1	Henry Ford High School in Detroit, Michigan	Devon Bell (18/M); William Morton (15/M)	1 dead; 3 wounded	1	Rifle (AK-47)	Academic	Same day	Force
Two teenage gunmen opened fire after exiting from a black sport utility vehicle, killing one person and wounding three others. The gunmen targeted students who were leaving school. ^{cccxvi}									
14 February 2008	1	Northern Illinois University in DeKalb, Illinois	Steven Phillip Kazmierczak (27/M)	5 dead; 0 wounded	4	3 handguns; shotgun (pump- action)	Academic	Same day	Suicide
Steven Phillip Kazmierczak, a former graduate student at Northern Illinois University, opened fire in a university lecture hall, killing five people. Kazmierczak carried his weapons onto the campus in a guitar case, stepped from behind a screen on the stage, and began firing at students. ^{cccxvii}									
8 February 2008	1	Louisiana Technical College in Baton Rouge, Louisiana	Latina Williams (23/F)	2 dead; 0 wounded	1	Handgun	Academic	Same day	Suicide
Latina Williams opened fire in a classroom at Louisiana Technical College in Baton Rouge, killing two students. ^{cccxiix cccxix}									

9 December 2007	2	Youth With a Mission Training Center in Arvada, Colorado; New Life Church in Colorado Springs, Colorado	Matthew Murray (24/M)	4 dead; 4 wounded	3	Rifle; 2 handguns	Other	Same day	Suicide
Matthew Murray opened fire in a missionary training center dormitory, killing two people and wounding four others. He then walked 70 miles to an evangelical church in Colorado Springs and fatally shot two more people. Murray had been expelled from the training center three years prior to the attack. Reports state that he sent hate mail to the center several weeks prior to the attack. ^{ccccx cccxxi cccxxi}									
10 October 2007	1	SuccessTech in Cleveland, Ohio	Asa H. Coon (14/M)	0 dead; 4 wounded	2	2 handguns (one .38-caliber and one .22 caliber)	Academic	Same day	Suicide
Asa Coon opened fire in his school, injuring two students and two teachers. Reports state that prior to the attack Coon was angry at being suspended for his involvement in a fight. ^{ccccxiii}									
21 September 2007	1	Delaware State University in Dover, Delaware	Loyer Braden (18/M)	1 dead; 1 wounded	1	Unknown	Academic	Same day	Force
Loyer D. Braden, a student at Delaware State University, opened fire in the campus dining hall, killing one student and injuring another. ^{ccccxiv cccxv}									
16 April 2007	1	Virginia Polytechnic Institute in Blacksburg, Virginia	Seung-Hui Cho (23/M)	32 dead; 20 wounded	2	2 handguns (one .22-caliber semi-automatic and one 9mm semi-automatic)	Academic	Same day	Suicide
Seung-Hui Cho, a Virginia Polytechnic Institute student, opened fire inside a university dormitory and in several classrooms, killing 32 people and wounding 20 others. He committed suicide after the attack. Reports state that Cho had a history of mental and behavioral problems. ^{ccccxvi}									

2 October 2006	1	Amish schoolhouse in Lancaster County, Pennsylvania	Charles Carl Roberts, IV (32/M)	5 dead; 0 wounded	3	Shotgun; Handgun (semi-automatic); Rifle	None	Same day	Suicide
Charles Carl Roberts IV opened fire in a one-room Amish schoolhouse, killing five female students. Roberts barricaded himself in the school before carrying out the attack. ^{cccxvii}									
29 September 2006	1	Weston Schools in Cazenovia, Wisconsin	Eric Hainstock (15/M)	1 dead; 0 wounded	2	Shotgun; Handgun (.22-caliber revolver)	Academic	Same day	Force
Eric Hainstock aimed a shotgun at his high school teacher before the weapon was wrestled from him by a custodian. The gunman then took his second firearm and opened fire, killing a principal. Hainstock had previously complained to teachers and school administrators about being teased by his fellow students. Additionally, he had been issued a disciplinary warning for possessing tobacco the day before the attack. ^{cccxviii}									
30 August 2006	1	Orange High School in Hillsborough, North Carolina	Alvaro Castillo (19/M)	0 dead; 2 wounded	2	Shotgun (sawed- off); Rifle (9mm)	Academic	Same day	Force
Alvaro Castillo opened fire and set off pipe bombs in the parking lot of his former high school, wounding two students. Prior to the attack, Castillo fatally shot his father in his home and sent an e-mail to the principal of Columbine High School warning of his attack. ^{cccxix cccxx}									
24 August 2006	1	Essex Elementary School in Essex, Vermont	Christopher Williams (27/M)	1 dead; 1 wounded	1	Handgun (.45- caliber)	Other	Same day	Force
Christopher Williams opened fire at the school where his ex-girlfriend taught, killing one teacher and wounding another. Reports state that the gunman was angry over his breakup with his girlfriend and was searching for her at the school. Prior to the school attack, Williams fatally shot his ex-girlfriend's mother in her home. After the attack, the gunman drove to his friend's house and shot his friend. ^{cccxxi cccxxii}									
14 March 2006	1	Pine Middle School in Reno, Nevada	James S.s Newman (14/M)	0 dead; 2 wounded	1	Handgun (.38- caliber)	Academic	Same day	Force

James Scott Newman opened fire outside his middle school cafeteria, injuring two classmates. ^{cccxiii}									
8 November 2005	1	Campbell County Comprehensive High School in Jacksboro, Tennessee	Ken Bartley, Jr. (15/M)	1 dead; 2 wounded	1	Handgun	Academic	Same day	Force
Kenneth Bartley Jr. opened fire in his high school principal's office, killing one assistant principal and wounding two others. Bartley began his attack when he was called into the principal's office because students had seen him with a gun on campus. ^{ccxxxiv}									
21 March 2005	1	Red Lake High School in Red Lake, Minnesota	Jeff Weise (16/M)	7 dead; 7 wounded	3	Handguns	Academic	Same day	Suicide
Jeff Weise opened fire at an Indian reservation high school, killing seven fellow students and wounding seven others. The shooting spree lasted 10 minutes. Prior to the attack Weise fatally shot his grandparents at their home. ^{ccxxxv cccxxvi}									
9 February 2004	1	Columbia High School in East Greenbush, New York	Jon W, Romano (16/M)	0 dead; 1 wounded	1	Shotgun (12-gauge pump-action)	Academic	Same day	Force
John Romano opened fire at his high school, injuring a teacher. An assistant principal tackled and disarmed Romano. Reports state that Romano loaded his gun in the bathroom prior to the attack. ^{ccxxxvii}									
24 September 2003	1	Rocori High School in St. Cloud, Minnesota	John Jason McLaughlin (15/M)	2 dead; 0 wounded	1	Handgun (.22- caliber)	Academic	Same day	Force
John McLaughlin opened fire at his high school, killing two students. He then aimed his gun at a gym coach, but ultimately put the gun down. The gym coach then took the suspect to the school office without a struggle. ^{ccxxxviii cccxxix}									

17 July 2003	1	Kanawha County Board of Education school board meeting in Charleston, West Virginia	Richard Dean "Rusty" Bright (58/M)	0 dead; 1 wounded	1	Rifle (AK-47)	Professional	Same day	Force
Richard Dean "Rusty" Bright opened fire at a Kanawha County Board of Education meeting, wounding a teacher. Bright, a maintenance worker for the Board of Education, began his attack by dousing his supervisor and a personnel official with gasoline. After his lighter failed, he shot the teacher. Police later discovered additional weapons in Bright's vehicle. ^{cccxl}									
9 May 2003	1	Case Western Reserve University in Cleveland, Ohio	Diswanath Halder (62/M)	1 dead; 2 wounded	2	2 handguns (semi- automatic)	Other	Same day	Force
Biswanath Halder opened fire at a Case Western Reserve University building, killing one person and wounding two others. The attack lasted seven hours. Reports state that Halder was upset because he believed a university student hacked into his web site. ^{cccxli}									
29 October 2002	1	University of Arizona in Tuscon, Arizona	Robert S. Flores, Jr. (41/M)	3 dead; 0 wounded	4	4 handguns (one .45-caliber semi- automatic, one .40-caliber semi-automatic, one .357- caliber revolver, and one 9- millimeter revolver)	Academic	Same day	Suicide
Robert Flores opened fire in an instructor's office at the University of Arizona Nursing College, killing three of his instructors. Reports state that Flores was a failing student. ^{cccxlii}									
16 January 2002	1	Appalachian School of Law in Grundy, Virginia	Peter Odighizuwa (42/M)	3 dead; 3 wounded	1	Handgun (.38- caliber semi- automatic)	Academic	Same day	Force

17 May 2001	1	Pacific Lutheran University in Tacoma, Washington	Donald Cowan (55/M)	1 dead; 0 wounded	1	Handgun (9mm semi-automatic)	None	Same day	Suicide
Peter Odighizuwa opened fire on the campus of the Appalachian School of law, killing the dean, a student and a professor, and wounding three other people. Reports state that Odighizuwa, a graduate student, was angry over recently being dismissed from the school. ^{cccxlili}									
22 March 2001	1	Granite Hills High School in El Cajon, California	Jason Anthony Hoffman (18/M)	0 dead; 5 wounded	2	Shotgun (12-gauge); Handgun (.22 caliber)	Academic	Same day	Force
Donald Cowan opened fire at a Pacific Lutheran University dormitory, killing a music professor. Cowan left a 16-page suicide note expressing anger at a colleague of the victim, whom Cowan briefly dated as a teenager ^{cccxliv}									
Jason Hoffman opened fire at his high school, wounding five people. The attack began when a school dean questioned Hoffman as to why he was carrying a gun over his shoulder. After shooting and missing the dean, Hoffman ran toward the administration offices while randomly shooting into windows and a doorway. ^{cccxlv}									
5 March 2001	1	Santana High School in Santee, California	Charles Andrews Williams (15/M)	2 dead; 13 wounded	1	Handgun (.22-caliber revolver)	Academic	Same day	Force
Charles Andrews Williams opened fire at his high school, killing two schoolmates and wounding 13 others. He began his shooting spree by firing randomly inside a bathroom and around the courtyard. Reports state that Williams had warned classmates he would bring a weapon to school. ^{cccxvi cccxvii}									
6 December 1999	1	Fort Gibson Middle School in Fort Gibson, Oklahoma	Seth Trickery (13/M)	0 dead; 4 wounded	1	Handgun (9mm semi-automatic)	Academic	Same day	Force
Seth Trickey opened fire on a crowd of students at his middle school, wounding four people. He was then subdued by a teacher. ^{cccxviii}									

21 May 1999	1	Heritage High School in Conyers, Georgia	Thomas Solomon, Jr. (15/M)	0 dead; 6 wounded	1	Rifle	Academic	Same day	Force
Thomas Solomon opened fire at his high school, wounding six students. Solomon was eventually disarmed by an assistant principal after attempting to commit suicide. Authorities later discovered printouts of bomb recipes and notes detailing his plot to plant explosives in the school building in Solomon's bedroom. Reports state that Solomon was distraught over a recent breakup with his girlfriend. ^{cccclix}									
20 April 1999	1	Columbine High School in Littleton, Colorado	Eric Harris (18/M); Dylan Klebold (17/M)	13 dead; 24 wounded	4	2 shotguns (sawed-off); Handgun (TEC-9); Other	Academic	Same day	Suicide
Eric Harris and Dylan Klebold opened fire at Columbine High School, killing 12 fellow students and a teacher and wounding 24 others. ^{cccc}									
16 April 1999	1	Notus Junior-Senior High School in Notus, Idaho	Shawn Cooper (16/M)	0 dead; 0 wounded	1	Shotgun	Academic	Same day	No Force
Shawn Cooper opened fire at his high school. The attack resulted in zero casualties. Students barricaded themselves in classrooms when Cooper began firing his shotgun at students and faculty. Cooper surrendered after a 20-minute standoff with police. Reports state that Cooper had been taking Ritalin prior to the attack. ^{cccclii}									
21 May 1998	1	Thurston High School in Springfield, Oregon	Kip Kinkel (15/M)	2 dead; 22 wounded	1	Rifle	Academic	Same day	Unknown
Kip Kinkel opened fire in the cafeteria of his high school, killing two students and wounding 22 other people. Prior to the attack, Kinkel fatally shot his parents at home. Although several students were aware that Kinkel had devised a "hit list" prior to the attack, no one alerted authorities. ^{ccccliv}									
24 March 1998	1	Westside Middle School in Jonesboro, Arkansas	Andrew Golden (11/M); Mitchell Johnson (13/M)	5 dead; 10 wounded	Unknown	2 rifle (-30-06 Remington and.30 carbine Universal); Handgun (semi-automatic); Other	Academic	Same day	Force

15 December 1997	<p>Mitchell Johnson and Andrew Golden opened fire outside their middle school, killing five people and wounding 10 others. Prior to the attack, Johnson and Golden pulled the fire alarm, luring the students and teachers outside the building and into the gunmen's line of fire. The boys stole a cache of weapons from Golden's grandfather's house. Reports state that the boys had warned classmates of the impending attack. ^{ccclvi ccclvii ccclviii}</p>								
1 December 1997	1	Stamps High School in Stamps, Arkansas	Joseph "Colt" Todd (14/M)	0 dead; 2 wounded	Unknown	Unknown	Academic	Same day	Force
1 December 1997	1	Heath High School in West Paduch, Kentucky	Michael Carneal (17/M)	3 dead; 5 wounded	4	2 shotguns; 2 rifles (.22-caliber)	Academic	Same day	No force
1 October 1997	1	Pearl High School in Pearl, Mississippi	Luke Woodham (16/M)	2 dead; 7 wounded	1	Rifle	Academic	Same day	Force
19 February 1997	1	Bethel Regional High School in Bethel, Alaska	Evan Ramsey (16/M)	2 dead; 2 wounded	1	Shotgun (12-gauge)	Academic	Same day	No Force
<p>Joseph Colt Todd opened fire outside his high school, injuring two students. Todd hid in the woods next to his school and shot at students in the parking lot. Reports state that Todd was angry at being teased by classmates. ^{ccclix ccclxx}</p> <p>Michael Carneal opened fire on a prayer group at Heath High School, killing three girls and wounding five others. A classmate and friend of the assailant persuaded Carneal to put the gun down. Carneal had warned several classmates of his plan. ^{ccclxi ccclxii}</p> <p>Luke Woodham opened fire at his high school, killing two people and wounding seven others. Prior to the attack, Woodham stabbed his mother to death in their home. ^{ccclxiii ccclxiv}</p> <p>Evan Ramsey opened fire at his high school, killing a student, a principal, and wounding two others. Reports state that Ramsey had been bullied by classmates and had openly discussed his plans with friends prior to the attack. ^{ccclxv ccclxvi}</p>									

8 February 1996	1	Mid-Peninsula Education Center in Palo Alto, California	Douglas Bradley (16/M)	0 dead; 3 wounded	1	Handgun (.38 caliber revolver)	Academic	Same day	Suicide
Douglas Bradley opened fire on his high school's basketball court, injuring three students. Bradley drove his car onto the court and threw money out the window to draw people into his line of fire. <small>ccclxviii cccclxxiii</small>									
2 February 1996	1	Frontier Middle School in Moses Lake, Washington	Barry Loukaitis (14/M)	3 dead; 1 wounded	3	Rifle; 2 handguns (one .22-caliber and one .25- caliber)	Academic	Same day	Force
Barry Loukaitis opened fire on his middle school algebra class, killing a teacher and two students and wounding another. Loukaitis held hostages for 10 minutes and released some of the wounded before he was disarmed by a gym instructor. Loukaitis wore a duster jacket to hide his weapons. <small>ccclxix ccdlxx ccdlxxi</small>									
15 November 1995	1	Richland High School in Lynville, Tennessee	Jamie Rouse (17/M)	2 dead; 1 wounded	1	Rifle	Academic	Same day	Force
Jamie Rouse opened fire at his high school, killing a teacher and a student, and wounding another teacher. Reports state that Rouse was angry at being socially ostracized at school. <small>ccclxxii cccclxxiii</small>									
12 October 1995	1	Blackville-Hilda High School in Blackville, South Carolina	Toby Sincino (16/M)	1 dead; 1 wounded	1	Handgun (.32- caliber revolver)	Academic	Same day	Suicide
Toby Sincino opened fire at his high school, killing one teacher and wounding another. Sincino began his attack by shooting his math teacher in the face. He then walked to the guidance counselor's office, but after being unable to unlock the door, he shot another math teacher. Reports state that Sincino was angry over being bullied at school and warned classmates that he possessed a gun. He had been suspended the day before the shooting. <small>ccclxxiv cccclxxv</small>									
7 November 1994	1	Wickliffe Middle School in Wickliffe, Ohio	Keith Ledeger (37/M)	1 dead; 3 wounded	1	Shotgun	Academic	Same day	Force

Keith A. Ledeger opened fire at his former middle school, killing a custodian and wounding two staff members. He then shot a police officer near the main entrance. Ledeger had been diagnosed with paranoid schizophrenia. cccixxi									
18 January 1993	1	East Carter High School in Graysosn, Kentucky	Gary Scott Pennington (17/M)	2 dead; 0 wounded	Unknown	Unknown	Academic	Same day	No Force
Gary Scott Pennington opened fired at a high school English class, killing a teacher and a custodian. Pennington then held 22 students hostage. ccclxxvii ccclxxviii									
14 December 1992	1	Simon's Rock College of Bard in Great Barrington, Massachusetts	Wayne Lo (18/M)	2 dead; 4 wounded	1	Rifle	Academic	Same day	No Force
Wayne Lo opened fire on his school's campus, killing two people and wounding four others. Lo began his attack by shooting a security guard and a professor before targeting students in the library and dormitories. Prior to the attack, school administrators were notified that Lo had received a package from an ammunition company, but determined the school had no authority to interfere with the package. In addition, the school resident director was warned that Lo threatened to kill her and her husband. cccixxix ccclxxx									
11 September 1992	1	Palo Duro High School in Amarillo, Texas	Randy Earl Matthews (17/M)	0 dead; 6 wounded	1	Handgun (.38- caliber)	Academic	Same day	Force
Randy Matthews opened fire at his high school pep rally, wounding six fellow students. Another student was trampled by the fleeing mob of students. Reports state that although Matthews initially targeted a student with whom he had fought, he continued to spray bullets at other students in the hallway. cccclxxxi									
14 May 1992	1	Silversado Middle School in Napa, California	John McMahan (14/M)	0 dead; 2 wounded	1	Handgun (.357 Magnum)	Academic	Same day	No Force
John McMahan opened fire on a middle school science class, wounding two fellow students. Reports state that McMahan was angry over being bullied in school. cccclxxxii cccclxxxiii									

1 May 1992	1	Lindhurst High School in Hoyt, Kansas	Eric Houston (20/M)	4 dead; 9 wounded	2	Shotgun (12-gauge); Rifle (.22-caliber)	Academic	Same day	No force
Eric Houston opened fire at his former high school, killing four people and wounding nine others. During the attack, Houston held dozens of students hostage on campus. <small>ccclxxxiv ccclxxxv</small>									
1 November 1991	1	University of Iowa in Iowa City, Iowa	Gang Lu (28/M)	5 dead; 1 wounded	2	Handguns (one .38-caliber revolver and one .22-caliber revolver)	Academic	Same day	Suicide
Gang Lu, a graduate student, opened fire on the University of Iowa campus, killing five people and wounding another. Lu's victims included two professors, a department chair, an associate professor, an associate vice president and a student employee. Reports state that Lu was angry over the unenthusiastic reception his dissertation received. Investigators recovered letters in which Mr. Lu enumerated a list of targets and outlined his plans to exact revenge. <small>ccclxxxvi ccclxxxvii</small>									
17 January 1989	1	Cleveland Elementary School in Stockade, California	Patrick Edward Purdy (24/M)	5 dead; 29 wounded	2	Rifle (.56-caliber); Handgun (9mm)	Academic	Same day	Suicide
Patrick Purdy opened fire at an elementary school playground, killing five people and wounding 29 others. Purdy had attended the school 16 years prior to his attack. <small>ccclxxxviii ccclxxxix</small>									
16 December 1988	1	Atlantic Shores Christian School in Virginia Beach, Virginia	Nicholas Elliot (16/M)	1 dead; 2 wounded	1	Handgun (semi-automatic)	None	Same day	Force
Nicholas Elliot opened fire at his high school, killing a teacher and wounding two others. Elliot hid his gun in his backpack. <small>ccclxxx ccclxxci</small>									

26 September 1988	1	Oakland Elementary School in Breenwood, South Carolina	James William Wilson (19/M)	2 dead; 9 wounded	1	Handgun (.22- caliber revolver)	None	Same day	No Force
James Wilson opened fire at an elementary school, killing two young girls and wounding nine other people. Reports state that Wilson was angry about being teased for his weight and for taking psychiatric drugs. ^{ccxcvii ccxcviii}									
20 May 1988	1	Hubbard Woods School in Winnetka, Illinois	Laurie Dann (30/F)	1 dead; 5 wounded	2	2 handguns (one .22-caliber semi- automatic and one .32 caliber)	None	Same day	Suicide
Laurie Dann opened fire at an elementary school, killing a second-grader and wounding five other students. Dann then shot a man in a nearby house. Prior to the attacks, Dunn, who had a history of mental illness, lit a house on fire, attempted to firebomb a school, and delivered poisoned snacks to people she knew. ^{ccxcvccccxv ccxcxvi}									
4 December 1986	1	Fergus High School in Lewiston, Montana	Kristofer Hans (14/M)	1 dead; 3 wounded	1	Handgun	Academic	Same day	Force
Kristofer Hans opened fire at his high school, killing one person and wounding three others. Hans initially tried to kill his teacher, but shot and killed her substitute instead. Hans then fired several shots as he fled the school building, wounding two students and a vice principal. Reports state that Hans was angry about failing a French class. ^{ccxcxvii ccxcviii ccxcix}									
10 December 1985	1	Portland Junior High School in Portland, Connecticut	Floyd Warmsley (13/M)	1 dead; 2 wounded	1	Rifle	Academic	Same day	Force
Floyd Warsmsley opened fire at his junior high school, killing a custodian and injuring the principal and secretary. After shooting the three victims, Warsmsley roamed the school and took a student hostage for more than a half-hour. ^{cd cdi}									
21 January 1985	1	Goddard Junior High School in Goddard, Kansas	James Alan Kearbey (14/M)	1 dead; 3 wounded	2	Rifle (M1-A); Handgun (.357 Magnum)	Academic	Same day	Force

21 January 1983	1	Parkway South Junior High School in Manchester, Missouri	David F. Lawler (14/M)	1 dead; 1 wounded	3	2 handguns (.22- caliber)	Academic	Same day	Suicide
James Alan Kearbey opened fire at his high school, killing the principal and wounding two teachers and a student. Kearbey's classmates claimed he was fascinated with military weapons and war. ^{cdii cdi}									
29 January 1979	1	Cleveland Elementary School in San Diego, California	Brenda Spencer (16/F)	2 dead; 9 wounded	1	Rifle	None	Same day	Force
David F. Lawler opened fire in his junior high school study hall, killing one student and wounding another. After Lawler committed suicide, investigators discovered a three-page suicide note in his bag. ^{cdiv cdv}									
12 July 1976	1	California State University in Fullerton, California	Edward Charles Allaway (37/M)	7 dead; 2 wounded	1	Rifle	Professional	Same day	No Force
Brenda Spencer opened fire at an elementary school, killing the principal and a custodian and wounding eight children and a police officer. Spencer fired the shots from her house across the street from the school. ^{cdvi cdvii}									
30 December 1974	1	Olean High School in Olean, New York	Anthony Barbaro (18/M)	3 dead; 9 wounded	2	Rifle; Shotgun	Academic	Same day	Force
Edward Charles Allaway opened fire in the basement of a library where he was employed as a custodian, killing seven people and wounding two others. Allaway then called the police and surrendered. ^{cdviii cdix}									
Anthony Barbaro opened fire at his high school, killing three people and wounding nine others. Equipped with guns and homemade bombs, Barbaro began his attack by setting several fires in the school. He then shot a janitor and fired from a third-floor window at responding firemen and bystanders. A search Barbaro's home revealed handmade bombs and a diary detailing five months of planning. ^{cdx cdxi cdxii}									

1 August 1966	1	University of Texas in Austin, Texas	Charles Joseph Whitman (25/M)	13 dead; 31 wounded	4	2 rifles; Shotgun (sawed-off); Handgun (.357 Magnum)	Academic	Same day	Force
Charles Joseph Whitman, an architectural engineering student, opened fire from an observation desk on the University of Texas campus, killing 13 people and wounding 31 others. Whitman's attack ended after he was shot by a police officer. ^{cdxiii}									

Other

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
28 September 2016	2	Townville Elementary School and private residence in Townville, South Carolina	Jesse Osborne (M/14)	2 dead; 2 wounded	1	Handgun	None	Same day	Force
26 September 2016	1	Condo Complex in Houston, Texas	Nathan Desai (M/45)	0 dead; 9 wounded	3	Handgun; Submachine gun; Knife	None	Same day	Force
16 September 2016	3	Police vehicle, bar, and street in Philadelphia, Pennsylvania	Nicholas Galent (M/25)	1 dead; 4 wounded	1	Handgun (9mm Ruger Pistol)	None	Same day	Force

14-year-old Jesse Osborne shot and killed his father before driving to Townville Elementary School. He reportedly then rammed his parents' vehicle into the chainlink fence surrounding the playground before opening fire on children outside for recess. Two of Osborne's two victims were six years old. Osborne was reportedly homeschooled and was home alone with his father at the time of the incident. ^{cdxvcdxv}

45-year-old Nathan Desai opened fire on Houston motorists, wounding nine. The successful Houston lawyer was carrying thousands of rounds of ammunition during his shooting spree. Desai, who was reportedly in a Jewish fraternity in college, was wearing Nazi symbols on his military-style clothing. ^{cdxvcdxvii}

	<p>At approximately 11:20 p.m., 25-year-old Nicholas Glenn ambushed Sergeant Sylvia Young while she sat in her police vehicle in west Philadelphia, shooting at her 18 times. Nearby officers heard the shots and pursued the gunman, who fired into a nearby bar injuring one security guard. Glenn then grabbed a woman and used her as a human shield before shooting her in the leg. He then fired into a car 14 times, killing one woman and injuring a man. Glenn was eventually chased into an alley where he was shot and killed by officers, though not before shooting a University of Pennsylvania officer twice. All told, one person was killed and three were injured. In a note found at the scene, Glenn expressed hatred towards police and specifically named one probation officer. ^{cdxxviii cdxxix}</p>									
<p>7 July 2016</p>	<table border="1"> <tr> <td>1</td> <td>Protest on the streets of Dallas, Texas</td> <td>Micah Xavier Johnson (M/25)</td> <td>5 dead; 6 wounded</td> <td>2</td> <td>Rifle (SKS Semi-Automatic Assault Rifle); Handgun</td> <td>None</td> <td>Same day</td> <td>Force</td> </tr> </table> <p>At approximately 10:45 p.m., 14 officers were targeted and fired upon during a Black Lives Matter protest against the recent deaths of Alton Sterling and Philando Castile. The perpetrator, Micah Johnson, opened fire from ground level with an SKS assault rifle, killing 5 officers and wounding 9 others. Johnson was neutralized with a police-controlled robot carrying explosives. Micah Johnson was a military veteran that served in Afghanistan. Reporting to date has not revealed any ties to a larger network or group. Investigators found explosive materials, ballistic vests, and ammunition in his home. The attack is considered the deadliest assault on law enforcement since 9/11. ^{cdxxx cdxxxi}</p>	1	Protest on the streets of Dallas, Texas	Micah Xavier Johnson (M/25)	5 dead; 6 wounded	2	Rifle (SKS Semi-Automatic Assault Rifle); Handgun	None	Same day	Force
1	Protest on the streets of Dallas, Texas	Micah Xavier Johnson (M/25)	5 dead; 6 wounded	2	Rifle (SKS Semi-Automatic Assault Rifle); Handgun	None	Same day	Force		
<p>29 May 2016</p>	<table border="1"> <tr> <td>1</td> <td>Auto Detail Shop and Neighborhood in Houston, Texas</td> <td>Dionisio Garza III (M/25)</td> <td>1 dead; 6 wounded</td> <td>2</td> <td>Rifle (AR-15); Handgun (Pistol)</td> <td>None</td> <td>Same day</td> <td>Force</td> </tr> </table> <p>On the morning of May 29, 2016, Dionisio Garza III, opened fire at an auto detail shop in Houston, Texas with an assault rifle. The shooter traveled on foot to a nearby neighborhood. Garza, an Army veteran who deployed twice to Afghanistan, reportedly chose the location for its tactical advantages. He fired 212 rounds during his rampage. ^{cdxxvii cdxxviii}</p>	1	Auto Detail Shop and Neighborhood in Houston, Texas	Dionisio Garza III (M/25)	1 dead; 6 wounded	2	Rifle (AR-15); Handgun (Pistol)	None	Same day	Force
1	Auto Detail Shop and Neighborhood in Houston, Texas	Dionisio Garza III (M/25)	1 dead; 6 wounded	2	Rifle (AR-15); Handgun (Pistol)	None	Same day	Force		
<p>25 May 2016</p>	<table border="1"> <tr> <td>1</td> <td>Highway near Phoenix, Arizona</td> <td>James David Walker (M/36)</td> <td>0 dead; 2 wounded</td> <td>3</td> <td>Rifle (AR-15); Rifle; Handgun</td> <td>None</td> <td>Same day</td> <td>No Force</td> </tr> </table> <p>On May 25, 2016, James David Walker, 36, armed with a rifle, allegedly began shooting at motorists on Beeline Highway (State Route 87) near Phoenix, Arizona. Over the next hour, while he was sitting in his parked vehicle, he shot towards 13 people in six different moving cars. He fled in a carjacked vehicle, hit a state trooper patrol vehicle, and then drove away. The shooter was apprehended by police after a police air unit spotted his vehicle in a ditch. No one was killed; two were wounded. ^{cdxxv cdxxvi cdxxvii cdxxviii cdxxix}</p>	1	Highway near Phoenix, Arizona	James David Walker (M/36)	0 dead; 2 wounded	3	Rifle (AR-15); Rifle; Handgun	None	Same day	No Force
1	Highway near Phoenix, Arizona	James David Walker (M/36)	0 dead; 2 wounded	3	Rifle (AR-15); Rifle; Handgun	None	Same day	No Force		

31 March 2016	1	Greyhound Bus Station in Richmond, Virginia	James Brown III (M/34)	1 dead; 2 wounded	1	Handgun (.40-caliber Beretta)	None	Same day	Force
At 2:45 p.m on March 31, James Brown opened fire at a Greyhound Bus Station in Richmond, VA, killing a Virginia State trooper already at the station. The trooper was allegedly talking to the suspect when he pulled out a gun. Two nearby troopers returned fire. The suspect died at the hospital. <small>cdxxxviiicdxviii</small>									
13 March 2016	1	Police Station in Landover, Maryland	Michael Ford (M/22)	1 dead; 0 wounded	1	Handgun	None	Same day	Force
Michael Ford opened fire on the Prince George's County Police station in Landover, Maryland. Ford's two brothers drove him to the police station and used mobile phones to record Michael Ford's attack. The video was described as a "last will and testament." Police Officer Jacai Colson was killed by friendly fire. <small>cdxxxixcdxxx</small>									
25 February 2016	3	Locations across Newton, Kansas including Excel Industries	Cedric Larry Ford (M/38)	3 dead; 14 wounded	2	1 Rifle (AK-47); 1 Handgun (Glock 22)	Professional	Same day	Force
Cedric Larry Ford began shooting from his vehicle in Newton, Kansas with a handgun and an assault rifle, wounding one person. He then drove two miles and shot another person before arriving at Excel Industries, a lawn care equipment manufacturing plant, where he killed three people and wounded 12. The shooter was an Excel employee. <small>cdxxxixcdxxxii</small>									
20 February 2016	3	Apartment Complex, Kia Dealership, and Cracker Barrel restaurant Kalamazoo, Michigan	Jason Brian Dalton (M/45)	6 dead; 2 wounded	2	2 Handguns (9mm Glock and Walther P-99)	None	Same day	No Force

	<p>On February 20, 2016, Jason Brian Dalton began shooting at the first of eight people in three different areas of Kalamazoo, Michigan. The shooter, carrying two handguns, drove for nearly five hour shooting randomly at individuals at an apartment complex, car dealership, and restaurant parking lot. Dalton, an Uber driver, continued to pick up fares during his assault, but was ultimately arrested by police two hours after the final shot was fired. ^{cdxxxviii}cdxxxiv cdxxxv</p>								
<p>27 November 2015</p>	<p>1</p>	<p>Planned Parenthood at the Westside Health Center in Colorado Springs, Colorado.</p>	<p>Robert Lewis Dear, Jr. (M/57)</p>	<p>3 dead; 9 wounded</p>	<p>4</p>	<p>4 rifles (SKS semi-automatic)</p>	<p>None</p>	<p>Same day</p>	<p>No Force</p>
<p>On November 27, 2015, Robert Lewis Dear, Jr. opened fire on a Planned Parenthood facility at the Colorado Springs Westside Health Center in Colorado Springs, Colorado. Armed with a rifle, he exchanged heavy fire with law enforcement during an hours-long standoff, injuring five responding officers prior to surrendering. ^{cdxxxvi}cdxxxvii</p>									
<p>31 October 2015</p>	<p>1</p>	<p>Neighborhood in Colorado Springs, Colorado</p>	<p>Noah Jacob Harpham (M/33)</p>	<p>3 dead; 0 wounded</p>	<p>3</p>	<p>2 handguns; Rifle (AR-15)</p>	<p>None</p>	<p>Same day</p>	<p>Force</p>
<p>On October 31, 2015, Noah Jacob Harpham began shooting people as he walked down the street in Colorado Springs, Colorado. Armed with two handguns and a rifle, the shooter killed three people before he was killed during an exchange of gunfire with law enforcement. Two days prior to his attack, Harpham took to the internet to leave a paranoid, rambling video message, which ranted about religion, the government and his family. ^{cdxxxviii}cdxxxix</p>									
<p>26 August 2015</p>	<p>1</p>	<p>Bridgewater Plaza in Moneta, Virginia</p>	<p>Vester Lee Flanagan II (41/M)</p>	<p>2 dead; 1 wounded</p>	<p>1</p>	<p>Handgun (9-mm Glock)</p>	<p>Professional</p>	<p>Same day</p>	<p>Suicide</p>
<p>Vester Lee Flanagan II opened fire during a live broadcast of WDBJ-TV in Moneta, Virginia killing two people and wounding one other. Flanagan, who was known by his onscreen pseudonym Bryce Williams, fled the scene prior to committing suicide. Flanagan was a former employee of the station and had a history of filing discrimination complaints, including one against the station. He reportedly accused co-workers of making racist comments and claimed that the shooting was intended to avenge the deaths of nine African-Americans in Charleston, South Carolina. ^{cdxl}cdxli cdxlii</p>									

16 July 2015	2	Military recruiting center in a strip mall and local Navy operations center in Chattanooga, Tennessee	Mohammad Youssef Abdulazeez (24/M)	5 dead; 2 wounded	3	Rifle (AK-47); Shotgun (12-gauge); Handgun (9-millimeter)	None	Same day	Force
Mohammad Youssef Abdulazeez opened fire at two military locations in Chattanooga, Tennessee, killing five persons and wounding two others before being killed by a police officer. Abdulazeez was reportedly dealing with drug and mental health issues and had downloaded recordings by al-Qa'ida ideologue Anwar al-Awlaqi. <small>cdxliii.cdxliiv.cdxlv</small>									
5 July 2015	1	Omni Austin Hotel Downtown in Austin, Texas	Michael McGregor Holt (M/35)	1 dead; 0 wounded	1	Rifle	None	Same day	Force
At 4:48 a.m., Michael Holt began shooting at bystanders at the Omni Austin Hotel Downtown in Austin, Texas. Surveillance video from inside the hotel shows Holt walking around with a hard hat on and a rifle draped over his shoulder. The shooter, armed with a rifle, was killed by responding law enforcement. <small>cdxlvicdxlvii</small>									
15 June 2015	1	Emanuel AME Church in Charleston, South Carolina	Dylann Storm Roof (M/21)	9 dead; 1 wounded	1	Handgun (.45-caliber Glock)	None	Same day	No Force
Dylann Storm Roof opened fire during a prayer meeting at the Emanuel African Methodist Episcopal Church in Charleston, South Carolina, killing nine people and wounding one before fleeing the scene. He was arrested the following day in North Carolina. Roof published a racist manifesto prior to the shooting and openly associated with the white supremacy movement. <small>cdxlviii.cdxlix.cdl</small>									

3 May 2015	1	Curtis Culwell Center in Garland, Texas	Elton Simpson (M/29) and Nadir Soofi (M/33)	0 dead; 1 wounded	6	3 rifles; 3 handguns (pistols)	None	Same day	Force
Two gunmen opened fire outside a complex in Garland, Texas, that was hosting a contest featuring cartoons of the Prophet Muhammad. One of the shooters was Elton Simpson, an Arizona man, who previously had been convicted on a minor charge in a broader terrorism-related case. Both gunmen were killed and one security officer was injured in the shootout. ^{cdlii}									
3 May 2015	1	Trestle Trail Bridge in Menasha, Wisconsin	Sergio Daniel Valencia Del Toro (M/27)	3 dead; 1 wounded	2	Handguns	None	Same day	Suicide
At 7:30 p.m., Sergio Daniel Valencia Del Toro shot into a crowd of people on the Trestle Trail Bridge in Menasha, Wisconsin, before turning the gun on himself before law enforcement arrived. He died a few hours later. ^{cdliii}									
17 April 2015	1	Los Angeles International Airport, Los Angeles, California	Everardo Custodio (21/M)	0 dead; 0 wounded	1	Handgun (Pistol)	None	Same day	Force
Everardo Custodio opened fire at Logan Square in Chicago, Illinois firing indiscriminately but wounding no one until he was wounded by an Uber driver who was carrying a licensed gun. Custodio's motive for the shooting is unknown. ^{cdliii cdliiv}									
28 March 2015	1	Spring break party in Panama City, Florida	David Jamichael Daniels (M/21)	0 dead; 7 wounded	1	Handgun	None	Same day	No Force
David Jamichael Daniels opened fire on a spring break party in Panama City, Florida using a handgun. He fled the scene, but was later apprehended by law enforcement. ^{cdlii cdlii}									

18 March 2015	4	Multiple locations in Mesa, Arizona	Ryan Elliot Giroux (M/41)	1 dead; 5 wounded	1	Handgun	None	Same day	Force
<p>On March 18, 2015, Ryan Elliot Giroux, targeted four separate locations in Mesa, Arizona, including the Tri-City Inn motel, a restaurant at the East Valley Institute of Technology, and two separate residential buildings. The shooter was apprehended by law enforcement several hours after his attack. ^{cdlvii,cdlviii}</p>									
26 January 2015	1	City Hall in New Hope, Minnesota	Raymond Kmetz (68/M)	0 killed; 2 wounded	1	Shotgun (12-gauge)	None	Same day	Force
<p>Raymond Kmetz opened fire after a swearing-in ceremony for new police officers in New Hope, Minnesota, wounding two police officers. Kmetz was killed by police officers. Kmetz's relationship with the wounded officers is unknown, but he was notorious in New Hope for a variety of prior crimes, criminal behavior and threatening police. ^{cdlix,cdlx,cdlii}</p>									
28 November 2014	3	Federal courthouse building, the Mexican Consulate, and law enforcement headquarters in downtown Austin, TX	Larry Steven McQuilliams (M/49)	0 dead; 0 wounded	4	Handgun; Rifle; 2 others (explosive devices)	None	Same day	Force
<p>On November 28, 2014, Larry Steven McQuilliams began shooting at a federal courthouse building in Downtown Austin, Texas. He was armed with a handgun, a rifle, and explosive devices. After targeting the courthouse, he continued his attack first at the Mexican Consulate and then headed to the Austin law enforcement headquarters. McQuilliams was killed during an exchange of gunfire with law enforcement. ^{cdlviii,cdlix}</p>									

22 November 2014	1	Shooter's residence in Tallahassee, Florida	Curtis Wade Holley (M/53)	1 dead; 1 wounded	1	Handgun	None	Same day	Force
At 10:15 a.m., Curtis Wade Holley targeting law enforcement responding to a 911 call at his residence in Tallahassee, Florida. The shooter appeared to have set fire to his house in order to attack first responders. Holley shot and killed one law enforcement officer with a handgun. ^{cdlxiv} cdlxv									
24 July 2014	1	Sister Marie Lenahan Wellness Center in Darby, Pennsylvania	Richard Steven Plotts (M/49)	1 dead; 1 wounded	1	Handgun	Other	Same day	Force
Richard Steven Plotts entered his psychiatrist's office at Sister Marie Lenahan Wellness Center in Darby, Pennsylvania, armed with a handgun on July 24. He shot and killed his caseworker and wounded his doctor. The doctor, who possessed a valid firearms permit, returned fire and wounded Plotts. Employees restrained the shooter until law enforcement arrived. ^{cdlxvi} cdlxvii									
6 June 2014	1	Forsyth county Courthouse in Cumming, Georgia	Denis Marx (48/M)	0 dead; 1 wounded	6	3 Handguns; 2 others (chemical grenades); Rifle	None	Same Day	Force
Denis Marx opened fire on a deputy just after attempting to run him down outside a courthouse. Marx also threw smoke, gas, and pepper spray grenades at first responders. A SWAT team killed him. Officers then searched his home and found homemade explosives. Marx saw himself as a "sovereign citizen" and held an anti-government ideology. Marx was supposed to appear at the Forsyth County Courthouse and was expected to make a plea for his multiple felony convictions. ^{cdlxviii} cdlxix									

23 May 2014	17	Multiple locations in Isla Vista, California, near the University of California, Santa Barbara, California	Eliot Rodger (22/M)	6 dead; 14 wounded	6	4 Handguns; 2 knives; Other (vehicle)	Academic	Same Day	Suicide
Eliot Rodger stabbed three men to death, including two of his roommates, in his apartment in Isla Vista, California with a knife. He then drove to a sorority house near the University of California, Santa Barbara campus and opened fire, killing two students and injuring one. Rodger drove to a deli where he shot and killed another student, then drove around randomly shooting at people on the streets before exchanging gunfire with police officers. He committed suicide as police moved to take him into custody. Rodger posted a video on YouTube and sent a 137-page letter to an online acquaintance before the rampage, both of which detailed his plan to target women. <small>cdlxxcdlxxicdlxxii</small>									
3 May 2014	2	A private home and a construction site in Jonesboro, Arkansas	Porfirio Sayago-Hernandez (40/M)	3 dead; 4 wounded	3	Handgun	Other	Same Day	Suicide
Porfirio Hernandez opened fire at a friend's home, killing two and wounding four. He then drove to his place of employment, a construction site, and shot and killed one more victim about twenty minutes later before fleeing the scene again. About an hour later, Hernandez's body was found in the driver's seat of a car on a roadside. Hernandez had been recently released from a mental institution. <small>cdlxxiiicdlxxiv</small>									
13 April 2014	2	Jewish Community Center and Village Shalom Retirement Home in Overland Park, Kansas	Frazier Glenn Miller, Jr. (73/M)	3 dead; 0 wounded	3	2 Handguns; Shotgun (Remington Model 870)	None	Same Day	No Force

	Frazier Glenn Miller shot two people in the parking lot behind the Jewish Community Center of Greater Kansas City before driving a few blocks away to a Jewish retirement community, Village Shalom, where he gunned down a woman. Officers arrested him in an elementary school parking lot a few hours later. During his trial, Miller stated that it was his intent to use the trial as a means to "put the Jews on trial where they belong." He called his shooting rampage justified, though he said he regretted killing the 14-year-old. <small>cdlxvcdlxvxi</small>	1	Fort Hood Army Base in Fort Hood, Texas	Ivan Antonio Lopez-Lopez (34/M)	3 dead; 16 wounded	1	Handgun (.45-caliber Smith & Wesson M&P Pistol)	Professional	Same Day	Suicide
2 April 2014	Army Specialist Ivan Lopez opened fire at the administration building of Fort Hood, killing one fellow soldier and wounding nine. He then shot and killed one soldier and injured two more victims at the motor pool office where he worked. Afterwards, the drove to the medical brigade building, shooting at people along the way. He killed another soldier and wounded two more at the medical brigade building, then fled the scene. Upon encountering a military police woman less than ten minutes later, Lopez committed suicide. Lopez had reportedly suffered from depression and possibly post-traumatic stress disorder. <small>cdlxvii cdlxviii</small>									
20 February 2014	Cedarville Rancheria Tribal Office in Alturas, California	Cherie Louise Rhoades (44/F)	4 dead; 2 wounded	2	Handgun; Knife	Familial	Same Day	Force	Cherie Louise Rhoades a.k.a. Sherie Lash opened fire during a meeting of the Cedarville Rancheria tribe, killing four and wounding one. Rhoades ran out of ammunition and used a butcher knife to stab another victim. The council meeting was to determine if she and her son would be evicted from their Rancheria home. <small>cdlxixcdlxxx</small>	
17 December 2013	Renown Regional Medical Center in Reno, Nevada	Alan Oliver Frazier (51/M)	1 dead; 2 wounded	3	Shotgun (pistol-grip, 12-gauge); 2 handguns (Derringer-style pistol and a .40-caliber handgun)	Other	Same Day	Suicide	Alan Oliver Frazier opened fire in the waiting room of the urology department at a medical center, killing one and wounding two. Frazier walked through the halls looking for doctors to target, telling patients they had to leave or he would shoot them. When confronted by police, Frazier took his own life. A suicide note found later claimed that Frazier had suffered a botched surgery and blamed the doctors for his physical ailments. <small>cdlxvxi cdlxvxi</small>	

1 November 2013	1	Los Angeles International Airport in Los Angeles, California	Paul Anthony Ciancia (23/M)	1 dead; 7 wounded	1	Rifle (.223-caliber Smith & Wesson M&P- 15-rifle)	None	Same Day	Force
Paul Anthony Ciancia opened fire at the security gates of Terminal 3 in the Los Angeles International Airport, killing one and wounding five. Ciancia targeted Transport Security Administration agents in the shooting spree and carried a note making death threats against airport security employees. Ciancia had sent text messages expressing suicidal thoughts to his family in New Jersey before the shooting. Police were asked to conduct a welfare check on Ciancia in his Los Angeles apartment, but he was not home. <small>cdlxxxviiicdlxxxiv</small>									
26 October 2013	1	Streets of Albuquerque, New Mexico	Christopher Thomas Chase (35/M)	0 dead; 4 wounded	1	Rifle	None	Same Day	Force
Christopher Thomas Chase opened fire on police after telling bystanders to call 9-1-1 in an apparent effort to draw the police to him. He took a patrol vehicle and a car chase ensued. Chase continued to fire on police, wounding three officers and one County sheriff's deputy. He was eventually shot and killed by police. His autopsy showed he had marijuana, methamphetamine, cocaine, and opiates in his bloodstream. He also had the words "Cop killer" tattooed on his knuckles. <small>cdlxxxvcdlxxxvi</small>									
16 September 2013	1	Washington Navy Yard in Washington D.C.	Aaron Alexis (34/M)	12 dead; 8 wounded	2	Rifle (AR-15 assault rifle); shotgun (12-gauge); handgun (9mm semiautomatic pistol)	Professional	Same Day	Force
Aaron Alexis entered a navy yard and opened fire, killing twelve people and wounding three. Alexis worked as a military subcontractor, which is how he gained access to the area. After shooting two outside the Sea Systems Command headquarters, Alexis entered the building and shot his victims from a gallery overlooking a cafeteria. He had previously expressed dissatisfaction with the pay he received. <small>cdlxxxviiicdlxxxviii</small>									
5 August 2013	1	Ross Township Municipal Building in Saylorsburg, Pennsylvania	Rockne Warren Newell (59/M)	3 dead; 2 wounded	2	Shotgun; Handgun	Other	Same Day	Force

<p>Rockne Warren Newell opened fire on the Ross Township Municipal Building in Saylorburg, Pennsylvania from the parking lot of the building before moving inside. He fired shots with a scoped long gun first and then went back to his vehicle to retrieve a handgun. Upon entering the Municipal Building, he was subdued by a bystander. ^{cdxcddxc1}</p>									
26 July 2013	1	Apartment Complex in Hialeah, Florida	Pedro Vargas (42/M)	6 dead; 0 wounded	1	Handgun (9mm Glock)	Other	Same Day	Force
<p>Pedro Vargas opened fire in his apartment complex, killing two building managers who arrived to investigate a fire he had started in his home. He then shot 10-20 rounds at paramedics and police who had arrived on the scene, killing a passerby but missing the officers. He then entered another neighbor's apartment, killing three inside. Taking two hostages, he continued firing on the police and was shot and killed in the exchange. The hostages were rescued unharmed. Before the attack, Vargas called the police and asked the dispatcher to run a license plate stating he was being followed. He told the dispatcher that people following him were threatening to do witchcraft on him. Vargas had admitted to harassing and threatening former co-workers online during a deposition. ^{cdxcifcdxciii.cdxiv}</p>									
21 June 2013	2	Kellum Law Firm and Walmart Parking Lots in Greenville, North Carolina	Lakim Anthony Faust (23/M)	0 dead; 4 wounded	1	Shotgun (pistol-grip)	None	Same Day	Force
<p>Lakim Anthony Faust opened fire on a man in a parking lot of a law firm, wounding him, then crossed five lanes of traffic to continue the attack in a Walmart parking lot, wounding another three people. Faust was shot and wounded by police after refusing to surrender. ^{cdxcv.cdxvi}</p>									

7 June 2013	6	Home in Santa Monica, California; outside the Santa Monica home; Streets of Santa Monica (approx. three locations); Santa Monica College, California	John Zawahri (23/M)	5 dead; 4 wounded	2	Rifle (AR-15 semiautomatic); Handgun (Remington Model 1858 revolver)	Familial	Same Day	Force
John Zawahri opened fire in his home, killing his father and brother and subsequently set fire to the house. He shot and wounded a woman in a car outside his home, then hijacked another car and ordered his hostage to drive to Santa Monica College, shooting randomly at two locations then at a city bus on the way there, wounding three women on the bus. At the campus, he shot and killed two and wounded another. He was eventually gunned down by police near the library. Zawahri had a history of mental illness. ^{cdxvii cdxviii}									
26 May 2013	5	A motel in Jacksonville, North Carolina near Camp LeJeune, and streets in the towns of Eden, Brady, and Eola, Texas	Esteban Jimenez Smith (23/M)	1 dead; 5 wounded	2	Rifle; Handgun	None	Same Day	Force
Marine Lance Cpl. Esteban Jimenez Smith opened fire from inside a pickup truck in Eden, Texas, wounding one. He then drove to a convenience store in Brady, Texas, and shot and wounded two more victims. He drove back to Eden and fired on another vehicle, wounding one. Heading north, Smith drove to Eola and killed one woman. Smith was stopped by authorities on US Highway 83 north of Eden. He exchanged gunfire with authorities, wounding a sheriff, before being killed in the shootout. About a day earlier, Smith had stabbed his wife to death in a motel room in Jacksonville, NC, outside Camp LeJeune. ^{cdxixd}									

21 April 2013	1	Pinewood Village Apartments in Federal Way, Washington	Dennis Clark III (27/M)	4 dead; 0 wounded	2	Handgun (.40 caliber Taurus semi-automatic pistol); Shotgun (pistol-grip Mossberg 500 pump shotgun)	Other	Same day	Force
Dennis Clark III opened fire in his apartment, killing his girlfriend. In the parking lot, he shot and killed two men. A neighbor and witness to the parking lot shooting was killed when Clark allegedly shot him through the door of his apartment. Clark was shot by police after refusing to lay down his weapon. Previous to the incident, Clark's past girlfriends had reported domestic disputes but Clark was never arrested because no assault charges had been filed. Authorities believe the other victims were targeted for being witnesses. ^{didi}									
16 October 2012	24	Multiple roads and highways in Wixom, Michigan	Raulie Wayne Casteel (43/M)	0 dead; 1 wounded	Unknown	Unknown	None	November 6, 2012	No force
Raulie Wayne Casteel repeatedly opened fire on drivers and pedestrians on different stretches of a highway in Michigan. The attacks occurred over the course of three weeks. Reports state that Casteel often fired from his car. ^{diii}									
5 August 2012	1	Sikh Temple of Wisconsin in Oak Creek, Wisconsin	Wade Michael Page (40/M)	6 dead; 4 wounded	1	Handgun (9-millimeter semi-automatic)	None	Same day	Suicide
Wade Michael Page opened fire in a Wisconsin Sikh temple, killing six people and wounding three others. Page fatally shot himself after wounding one responding officer. Reports state that Page belonged to multiple white supremacist groups. ^{div}									
16 July 2012	2	Copper Top bar in Tuscaloosa, Alabama and a private apartment in Northport, Alabama	Nathan Van Wilkins (44/M)	0 dead; 18 wounded	1	Rifle	None	Same day	No force

	<p>Nathan Van Wilkins opened fire at a bar in Tuscaloosa, Alabama. Reports state that he fired through the windows and door of the bar, wounding 17 people. He was also charged with an unrelated shooting that took place earlier in the evening. Though he later told police that he hoped that officers would kill him, he surrendered to police.^{dv dvi}</p>									
7 April 2012	<table border="1"> <tr> <td>3</td> <td>Tulsa, Oklahoma</td> <td>Jake England (19/M); Alvin Watts (33/M)</td> <td>3 dead; 2 wounded</td> <td>Unknown</td> <td>Unknown</td> <td>None</td> <td>Same day</td> <td>No force.</td> </tr> </table>	3	Tulsa, Oklahoma	Jake England (19/M); Alvin Watts (33/M)	3 dead; 2 wounded	Unknown	Unknown	None	Same day	No force.
3	Tulsa, Oklahoma	Jake England (19/M); Alvin Watts (33/M)	3 dead; 2 wounded	Unknown	Unknown	None	Same day	No force.		
8 March 2012	<p>Jake England and Alvin Watts opened fire on three different groups of people in Tulsa, Oklahoma, killing three and wounding two others. The three shootings occurred within one mile of each other. Authorities believed the shooters selected their victims based on race.^{dvii dviii}</p> <table border="1"> <tr> <td>1</td> <td>University of Pittsburgh Medical Center in Pittsburgh, Pennsylvania</td> <td>John Shick (30/M)</td> <td>1 dead; 5 wounded</td> <td>2</td> <td>Handguns</td> <td>None</td> <td>Same day</td> <td>Force</td> </tr> </table> <p>John Shick opened fire in a psychiatric clinic, killing one person and wounding five others before being fatally shot by police. Reports state that Shick had previously been a patient at the psychiatric clinic and had threatened employees with a bat twice after being discharged.^{dix dx}</p>	1	University of Pittsburgh Medical Center in Pittsburgh, Pennsylvania	John Shick (30/M)	1 dead; 5 wounded	2	Handguns	None	Same day	Force
1	University of Pittsburgh Medical Center in Pittsburgh, Pennsylvania	John Shick (30/M)	1 dead; 5 wounded	2	Handguns	None	Same day	Force		
2 December 2011	<p>Metropolitan Transit Authority bus Q111 in Jamaica, Queens, New York</p> <table border="1"> <tr> <td>1</td> <td>Metropolitan Transit Authority bus Q111 in Jamaica, Queens, New York</td> <td>Damel Burton (34/M)</td> <td>1 dead; 1 wounded</td> <td>1</td> <td>Handgun (9-millimeter semi-automatic)</td> <td>None</td> <td>Same day</td> <td>Force</td> </tr> </table> <p>Damel Burton opened fire on a bus in Jamaica, Queens, killing one person and wounding one other. Prior to the bus attack, Burton fatally shot his girlfriend's son at their apartment.^{dxii}</p>	1	Metropolitan Transit Authority bus Q111 in Jamaica, Queens, New York	Damel Burton (34/M)	1 dead; 1 wounded	1	Handgun (9-millimeter semi-automatic)	None	Same day	Force
1	Metropolitan Transit Authority bus Q111 in Jamaica, Queens, New York	Damel Burton (34/M)	1 dead; 1 wounded	1	Handgun (9-millimeter semi-automatic)	None	Same day	Force		
13 December 2011	<p>Office of Judge Gary Cottrell in Crawford County, Arkansas</p> <table border="1"> <tr> <td>1</td> <td>Office of Judge Gary Cottrell in Crawford County, Arkansas</td> <td>James Ray Palmer (48/M)</td> <td>0 dead; 1 wounded</td> <td>2</td> <td>Handguns (semi-automatic); Rifle (semi-automatic)</td> <td>None</td> <td>Same day</td> <td>Force</td> </tr> </table> <p>James Ray Palmer opened fire in a judge's office in Arkansas, wounding one person. Reports state Palmer was equipped with a tactical vest that enabled him to carry additional ammunition. Officers later discovered timed incendiary devices in his home.^{dxiii dxiv}</p>	1	Office of Judge Gary Cottrell in Crawford County, Arkansas	James Ray Palmer (48/M)	0 dead; 1 wounded	2	Handguns (semi-automatic); Rifle (semi-automatic)	None	Same day	Force
1	Office of Judge Gary Cottrell in Crawford County, Arkansas	James Ray Palmer (48/M)	0 dead; 1 wounded	2	Handguns (semi-automatic); Rifle (semi-automatic)	None	Same day	Force		

23 January 2011	1	Police Precinct (6 th) in Detroit, Michigan	Lamar D. Moore (38/M)	0 dead; 4 wounded	1	Shotgun	None	Same day	Force
Lamar Deshea Moore opened fire in a Michigan police precinct, injuring four officers before being fatally shot by police. Moore was being investigated for the kidnapping and sexual assault of a teenage girl. ^{dxv dxvi}									
4 October 2010	5	Gainesville neighborhood, Florida	Clifford Miller Jr. (24/M)	1 dead; 5 wounded	1	Handgun (.38- caliber revolver)	Familial	Same day	Suicide
Clifford Miller Jr. opened fire throughout his neighborhood during a 13-minute shooting spree, killing his father and wounding five others. He then committed suicide. ^{dxvii dxviii}									
19 April 2010	1	Parkwest Medical Center in Knoxville, Tennessee	Abdo Ibssa (38/M)	1 dead; 2 wounded	1	Handgun (.357- caliber magnum revolver)	Professional	Same day	Suicide
Abdo Ibssa opened fire in the Parkwest Medical Center parking lot, killing one hospital employee and wounding two others. Reports state that Ibssa, who had a history of mental illness, was convinced that a monitoring device had been implanted in him during an appendectomy in 2001. ^{dxix dxx}									
4 January 2010	1	Federal District Courthouse in Las Vegas, Nevada	Johnny Lee Wicks (66/M)	1 dead; 1 wounded	1	Shotgun	None	Same day	Force
Johnny Wicks opened fire in the lobby of a federal courthouse, killing a security officer and wounding a deputy United States Marshal. Wicks was fatally shot by police. Reports state that the gunman was disgruntled over a reduction in his Social Security benefits ^{dxxi dxxii}									
5 November 2009	1	Fort Hood Soldier Readiness Center in Killeen, Texas	Nidal Malik Hasan	13 dead; 31 wounded	2	2 handguns (one FN Herstal 5.7 tactical semi- automatic and one .357-magnum Smith & Wesson revolver)	Professional	Same day	Force

Nidal Malik Hasan, an Army psychiatrist, opened fire at the Fort Hood army base, killing 13 people and wounding 31 others. ^{dxixiii} dxxiv									
2 July 2009	1	Family Dental Care Center in Simi Valley, California	Jaime Paredes (29/M)	1 dead; 3 wounded	1	Rifle	Familial	Same day	No force
Jamie Paredes opened fire at a dental office, killing his wife and wounding three other people. Reports state that Paredes was distraught about his wife seeking a divorce. ^{dxv} dxvvi dxvii									
1 July 2009	1	U.S. Army Recruiting Booth in Little Rock, Arkansas	Abdulahkim Mujahid Muhammed (23/M)	1 dead; 1 wounded	2	Rifle (.22-caliber); Handgun	None	Same day	Force
Abdulahkim Mujahid Muhammad opened fire outside an Army recruiting booth, killing a soldier and wounding another. Reports state that Muhammad targeted soldiers because of U.S. policies toward the Muslim world. ^{dxviii}									
17 April 2009	1	Long Beach Memorial Medical Center in Long Beach, California	Mario Ramirez (50/M)	1 dead; 1 wounded	2	Handguns	Professional	Same day	Suicide
Mario Ramirez opened fire at the hospital where he worked, killing his boss and wounding another person. He then committed suicide. ^{dxix} dxix									
29 March 2009	1	Pinelake Health and Rehab Center in Carthage, North Carolina	Robert Stewart (45/M)	8 dead; 4 wounded	1	Shotgun	None	Same day	Force
Robert Stewart opened fire at a nursing home, killing seven elderly residents and a nurse, and wounding four other people. ^{dxixi}									
21 March 2009	1	Police station in Oakland, California	Lovelle Mixon (26/M)	4 dead; 1 wounded	2	Rifle (AK-47); Handgun (semi- automatic)	None	Same day	Force
Lovelle Mixon opened fire near a police substation, killing four police officers and wounding another. Mixon was on parole at the time of the attack. ^{dxixii} dxixiii									

14 February 2009	1	Lakeside Memorial Hospital in Brockport New York	Frank Garcia (35/M)	2 dead; 0 wounded	1	Handgun (.40-caliber Glock)	Professional	Same day	No force
Frank Garcia opened fire at his former workplace, killing a nurse and a bystander. Reports state that Garcia, who worked at the hospital as a nursing supervisor before being fired, was angry at co-workers who had accused him of sexual harassment. Earlier in the day, Garcia also killed another former co-worker and her husband in their home. ^{dxxxiv dxxxv}									
27 July 2008	1	Tennessee Valley Unitarian Church in Knoxville, Tennessee	Jim D. Adkisson (58/M)	2 dead; 7 wounded	1	Shotgun (12-gauge)	None	Same day	Force
Jim D. Adkisson opened fire at a church during a children's performance of the musical "Annie," killing two people and wounding seven others. Adkisson, an anti-liberal activist, left a suicide note in his car explaining his motives for the attack. ^{dxxxvi dxxxvii dxxxviii}									
7 February 2008	1	City Hall in Kirkwood, Missouri	Charles Lee Thornton (50/M)	5 dead; 2 wounded	2	Handguns (one .357-magnum)	None	Same day	Force
Charles Lee "Cookie" Thornton opened fire on Kirkwood's City Council, killing five people and wounding two others. Thornton began his attack by fatally shooting a police sergeant outside City Hall. He then grabbed the sergeant's gun, and continued his shooting spree inside the council chambers. Reports state that Thornton had a history of disputes with the city government and had been arrested twice at council meetings prior to the attack. The gunman left a suicide note. ^{dxxxix dxi dxli}									
20 May 2007	2	Latah County Courthouse and First Presbyterian Church in Moscow, Idaho	Jason Hamilton (37/M)	2 dead; 2 wounded	2	Rifles (one Springfield M-1A and one AK-47)	None	Same day	Suicide
Jason Hamilton opened fired at a courthouse, killing a police officer and wounding a sheriff's deputy and a bystander. Hamilton then killed a caretaker in a nearby church. ^{dxlii dxliiii dxliv}									

9 May 2005	1	Conrad Community Service Center in San Francisco, California	Gregory Gray (54/M)	1 dead; 0 wounded	1	Shotgun	Professional	Same day	Force
Gregory Gray opened fire at his former workplace, killing a former coworker. An employee tackled and subdued Gray as he reached for his second gun. Gray was fired from the mental health center a year prior to the attack. ^{dxiv}									
25 February 2005	1	Bureau of Street Services maintenance yard in Los Angeles, California	Unknown (unknown/M)	2 dead; 0 wounded	1	Rifle (AK-47)	Professional	Same day	No force.
A gunman opened fire at his workplace, killing his boss and another employee. The maintenance worker began his attack after being reprimanded for arriving late to work. ^{dxvi dxvii}									
6 November 2003	1	Watkins Motor Lines in West Chester, Ohio	Tom West (50/M)	2 dead; 3 wounded	2	Handguns	Professional	Same day	Force
Tom West opened fire at his former workplace, killing two people and wounding three others. ^{dxviii}									
7 October 2003	1	Alvin C. York Veterans Affairs Medical Center in Murfreesboro, Tennessee	Michal Gardner (50/M)	0 dead; 0 wounded	1	Shotgun	Professional	Same day	No force
Michael Gardner opened fire at his workplace, targeting employees and responding police officers. The attack resulted in zero casualties. Gardner surrendered when law enforcement arrived on scene. Gardner had been taking medication for mental health issues at the time of the attack. ^{dxlix dl}									

5 October 2003	1	Turner Monumental AME Church in Atlanta, Georgia	Sheila W. Chaney Wilson (43/F)	2 dead; 0 wounded	1	Handgun (.44- caliber)	Familial	Same day	Suicide
Sheila W. Chaney Wilson opened fire at an Atlanta church before Sunday morning services, killing her mother and the minister. She then committed suicide. Wilson had recently been taken out of a mental health facility. ^{dlii}									
23 July 2003	1	City Hall in New York, New York	Othniel Askew (31/M)	1 dead; 0 wounded	1	Handgun (.40- caliber Smith & Wesson)	Professional	Same day	Force
Othniel Askew opened fire at City Hall in New York City, killing a city councilman. Askew was a political rival of the victim. Authorities found extra cartridges in the Askew's socks. ^{dliiii}									
2 October 2002	14	Washington, D.C. metro area	John Allen Muhammad (42/M); Lee Boyd Malvo (16/M)	10 dead; 3 wounded	2	Rifle (Bushmaster XM-15); handgun (.223- caliber)	None	October 22, 2002	Force
John Allen Muhammad and Lee Boyd Malvo opened fire on random targets during a three-week sniper rampage along Interstate 95 around the Virginia and Washington, D.C. Metro area. ^{dliiv}									
8 July 2002	1	Louis Armstrong International Airport in New Orleans, Louisiana	Patrick Gott (43/M)	1 dead; 1 wounded	1	Shotgun	None	Same day	Force
Patrick Gott opened fire in the Louis Armstrong International Airport, killing one person and wounding another. Reports state that Gott, a former Marine, was angry about bystanders ridiculing his turban. ^{dlivi}									
4 July 2002	1	Los Angeles International Airport in Los Angeles, California	Hesham Mohamed Hadayet (41/M)	2 dead; 4 wounded	1	Handgun (.45- caliber)	None	Same day	Force

9 September 2001	2	City equipment yard and City marina in Sacramento, California	Joseph Ferguson (20/M)	5 dead; 2 wounded	2	Rifle (AK-47); 1 Handgun (9- millimeter)	Professional	September 20, 2001	Suicide	Hesham Mohamed Hadayet opened fire at Los Angeles International Airport, killing two people and wounding four others. Hadayet began his attack while standing in line at the ticket counter of Israel's El-Al Airlines. ^{dlixviii}
Joseph Ferguson opened fire at his workplace, killing five people, including his girlfriend, and wounding two others. The attack occurred a week after Ferguson had been suspended from his job as a security guard. During the 24-hour incident, Ferguson took hostages and left behind a suicide video explaining the motives behind his attack. The attack concluded when Ferguson committed suicide amidst a standoff with police. ^{dlix dlx dixi dixii}										
23 July 2001	1	Construction site in Palm Beach Gardens, Florida	Keith James Adames (28/M)	1 dead; 1 wounded	1	Rifle (AK-47)	Professional	Same day	No force	Keith Adams opened fire at a construction site where he was employed, killing a co-worker and wounding another. Police recovered more than 80 live rounds from Adam's truck. ^{dlixiii dlixiv}
30 December 1999	1	Radisson Bay Harbor Hotel in Tampa, Florida	Silvio Iquierdo- Leyva (38/M)	5 dead; 3 wounded	2	Handguns (one- millimeter semi- automatic and one .38-caliber revolver)	Professional	Same day	Force	Silvio Iquierdo-Leyva opened fire at the Radisson Hotel where he was employed, killing four co-workers and wounding three others. Iquierdo-Leyva then killed a fifth person who would not give him her car. ^{dlixv dlixvi}
4 November 1999	1	Northlake Shipyard in Seattle, Washington	Kevin Cruz (29/M)	2 dead; 2 wounded	1	Handgun (9- millimeter semi- automatic)	Professional	Same day	Force	Kevin Cruz opened fire at a shipyard, killing two people and wounding two others. Cruz fled the scene and was arrested months later. ^{dlixvii dlixviii dlixix}

14 September 1999	1	West Anaheim Medical Center in Anaheim, California	Dung Trinh (43.M)	3 dead; 0 wounded	2	Handgun (revolver); handgun (revolver)	Other	Same day	Force
Dung Trinh opened fire at a hospital, killing three employees. He was disarmed by an employee of the hospital. Reports state that Trinh was distraught over his mother's death and intended to kill his mother's nurse. ^{dlix} ^{dlxvi} ^{dlixii}									
12 August 1999	1	Jewish Community Center in Los Angeles, California	Burford O'Neal Furrow, Jr. (38/M)	1 dead; 5 wounded	3	Rifle (AR-15); Submachine gun (Uzi); Handgun (Glock 9- millimeter)	None	Same day	No force
Burford O'Neal Furrow Jr. opened fire at a day care center in the North Valley Jewish Community Center, injuring five people. Furrow then shot and killed a letter carrier after leaving the community center. Furrow had an extensive criminal record prior to the attack. ^{dlxxiii} ^{dlxxiv} ^{dlxxv}									
15 April 1999	1	Temple Square Mormon Church in Salt Lake City, Utah	Sergei S. Barbain (70/M)	2 dead; 5 wounded	1	Handgun (.22- caliber)	None	Same day	Force
Sergei Babarin opened fire at a Mormon library, killing two people and wounding five others. He was shot by police. Reports state that Barbain, a diagnosed schizophrenic, had stopped taking his medication for several months leading up to the attack. ^{dlxxvi}									
24 July 1998	1	United States Capitol Building in Washington, D.C.	Russell E. Weston, Jr. (41/M)	2 dead, 1 wounded	1	Handgun (.38- caliber revolver)	None	Same day	Force
Russell Eugene Weston Jr. opened fire at a security checkpoint at the United States Capitol, killing a police officer and wounding a tourist. Weston then fatally shot a plain-clothed detective stationed outside of Representative Tom Delay's office. Weston began his attack when a Capitol police officer confronted Weston about trying to avoid the metal detector. ^{dlxxviii} ^{dlxxix}									
18 December 1997	1	Caltrans Maintenance Yard in Orange County, California	Arturo Reyes Torres (unknown/M)	4 dead; 2 wounded	1	Rifle (AK-47)	Professional	Same day	Force

Arturo Reyes Torres opened fire at a California maintenance yard where he was formerly employed, killing four employees and wounding two others. The attack concluded when Torres was killed by police. He had recently been fired from the company for stealing. ^{d1xxxix d1xxx d1xxxix}									
24 April 1996	1	Jackson Fire Department in Jackson, Mississippi	Kenneth Tornes (32/M)	4 dead; 0 wounded	4	3 handguns (one .45-caliber semi-automatic and one TEC-9 semi-automatic); Rifle (Mac 11)	Professional	Same day	Force
Kenneth Tornes opened fire at the firehouse where he worked, killing four supervisors. He then engaged police in a shootout at a shopping center after leading the officers on a chase. Prior to the attack, Tornes killed his estranged wife in her home. ^{d1xxxvii d1xxxviii}									
9 February 1996	1	Fort Lauderdale Beach in Fort Lauderdale, Florida	Clifton McCree (41/M)	5 dead; 1 wounded	2	Handguns (one revolver and one semi-automatic)	Professional	Same day	Suicide
Clifton McCree opened fire in a trailer, killing five former colleagues and wounding another. Reports state that McCree, a former maintenance crew worker, was angry about being fired from his job for illegal drug use 14 months earlier. ^{d1xxxiv}									
7 December 1993	1	Long Island Railroad car to Hicksville, Garden City, New York	Colin Ferguson (37/M)	6 dead; 19 wounded	1	Handgun (9-millimeter Ruger)	None	Same day	Force
Colin Ferguson opened fire in a crowded car on a Long Island Railroad train, killing six passengers and wounding 19 others. ^{d1xxxv d1xxxvi d1xxxvii}									

International Attacks at Office Buildings

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
7 January 2015	3	Charlie Hebdo office and sidewalk in Paris, France and street in Porte de Patin, France	Said Kouachi (M/34); and Cherif Kouachi (M/32)	12 dead; 11 wounded	Unknown	Rifle (assault); Handguns; Shotgun; Other (explosives); Other (vehicle)	None	January 9, 2015	Force
<p>Two brothers, Said and Cherif Kouachi, entered the office of <i>Charlie Hebdo</i>, a French satirical newspaper, in Paris, and opened fire. The two killed 12 and wounded 11 others within the office, on the sidewalk outside, and in Porte de Patin as they evaded capture. The attackers were apprehended after a standoff with police on January 9, in which the brothers detonated several small explosions and opened fire; the attackers were ultimately shot and killed in the ensuing gunfight. The brothers belonged to al-Qa'ida's branch in Yemen, which claimed responsibility for the attack. ^{d1xxxviii} ^{d1xxxix} ^{dxc} ^{dxc1} ^{dxcii}</p>									

International Attacks at Factories

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
27 February 2013	1	Kronospan wood-processing plant in Manznau, Switzerland	Viktor Berisha (M/42)	3 dead; 6 wounded	1	Handgun (pistol)	Professional	Same day	Suicide
Viktor Berisha opened fire in the canteen area of the Kronospan wood-processing plant in Manznau, Switzerland, killing four and injuring five others. Berisha was a long-time employee of the plant. ^{dxciiii} dxciiv dxciiv									

International Attacks at Open Commercial Locations

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
18 March 2016	3	McDonald's, Saturn Electronics Store, and Olympia Shopping Mall in Munich, Germany	David Sonboly (M/18)	9 dead; 37 wounded	1	Handgun (semi-automatic)	None	Same day	Suicide
		David Sonboly a.k.a. Ali Sonboly carried out a shooting attack in the area of the Olympia Shopping Mall in Munich, Germany, killing nine, and wounding 37 others. The attacker reportedly shouted "Allahu Akbar" during the course of the event. <small>dxcvf dxcvii</small>							
15 January 2016	3	Cappuccino restaurant, The Splendid Hotel, and the YIBI Hotel in Ouagadougou, Burkina Faso	Unknown (F/Unknown); Unknown (F/Unknown); Unknown (M/Unknown); Unknown (M/Unknown); Unknown (Unknown/Unknown); and one possible (Unknown/Unknown)	30 dead; 56 wounded	Unknown	Unknown	None	January 16, 2016	Force; Attacker Fled

<p>13 November 2015</p>	<p>1</p>	<p>Bataclan Theatre in Paris, France</p>	<p>Omar Ismail Mostefai (M/29); Samy Amimour (M/28); Foued Mohamed-Aggad (M/23)</p>	<p>89 dead; unknown wounded¹</p>	<p>Unknown</p>	<p>Rifle (assault); Other (explosives)</p>	<p>None</p>	<p>Same day</p>	<p>Suicide</p>
<p>A series of coordinated terror attacks took place in Paris, France and the city suburb of Saint-Denis, beginning with three suicide attacks outside of the Stade de France in Saint-Denis. This attack was followed by several shooting events and a suicide bombing at cafés, restaurants, and a concert in Paris. ISIS claimed responsibility for the attacks. This entry breaks out the shooting event in which three gunmen opened fire at an Eagles of Death Metal concert at the Bataclan Theatre^{dc dci dci iii}</p>									
<p>18 March 2015</p>	<p>1</p>	<p>Bardo National Museum in Tunisia</p>	<p>Yassine Labidi (M/unknown); Saber Khachnaoui (M/unknown); Unknown (M/unknown)</p>	<p>21 dead; 50 wounded</p>	<p>Unknown</p>	<p>Rifle (assault); Other (explosives)</p>	<p>None</p>	<p>Same day</p>	<p>Force</p>
<p>Three ISIS militants opened fire in the Bardo National Museum in Tunis, Tunisia. Twenty-one individuals, predominantly tourists, were killed in the attack and approximately 50 were injured. Two of the gunmen were killed at the scene, and one has yet to be apprehended.^{dciv dcv dci vi}</p>									

¹ Due to the size of the string of attacks in Paris on November 13, media outlets did not separately break out the number of wounded from the overall total of injuries for all combined events. Overall, the string of attacks killed 129 people and 368 were injured.

9 January 2015	1	Hypercacher Kosher Supermarket, Paris, France	Amedy Coulibaly (M/32)	4 dead; 9 wounded	2	Handgun; Submachinegun	None	Same day	Force
Amedy Coulibaly opened fire on individuals at the Hypercacher Kosher Supermarket in Paris, France, and subsequently took several hostages. During the attack, Coulibaly recorded the scene for seven minutes using a GoPro camera attached to his torso, and emailed the footage using a computer at the supermarket. Coulibaly also spoke to the press during hostage negotiation process, stating that he targeted Jewish individuals at the Kosher grocery store intentionally; he had previously expressed his allegiance to ISIS. ^{dcvii dcviii dcix dcx}									
24 May 2014	1	Jewish Museum of Belgium in Brussels, Belgium	Mehdi Nemmouche (M/29)	4 dead; 0 wounded	2	Rifle (assault); Handgun	None	Same day	No force
Mehdi Nemmuouche carried out a shooting attack at the Jewish Museum of Belgium in Brussels, killing four people. He had been radicalized in prison and fought on behalf of ISIS in Syria prior to the attack. ^{dcxi dcxii dcxiii}									
21 September 2013	1	Westgate Shopping Mall in Nairobi, Kenya	Hasan Abdi Dhuhulow, a.k.a. Abu Baara al- Sudani (M/ 22 or 23). Ahmed Hassan Abukar a.k.a. Khattab al-Kene (M/Unknown); Mohammed Abdinur Said a.k.a. Umayr al-Mogadis (M/Unknown); Yahya Ahmed Osman, a.k.a. Omar Abdul	64 dead; 175 wounded	Unknown	Rifles (assault); Other (explosives)	None	Same day	Force; Attacker fled

30 August 2010	1	Devinska Nova Ves District in Bratislava, Slovakia	Lubomir Harman (48/M)	7 dead; 15 wounded	3	2 handguns; Submachine gun	Other	Same day	Suicide
Lubomir Harman opened fire in his neighbor's apartment, killing six people. Harman then left the apartment and indiscriminately opened fire on bystanders in the street, killing one person and wounding 15 others. Reports state that Harman may have been motivated by racism, as well as loud noise emanating from the neighbor's apartment. ^{dccc dxxxi}									
2 June 2010	6	Cumbria, England, United Kingdom	Derrick Bird (52/M)	12 dead; 11 wounded	2	Shotgun; Rifle	Familial	Same day	Suicide
Derrick Bird opened fire during a three-hour shooting spree, killing 12 people and wounding 11 others. Bird began his attack by shooting his twin brother, family lawyer and three fellow taxi drivers. He then drove across Cumbria County, firing randomly at bystanders and occasionally pulling over to shoot more victims. ^{dccxlii dccciii dccciv}									
13 December 2011	1	Saint-Lambert Square in Liege, Belgium	Nordine Amrani (33/M)	6 dead; 125 wounded	6	Rifle; Handgun; 4 other	None	Same day	Suicide
Nordine Amrani opened fire and threw four stun grenades into a crowd at Saint-Lambert square in Liege, Belgium, killing six people and wounding 125 others. Reports state that Amrani concealed his weapons in his bag to avoid detection. Prior to his attack in the Square, Amrani fatally shot a cleaning woman in his home. ^{dcccv dcccvi}									
9 April 2011	1	Millard Ridderhof Mall, Alphen aan den Rijn, Netherlands	Tristan van der Vlis (24/M)	6 dead; 17 wounded	3	Rifle (semi- automatic); 2 handguns	None	Same day	Suicide
Tristan van der Vlis opened fire at a mall in the Netherlands, killing six people and wounding 17 others. Van der Vlis, who had a history of mental illness, fired over 100 rounds before committing suicide. ^{dcccvii dcccviii}									

<p>26 November 2008</p>	<p>10</p>	<p>Cama Hospital; Rail Terminus; Leopold Café; Mumbai Chabad House; Oberoi Trident Hotel; Taj Mahal Hotel in Mumbai, India</p>	<p>Ajmal Kasab (21/M); Ismail Khan (25/M); Hafiz Arshad (23/M); Javed (22/M); Shoaib (21/M); Nazir (28/M); Nasr (23/M); Babr Imran (25/M); Abdul Rahman (21/M); Fahad Ullah (23/M)</p>	<p>188 dead; 372 wounded</p>	<p>Unknown</p>	<p>Handgun; 2 rifles (semi-automatic)</p>	<p>None</p>	<p>November 29, 2008</p>	<p>Force</p>	
<p>10 militants launched a series of coordinated shooting and bombing attacks throughout Mumbai, killing 188 people and wounding 372 others. The attackers were trained in Pakistan by the Islamic terrorist group, Lashkar-e-Taiba. Nine of the assailants were killed during the standoff with law enforcement. ^{dcxxxix} ^{dcxxx}</p>										
<p>28 April 1996</p>	<p>1</p>	<p>Broad Arrow Café and Port Arthur in Tasmania, Australia</p>	<p>Martin Bryant (28/M)</p>	<p>35 dead; 21 wounded</p>	<p>2</p>	<p>2 rifles (semi- automatic)</p>	<p>None</p>	<p>April 29, 1996</p>	<p>Force</p>	
<p>Martin Bryant opened fire during an extended shooting spree, killing 35 people and wounding 21 others. Bryant began the attack by stabbing the owner of a Seascope guest accommodation site. He then entered the Broad Arrow café and shot 20 people dead in a span of 15 seconds. The gunman continued to open fire on the crowd outside of the café as well as under a tour bus where tourists were hiding for cover. Bryant then escaped in a car, shooting pedestrians and vehicle passengers along the way. Following the shooting spree, Bryant took a man hostage and entered a Seascope guest house, where authorities negotiated with Bryant for six hours until his phone battery died. Bryant was captured the next morning. ^{dcxxxii} ^{dcxxxiii}</p>										
<p>17 August 1991</p>	<p>1</p>	<p>Strathfield Shopping Plaza in Strathfield, Australia</p>	<p>Wade Frankum (33/M)</p>	<p>6 dead; 8 wounded</p>	<p>2</p>	<p>Rifle (AK-47); Other</p>	<p>None</p>	<p>Same day</p>	<p>Suicide</p>	
<p>Wade Frankum opened fire in a shopping mall, killing six people and wounding eight others. ^{dcxxxiii}</p>										

8 December 1987	1	Post Office in Melbourne, Australia	Frank Vitkovic (22/M)	8 dead; 0 wounded	1	Rifle (sawed-off)	None	Same day	Force
	Frank Vitkovic opened fire on three floors at a post office, killing eight people ^{dcxxxiv dcxxxv}								
19 August 1987	2	Wiltshire and Hungerford in Berkshire, United Kingdom	Michael Ryan (27/M)	16 dead; 15 wounded	4	Rifle (Kalashnikov); Rifle (automatic); Handgun (Beretta); Other	Familial	Same day	Suicide
	Michael Ryan opened fire during a shooting spree, killing 16 people and wounding 15 others. Ryan's attack began in Wiltshire where he shot a woman in a forest and a cashier at a gas station. The assailant then killed his mother and fired indiscriminately on bystanders as he drove to a busy shopping area. Ryan committed suicide shortly after the attack. ^{dcxxxvi dcxxxvii dcxxxviii}								

International Attacks at Schools

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
11 March 2012	4	Ozar Hatorah School, a gymnasium, and The attacker's apartment in Toulouse, France; shopping center in Montauban, France	Mohamed Merah (23/M)	7 dead; 5 wounded	2	Handguns (.45-caliber handgun; .35-caliber handgun)	None	March 22, 2012	Force
7 April 2011	1	Tasso da Silveira Municipal School in Rio de Janeiro, Brazil	Wellington Menezes de Oliveira (24/M)	12 dead; 12 wounded	2	Handguns (.32-caliber revolver; .35 caliber revolver)	Academic	Same day	Suicide

Mohamed Merah opened fire at three locations in France over the course of eight days, killing seven people and wounding five others. On March 11, Merah killed an off-duty French paratrooper outside a gym in Toulouse. Four days later, Merah fired upon three off-duty French soldiers in Montauban, killing two and wounding one. On March 19, Merah killed three children and one adult outside a Jewish school in Toulouse. The perpetrator was killed and three officers were wounded during a two-day long police siege. Merah claimed to be a jihadist with ties to al-Qaeda.

dcxxxix dexti dxxli

Wellington Menezes de Oliveir opened fire at his former middle school in Brazil, killing 12 students and wounding at least 12 others before committing suicide. Reports state that Oliveir was able to enter the building by telling school officials he sought to obtain a transcript. dcxlii dcxliii dcxliiv

11 March 2009	1	Albertville-Realschule Winnenden school in Winnenden, Germany	Tim Kretschmer (17/M)	15 dead; 9 wounded	1	Handgun	Academic	Same day	Suicide
Tim Kretschmer opened fire at his high school in Germany, killing 15 people and wounding nine others. He then committed suicide. ^{dcxlv}									
23 September 2008	1	Kauhajoki School of Hospitality in Kauhajoki, Finland	Mattie Juhani Saari (22/M)	10 dead; 0 wounded	1	Handgun (.22-caliber)	Academic	Same day	Suicide
Matti Juhani Saari opened fire at his university in Finland, killing 10 people. He then committed suicide after setting a fire on campus. ^{dcxvii}									
6 March 2008	1	Mercuz Harav Yeshiva in Jerusalem, Israel	Alaa Abu Dhein (26/M)	8 dead; 11 wounded	1	Handgun	None	Same day	Force
Alaa Abu Dhein opened fire in a crowded library at the Mercuz Harav Yeshiva in Jerusalem, killing eight teenage students and wounding 11 others. The gunman was killed in a gunfight between the assailant and Israeli security forces. ^{dcxviii}									
7 November 2007	1	Jokela High School in Tuusula, Finland	Pekka-Eric Auvinen (18/M)	8 dead; 12 wounded	1	Handgun (.22-caliber)	Academic	Same day	Suicide
Pekka-Eric Auvinen opened fire at his high school, killing seven students and a teacher and wounding 12 other people. Auvinen had previously posted a video on the internet stating he was going to "eliminate" everyone who he deemed "unfit." ^{dcxlviii} ^{dcxlix}									
20 November 2006	1	Geschwister School in Erfurt, Germany	Sebastian Bosse (18/M)	0 dead; 5 wounded	3	Rifles (One small-bore and two sawed-off)	Academic	Sam day	Suicide
Sebastian Bosse opened fire at his former high school, injuring five people. The gunman was armed with guns, pipe bombs and smoke bombs. Reports state that Bosse had left a suicide note prior to the attack and indicated his plans on an internet site. ^{dcl}									

13 September 2006	1	Dawson College in Montreal, Canada	Kimveer Gill (25/M)	1 dead; 19 wounded	1	Rifle	Academic	Same day	Suicide
Kimveer Singh Gill opened fire on students in a Canadian college, killing one person and wounding 19 others. ^{dclii}									
28 September 2004	1	Middle school in Carmen de Patagones, Argentina	Rafael (15/M)	4 dead; 5 wounded	1	Handgun	Academic	Same day	Force
A middle school student opened fire at his school, killing four students and wounding five others. ^{dcliii dcliv}									
6 June 2003	1	Pak Phanang in Nakorn Srihammarat, Thailand	Anatcha Boonkwan (17/M)	2 dead; 4 wounded	1	Handgun	Academic	Same day	Force
Anatcha Boonkwan opened fire in a school field, killing two people and wounding four others. Boonkwan targeted students gathering to listen to a campaign speech from a student body presidential candidate. He used a pistol that he stole from his father. ^{dclv dclvi}									
21 October 2002	1	Monash University in Melbourne, Australia	Huan Yun "Allen" Xiang (37/M)	2 dead; 5 wounded	1	Unknown firearm	Academic	Same day	Force
Huan Yun Xiang opened fire in a Melbourne University classroom, killing two students and wounding five others. Reports state that before firing, Xiang, a fourth-year honors student, stood on his desk, pointed his gun at students and yelled, "you never understand me." ^{dclvii dclviii}									
29 April 2002	1	Vlasenica High School in Vlasenica, Bosnia- Herzegovina	Dragoslav Petkovic (17/M)	1 dead; 1 wounded	1	Handgun (7.65- millimeter)	Academic	Same day	Suicide
Dragoslav Petkovic opened fire at his high school, killing one teacher and wounding another. ^{dclix}									

26 April 2002	1	Johann Gutenberg High School in Erfurt, Germany	Robert Steinhauser (19/M)	16 dead; 0 wounded	1	Handgun	Academic	Same day	Suicide
Robert Steinhaeuser opened fire at a German high school, killing 13 teachers, two students, and a policeman. The attack lasted for 20 minutes. Steinhaeuser was expelled from the school prior to the attack. ^{dcix dclxi}									
19 February 2002	2	Factory in Eching, Germany; high school in Freising, Germany	Unknown (unknown/M)	3 dead; 1 wounded	At least 3	Unknown firearm; Others (explosive devices)	Professional	Same day	Suicide
A gunman opened fire at a factory where he was formerly employed, killing two people. The gunman then opened fire at his former school, killing a headmaster and wounding a teacher. The assailant also detonated at least two homemade pipe bombs in the school. He had been expelled from the school prior to the attack. ^{dclxii dclxiii}									
7 December 1999	1	De Leijgraaf High School in Veghel, Netherlands	Unknown (17/M)	0 dead; 5 wounded	Unknown	Unknown firearm	Academic	Same day	No force
A gunman opened fire at his high school, injuring five people. The gunman began targeting students in a hallway and a computer room. Reports state that the attack was fueled by a feud between the assailant's family and one of the victims' family. Prior to the attack, one of the victim's family members had asked police for protection from the assailant, but their request was denied. ^{dcxiv dcxv dcxvi}									
28 April 1999	1	W.R. Myers High School in Alberta, Canada	Todd Cameron Smith (14/M)	1 dead; 1 wounded	1	Rifle (.22-caliber)	Academic	Same day	Force
Todd Smith, a high school drop-out, opened fire at his former high school, killing one person and wounding one other. Reports state that Smith's mother claimed her son was obsessed with violent movies and video games, endured incessant bullying by his peers and displayed signs of depression before the shooting. ^{dcxvii dclxviii}									

30 March 1997	1	Tala'l Private School and Musa Bin Nusayr School in Sanaa, Yemen	Mohammad Ahman al-Naziri (48/M)	8 dead; 14 wounded	1	Rifle (Kalishnikov)	Other	Same day	Force
Mohammad Ahman al-Naziri (also known as Hassan Ali al-Baadani) opened fire at two neighboring schools, killing eight people, including six children and wounding 14 others. The gunman claimed his daughter was raped by an administrator at one of the schools. ^{dclxix dclxx}									
13 March 1996	1	Dunblane Primary School in Dunblane, Scotland, United Kingdom	Thomas Hamilton (43/M)	17 dead; 0 wounded	4	Handguns	Academic	Same day	Suicide
Thomas Hamilton opened fire at a primary school, killing 17 students and teachers. Hamilton was fired from his post as a Scout Master prior to the attack. ^{dclxxi}									
20 October 1994	1	Brockton High School in Toronto, Canada	Ta Phu Cuong (27/M)	0 dead; 2 wounded	1	Rifle (sawed-off)	Academic	Same day	Force
Ta Phu Cuong opened fire at a high school, injuring two staff members. Reports state that Cuong was disappointed with his grades. ^{dclxxii dclxxiii}									
24 August 1992	1	Concordia University in Quebec, Canada	Valery Fabrikant (52/M)	4 dead; 1 wounded	3	Handguns (one .38-caliber Smith & Wesson revolver, one 6.35-millimeter semiautomatic, and one 7.65-millimeter semiautomatic)	Professional	Same day	Force
Valery Fabrikant, a mechanical engineering professor, opened fire at Concordia University's Henry F. Hall Building, killing four colleagues and wounding another. Fabrikant barricaded himself in an office with two hostages who ultimately tackled and disarmed him. ^{dclxxiv dclxxv dclxxvi}									

6 December 1989	1	Ecole Polytechnique in Quebec, Canada	Marc Lepine (25/M)	14 dead; 14 wounded	1	Rifle (Sturm Ruger brand rifle, mini-14 model)	Academic	Same day	Suicide
Marc Lepine opened fire at a university, killing 14 people and wounding 14 others. Lepine began his attack by splitting up students in a classroom by gender and systematically shooting nine female students. He then targeted women in the corridors, cafeteria and classrooms. ^{dclxxxvii}									
27 October 1975	1	St. Pius X High School in Ottowa, Canada	Robert Poulin (18/M)	1 dead; 5 wounded	1	Shotgun (sawed- off)	Academic	Same day	Suicide
Robert Poulin opened fire in a classroom at St. Pius X High School, killing one person and injuring five others. Prior to the attack, Poulin raped and fatally burned a female teenager at his home ^{dclxxxviii dclxxxix}									
28 May 1975	1	Centennial Secondary School in Ontario, Canada	Michael Slobodian (16/M)	2 dead; 13 wounded	2	2 rifles (one .44- Magnum lever action and one .22-caliber)	Academic	Same day	Suicide
Michael Slobodian opened fire at a secondary school, killing a teacher and a student and injuring 13 others. ^{dclxxx dclxxxi dclxxxii}									
15 May 1974	1	Netiv Meir School in Ma'a lot, Israel	Ali Ahmad Hasan al- Atmah (27/M); Ziyad Abdar- Rahim Ka'ik (22/M); Muhammad Muslih Salim Dardour (20/M)	26 dead; 70 wounded	Unknown	Rifle (AK-47); Other	None	Same day	Force
Three terrorists from the Popular Front for the Liberation of Palestine opened fire at an elementary school in a series of attacks that killed 26 people and wounded 70 others. The assailants then took students hostage and demanded that Israel release political prisoners. Prior to attacking the school, the gunmen attacked a van, killed a family in an apartment and shot a bystander. They were ultimately killed by Israeli fire. ^{dclxxxiii dclxxxiv dclxxxv}									

International Attacks at “Other” Locations

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
26 June 2015	2	Beach in Sousse, Tunisia; Riu Imperial Marhaba Hotel in Sousse, Tunisia.	Seifeddine Rezgui Yacoubi, a.k.a. Abu Yahya al Qayrawani (M/23)	38 dead; 39 wounded	1	Rifle (assault)	None	Same day	Force
Seifeddine Rezgui Yacoubi, disguised as a tourist, fired on European tourists on the beach in Sousse, Tunisia, killing 38 and wounding 39 others. The attacker was a member of Islamic terrorist group Ajnad al-Khilafah. ^{dc1xxxvi dc1xxxvii dc1xxxviii}									
23 June 2014	2	Goseong, Gangwon province, South Korea, on the border with North Korea	Sergeant Yim (M/22)	5 dead; 8 wounded (including attacker)	2	Rifle (semi-automatic K2); Other (explosive)	Professional	June 25, 2014	Attempted Suicide
A soldier in the South Korean Army shot and killed five of his fellow soldiers with a rifle and hand grenade before running away from his military unit in South Korea on the border with North Korea. Troops chased the shooter until the next day where a shootout occurred. The shooter's parents were brought to the scene to help negotiate and the next day, the shooter was captured. ^{dc1xxxix dc1xc dc1xci}									
8 June 2014	1	Jinnah International Airport in Karachi, Pakistan	10 Unknown (Unknown/M)	At least 27 killed; “dozens” injured	Unknown	Rifles (automatic); Other (explosives)	None	June 9, 2014	Force; Suicide

4 June 2014	<p>10 armed Pakistani Taliban gunmen wearing Airport Security Force uniforms entered Jinnah International Airport in Karachi, Pakistan. They began to attack and got into a gunfight with security officials. It is believed that the militants intended to hijack planes or hold the airport under siege. ^{dcxcii dxcxiii}</p>								
	1	Street in Moncton, New Brunswick, Canada	Justin Bourque (M/24)	3 dead; 2 wounded	Unknown	Unknown firearms	None	Same day	Force
29 September 2011	<p>Justin Bourque shot and killed three Royal Canadian Mounted Police on the streets of Moncton, New Brunswick around 7:30pm. He wounded two other officers. Bourque then escaped into the woods and was found two days later by authorities. A 30-hour manhunt for Bourque resulted in his capture on June 6, 2014 and his arrest. Bourque is believed to hold anti-authority beliefs. ^{dcxciv dxcv dxcvi}</p>								
	1	Santa Maria del Pina Church in Madrid, Spain	Ivan Berral Cid (34/M)	2 dead; 1 wounded	1	Handgun	None	Same day	Suicide
22 July 2011	<p>Ivan Berral Cid opened fire at a church in Spain, killing one woman and wounding another before committing suicide. Reports state that the gunman concealed his weapon in a tennis racket cover and entered the church two hours before his attack to determine what time the evening mass started. ^{dcxcvii dxcviii}</p>								
	1	Workers' Youth League (AUF) in Utoya, Norway	Anders Behring Breivik (32/M)	69 dead; 33 wounded	2	Handgun (9-millimeter semi-automatic); Rifle (.223 caliber semi-automatic)	None	Same day	No force
4 July 2011	<p>Anders Behring Breivik opened fire at a youth camp in Norway, killing 69 people and wounding 33 others. Prior to the attack on the camp, during which he posed as a police officer, Breivik detonated a vehicle-borne improvised explosive device outside government offices in Oslo, killing eight people and wounding 207 others. ^{dcxcix dcc dccii}</p>								
	1	Marine Corp. barracks on Gwanghwa Island in South Korea	Kim (19/M)	4 dead; 1 wounded	2	Rifle; Other (grenade)	Professional	Same day	Attempted Suicide
<p>A Marine Corps Corporal in South Korea, identified only as Kim, opened fire in his barracks, killing four people and wounding one other. Reports state that Kim then detonated a grenade in an attempt to commit suicide. ^{dcxcii dcciii}</p>									

2 March 2011	1	Frankfurt International Airport in Frankfurt, Germany	Arid Uka (21/M)	2 dead; 2 wounded	1	Handgun (9-millimeter semi-automatic)	None	Same day	Force
Arid Uka opened fire inside a U.S. military bus at Frankfurt International Airport, killing two airmen and wounding two others. Uka was an employee at the German airport. Uka claimed to have been radicalized by online jihadist videos. ^{dcciv dccv}									
19 September 2010	1	St. Elisabeth Hospital in Lorrach, Germany	Sabine Radmacher (41/F)	3 dead; 3 wounded	1	Handgun (.22-caliber)	None	Same day	Force
Sabine Radmacher opened fire in the gynecology unit of St. Elisabeth Hospital in Germany, killing a nurse and wounding three other people, including a police officer. Radmacher killed her estranged husband and son at their apartment across the street minutes before the attack at the hospital. ^{dccvi dccvii}									
19 September 2010	1	Jama Masjid Mosque in New Delhi, India	Unknown (unknown/ M); Unknown (unknown/ M)	0 dead; 2 wounded	1	Handgun (automatic)	None	Same day	Attacker fled
Two gunmen opened fire on tourists at a 17th century New Delhi mosque, wounding two people. ^{dccviii dccix}									
24 August 2010	1	Muna Hotel in Mogadishu, Somalia	Unknown (unknown/ unknown); Unknown (unknown/ unknown); Unknown (unknown/ unknown)	30-33 dead; 16 wounded	Unknown	Rifle (assault)	None	Same day	Suicide
A group of three Al-Shabaab insurgents opened fire at the Muna Hotel in Somalia, killing roughly 30 people and injuring 16 others. The gunmen, who were disguised in government military uniforms, targeted bystanders, hotel staff and armed guards. The insurgents moved throughout different floors in the hotel during the attack. ^{dccx dccxi dccxii}									

7 May 2004	1	Liquiterminal Ltd. Trucking facility in Mississauga, Canada	Jean Delagrave	1 dead; 2 wounded	1	Unknown firearm	Professional	Same day	No force
Jean Delagrave opened fire at his workplace, killing one person and wounding two others. Delagrave surrendered to law enforcement shortly after the shooting. ^{dcxxviii} ^{dcxxv}									
27 March 2002	1	Nanterre Town Hall in Nanterre, France	Richard Durn (33/M)	8 dead; 19 wounded	2	Handguns (one semi-automatic and one .357 magnum)	None	Same day	Force
Richard Durn opened fire at a meeting of councilors in Nanterre Town Hall, killing eight counselors and wounding 19 other people. Durn died the following day after leaping from a police station window during questioning. Police officers discovered a 13-page suicide note at Mr. Durn's home. ^{dcxxv} ^{dcxxvi} ^{dcxxvii}									
17 November 1997	1	Temple of Hatshepsut in Deir el-Bahri, Egypt	Karam Mohammad Ismail (18/M); Essmat Erian (24/M); Mahmoud Ahmed Karim (23/M); Saeed Mohammed Shawaki (23/M); Medhat Abdel Rahman (32/M); unknown/unknown)	62 dead; 26 wounded	Unknown	Rifle; Handgun; Knife; Other	None	Same day	Suicide
Six gunmen opened fire at the ancient Temple of Queen Hatshepsut, killing 62 people, including 58 foreigners, and wounding 26 others. Following the attack, the assailants' bodies were discovered in a cave in an apparent suicide. The Islamic Group and Jihad Talaat al-Fath claimed credit for the attack. ^{dcxxviii} ^{dcxxix}									

11 June 1994	1	Army base and public streets in Falun, Sweden	Mattias Flink (24/M)	7 dead; 0 wounded	1	Rifle (AK-5)	None	Same day	Force
Mattias Flink, a police lieutenant, opened fire at an army base and on public streets, killing seven people. ^{dcxxx dcccxi dcccxii}									
30 April 1989	1	Monkseaton in North Tyneside, United Kingdom	Robert Sartin (22/M)	1 dead; 14 wounded	1	Shotgun	None	Same day	Force
Robert Sartin opened fire throughout the town of Monkseaton, killing one person and wounding 14 others. Sartin's 20-minute shooting spree concluded when he was cornered by police officers near a seafront. He stole his father's shotgun to carry out the attack. ^{dcccxiii dcccxiv}									
9 August 1987	1	Hoddle Street in Melbourne, Australia	Julian Knight (19/M)	7 dead; 19 wounded	3	Rifle (.22-caliber Ruger); Shotgun (12-gauge pump-action); Rifle (M14)	None	Same day	No Force
Julian Knight opened fire on pedestrians and cars from atop a billboard platform, killing seven people and wounding 19 others. Knight was a failed army cadet. ^{dcxxxv dcccxxvi dcccxxvii dcccxxviii}									
27 December 1985	1	Leonardo da Vinci Airport in Rome, Italy	Unknown (unknown); Unknown (unknown); Unknown (unknown); Ibrahim Mohammed Khaled (unknown/M)	13 dead; 75 wounded	Unknown	Rifle; Other	None	Same day	Force
Four gunmen belonging to the Abu Nidal Organization opened fire at the El-Al and Trans World Airlines ticket counters at Rome's Leonardo da Vinci Airport, killing 13 people and wounding 75 others. Italian police and Israeli security guards killed three of the gunmen and captured the fourth. The gunmen were armed with grenades and automatic rifles. ^{dcxxxix dcccxx}									

27 December 1985	1	Schwechat Airport in Vienna, Austria	Unknown (unknown/ unknown); Unknown (unknown/ unknown); Unknown (unknown/ unknown); Unknown (unknown/ unknown);	3 dead; 30 wounded	Unknown	Submachine gun; Other	None	Same day	Force
Three gunmen belonging to the Abu Nidal Organization opened fire at the El-Al ticket counter at Vienna's Schwechat Airport, killing three people and wounding 30 others. Austrian police killed one of the gunmen and captured the other two. ^{dccxxxi} ^{dccxxiii}									
5 August 1973	1	Athens Airport in Athens, Greece	Sehud Muhammad (unknown/M); Talat Hussan (unknown/M)	3 dead; 55 wounded	2	Unknown firearm; Other	None	Same day	No force
Sehud Muhammad and Talat Hussan opened fire and threw grenades in a crowded passenger lounge at Athens Airport, killing three people and wounding 55 others. The passengers in the lounge were about to board a flight for Israel. The Palestinian gunmen surrendered after taking 35 passengers hostage for two hours. ^{dccxxviii}									
29 May 1972	1	Lod International Airport in Airport City, Israel	Kozo Okamoto (24/M); Tsuyoshi Okudaira (unknown/M); Yasuyuki Yasuda (unknown/M)	26 dead; 72 wounded	2	Unknown firearm; Other	None	Same day	Force; Suicide
Kozo Okamoto, Tsuyoshi Okudaira and Yasuyuki Yasuda opened fire on crowds at the Lod International Airport in Israel, killing 26 people and injuring 72 others. As the three Japanese gunmen arrived at the airport from Paris, they began randomly targeting victims using automatic guns and hand grenades. The Popular Front for the Liberation of Palestine recruited the gunmen from the Japanese Red Army. ^{dccxxxiv} ^{dccxxxv}									

Foiled Plots at Office Buildings

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
29 December 2010	1	Jyllands-Posten in Copenhagen, Denmark	Unknown (44/M); Unknown (29/M); Unknown (30/M); Unknown (26/M); Unknown (37/M)	N/A	2	Submachine gun; Handgun	None	N/A	Plot was foiled when authorities learned of the assailants' plans, following months of investigation.

Five men were arrested for planning a shooting attack on the offices of Jyllands-Posten, the Danish newspaper that published satirical cartoons of the Prophet Muhammad in 2005.^{dccccxvi dccccxvii dccccxviii}

Foiled Plots at Schools

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
20 March 2012	N/A	N/A	Trey Selser (22/M)	N/A	6	Handguns; Rifles	Unknown	N/A	Authorities arrested Selser for the murders of his parents and his brother
11 March 2012	1	University of Maryland in College Park, Maryland	Alexander Song (19/M)	N/A	Unknown	Unknown firearm	Academic	N/A	Trey Selser shot and killed his parents and his brother in Waller, Texas. Reports state that Selser was obsessed with the Columbine shooting and was planning a mass shooting. The mass shooting was foiled when police received a concerned phone call from a relative. Upon visiting Selser's home, the police discovered the bodies of his parents and seized a collection of guns. ^{dcccxxxix} Plot was foiled when Song's comments on the internet were reported to police.
27 September 2011	1	Wigwam Creek Middle School in Litchfield Park, Arizona	Unknown (14/M)	N/A	N/A	N/A	Academic	N/A	Alexander Song was arrested after posting on a website that he planned to "kill enough people to make it to national news." Song did not obtain weapons prior to his arrest. ^{dcccxl} Plot was foiled when an individual saw the student's comments on

									YouTube and alerted the police. The student was then arrested at his home.
5 August 2011	1	Lakeshore High School in Covington, Louisiana	Unknown (unknown; unknown)	N/A	Unknown	Unknown firearm	Academic	N/A	Plot was foiled when the students' plans were revealed by students who contacted administrators of the school. Authorities discovered an invitation-only Facebook group including all three of the students.
5 August 2011	1	Lincoln County High school in Winfield, Missouri	Donald G. Waters (18/M); unidentified juvenile (16/M)	N/A	Unknown	Unknown firearm	Academic	N/A	Jacob Keller, Todd Singleton and Daniel Hopkins' planned to shoot fellow high school students during the first day of classes. Police foiled the plot when other students at the school alerted them to the students' suspicious behavior. ^{dccxlii} Plan was foiled when students reported to the school's resource

									officer that the two students attempted to recruit them to help with the shooting.
26 August 2010	1	Leto High School in Tampa, Florida	Austin James Cook (17/M)	N/A	1	Rifle (.22-caliber)	Academic	N/A	Plot was foiled when law enforcement investigated a tip that was reported to Campus Crime Stoppers.
7 May 2010	1	Connetquot High School in Long Island, New York	Christopher Franko (17/M); Dana Saltzman (16/F)	N/A	Unknown	Shotguns; Other	Academic	N/A	Plot was foiled when Franko's social worker alerted police as to her suspicions that the two suspects might be planning an attack.
									Donald Waters and a minor planned to go through their high school and shoot as many people as possible. Waters attempted to recruit fellow students to assist him with the shooting. Police foiled the plot when two students Waters reached out to turned him in to school officials. ^{dcxliii} Austin Cook was arrested when authorities uncovered his plan to "break the record" of the Columbine and Virginia Tech school shootings at his high school. Police seized a rifle, bow and arrow, several gun-related books and a Columbine video game from the suspect's home. Prior to his arrest, Cook attempted to recruit someone to help him conduct the attack. ^{dcxliiv dccciv dcccvi} Christopher Franko and his girlfriend, Dana Saltzman, were arrested for planning an attack on their high school. Reports state that the suspects sought to purchase shotguns and randomly shoot students, faculty and staff at Franko's former school. Prior to this plot, Franko had been accused of similar shooting attempts at his school. ^{dcxlvii dcccvi}

4 March 2010	1	Chelan High School in Chelan, Washington	Charles T. Mustoe (17/M)	N/A	10	3 shotguns; 5 rifles; 2 handguns	Academic	N/A	Plot was foiled when the parents of a girl with whom Mustoe had discussed his plans alerted authorities.
Charles Mustoe was arrested for planning an attack at Chelan High School. Mustoe planned to carry out the attack on April 20, 2011, the anniversary of the Columbine High school shooting. Reports state that Mustoe was angry about being bullied at school. ^{dcccix dcci}									
14 February 2010	1	Marshall High School in San Antonio, Texas	Unknown (16/M)	N/A	Unknown	Unknown	Academic	N/A	Plot was foiled when the suspect revealed his plans to a man with whom he was playing an online video game; the man immediately notified law enforcement.
A student was arrested for planning a shooting spree at Marshall High School. ^{dccii dcciii}									
4 May 2009	1	Covina High School in West Covina, California	Unknown (15/M); Unknown (16/M)	N/A	2	2 handguns (one Glock .40-caliber and one Smith & Wesson .357-caliber)	Academic	N/A	Plot was foiled when a man reported the theft of two handguns from his home, enabling police to trace the theft to the

												Victim's stepson.
<p>Two high school students were arrested for plotting to randomly shoot classmates at Covina High School during a school assembly. Authorities discovered two loaded handguns as well as violent drawings at the home of one of the teenagers. The boys admitted to having brought their weapons to the school three times in the past.^{dccliii}</p>												
9 April 2009	1	Dove Creek High School in Colorado	Cody Barr (19/M); unknown (16/M)	N/A	Over 10	7 rifles; Handguns (.22-caliber); Shotguns; Rifles (M1 carbine); Other	Academic	N/A	Plot was foiled when one of the suspects informed his family about the plot.			
<p>During an investigation of two teenagers who were arrested in New Mexico on suspicion of burglary, authorities uncovered the teenagers' plans for a shooting attack at Dove Creek High School. The teenagers planned to shoot students, the school principal, the superintendent, the County Sheriff, and the Undersheriff. A stash of weapons was discovered in one of the teenagers' home.^{dccliv dcclv}</p>												
8 April 2009	1	Landstown High School in Virginia Beach, Virginia	Phillip Bay (17/M); unknown (unknown/M); unknown (unknown/M)	N/A	Over 30	2 shotguns; Other	Academic	N/A	Plot was foiled when the suspects' friend alerted authorities of their plan to bomb the school.			
<p>Three high school students were arrested for plotting to bomb their high school after police discovered 28 pipe bombs, Molotov cocktails, shotguns, violent videos, and a hit-list of students' names at one of the teenagers' home. Two years prior, one of the teenagers had served three months of supervised probation for possessing a hoax explosive device around the date of the Columbine High School attack anniversary.^{dcclvi dcclvii}</p>												
8 December 2008	1	Blue Mountain High School in North Manheim, Pennsylvania	Gregory N. Nason (17/M)	N/A	5	2 rifles; Shotgun; Other	Academic	N/A	Plot was foiled when several students informed school officials that they suspected			

4 December 2008	1	Pottstown High School in Montco, Pennsylvania	Richard Yanis (15/M)	N/A	3	Handguns (one Smith & Wesson .357 caliber revolver; one Smith & Wesson .22 caliber semi-automatic; one Colt .45 caliber semi-automatic)	Academic	N/A	Nason might conduct a school shooting.
<p>Gregory Nason was arrested for plotting to shoot students at Blue Mountain High School. Police found multiple weapons, replica guns, a gas mask, a fake hand grenade, shooting gloves, replica explosive devices and paramilitary clothing at his home.^{dcclviii}</p> <p>Plot was foiled when the suspect's father reported three handguns stolen from a secured gun locker in his basement. Simultaneously, a school friend of the suspect alerted a teacher about his friend's weapons. The teacher immediately contacted authorities.</p> <p>Richard Yanis was arrested after stealing three guns and hundreds of rounds of ammunition from his father. Reports state that Yanis's intention was to conduct a shooting spree at Pottstown High School.^{dcclix}</p>									

29 October 2008	1	Big Bear High School in Big Bear, California	Unknown (16/M); unknown (16/M); unknown (16/M); unknown (15/M); unknown (15/M)	N/A	Unknown	Unknown	Academic	N/A	Plot was foiled when fellow students overheard the plans and alerted school authorities.
Five teenage boys were arrested for plotting to shoot students, teachers, and staff at Big Bear High School. ^{dccix}									
6 March 2008	1	Belvidere High School in Belvidere, New Jersey	Unknown (17/M)	N/A	Unknown	Unknown	Academic	N/A	Plot was foiled when the suspect warned classmates about a hit-list he had drafted. Worried students notified school administrators.
A high school student was arrested when his plot to murder classmates and teachers in New Jersey was foiled by fellow students. Reports state that the student had begun surveying school security and mapping escape routes. The student had also drafted a hit-list of intended victims. ^{dccix}									
28 November 2007	1	Arlington High School in Lagrangeville, New York	Patrick Quigley (16/M); Joseph Saia (16/M); Unknown (15/M)	N/A	Unknown	Unknown	Academic	N/A	Plot was foiled when a student saw a MySpace posting detailing the attack and reported it to the high school principal.

Three high school students were arrested for planning to attack their school on the 11th anniversary of the Columbine High School shooting attacks. ^{dcclxxii}									
18 November 2007	1	Georg-Buechner Gymnasium in Cologne, Germany	Unknown (17/M); Unknown (18/M)	N/A	Unknown	Other	Academic	N/A	Plot was foiled when classmates informed school authorities that the suspects were studying a website containing images of the Columbine massacre. One of the suspects had also warned several students of an imminent attack.
Two teenagers were arrested for planning an attack on their high school on the anniversary of a 2006 school shooting in Germany. After being questioned by law enforcement, one of the youths committed suicide by throwing himself in front of a train. The other suspect confessed to the plot. Air guns, crossbows and a possible hit-list of intended victims were discovered in one of the suspects' home. ^{dcclxxiii}									
12 October 2007	1	Plymouth Whitemarsh High School in Norristown, Pennsylvania	Dillon Cossey (14/M)	N/A	Over 34	Handgun (.22-caliber); 33 Rifles (one .22-Caliber, one 9-millimeter semiautomatic, 30 air-powered, one 9-	Academic	N/A	Plot was foiled when a high school student informed police officers of the impending attack.

						millimeter semi-automatic with a laser scope)			
<p>Dillon Cossey was arrested for stockpiling weapons and plotting a school attack. Police found more than 35 weapons, a bomb-making book and violent journals and videos of the 1999 Columbine High School shooting in Cossey's bedroom. Reports state that Cossey was angry about being bullied at his school and told a friend that he wanted to stage an attack similar to the assault on Columbine High School.^{dcclxiv dcdlxv}</p>									
13 July 2007	1	Connetquot High School in Long Island, New York	Michael McDonough (17/M); unknown (15/M)	N/A	3	2 rifles (one Uzi semi-automatic and one AK-47); Other	Academic	N/A	Plot was foiled when a journal belonging to one of the suspects was turned over to authorities after it was discovered by a customer in a McDonald's parking lot. The journal contained numerous threats and detailed plans to attack the school.
<p>Two teenagers were arrested for planning an assault at the Connetquot High School in Long Island on the anniversary of the Columbine High School rampage. The teenagers detailed their plot in journals and a video in which they identified several victims by name. The teenagers also considered throwing bombs in the McDonald's where they worked and made numerous unsuccessful attempts to purchase weapons.^{dcclxvi dcdlxvii}</p>									
21 September 2006	1	East High School in Green Bay, Wisconsin	William Cornell (17/M); Shawn Sturtz,	N/A	Unknown	Shotgun; Rifles; Handguns; Other	Academic	N/A	Plot was foiled when a friend of the suspects

	<p>A group of six seventh-graders were arrested for planning an attack on their middle school. The students intended to cut off power and telephone service to their school and kill classmates and faculty with guns and knives. Reports state that the students claimed to have been bullied by other students and sought to exact revenge.^{dccclxxx dccclxxi}</p>								<p>Plot was foiled when school officials were notified about a threatening message on one of the suspects' MySpace page. A teenager who chatted with one of the suspects on MySpace received a list of a dozen potential victims from the suspect and immediately notified law enforcement.</p>
<p>20 April 2006</p>	<p>1</p> <p>Riverton High School in Riverton, Kansas</p>	<p>Unknown (unknown/M); unknown (unknown/M); unknown (unknown/M); unknown (unknown/M); unknown (unknown/M)</p>	<p>N/A</p>	<p>Unknown</p>	<p>Handguns; Other</p>	<p>Academic</p>	<p>N/A</p>		
<p>10 April 2006</p>	<p>1</p> <p>Winslow Township High School in Camden,</p>	<p>Edwin DeLeon (15/M); Peter Cunningham</p>	<p>N/A</p>	<p>Unknown</p>	<p>Unknown</p>	<p>Academic</p>	<p>N/A</p>		<p>Plot was foiled when the principal at</p>

		New Jersey	(16/M); David Cruz Jr. (16/M); James Whelan (15/M)						Winslow Township High School heard about the alleged plot and alerted police.
	Four students were arrested for plotting to shoot fellow students, teachers and residents of their community. The students planned to start a food fight during school lunch to cause a distraction and then begin executing students and teachers from a hit-list before continuing their shooting rampage off-campus. The students surveyed school security and mapped escape routes but failed to obtain any weapons before school officials were alerted to the plot. ^{dcclxxxiv dcclxxxv}								
15 December 2005	1	Quartz Hill High School in Quartz Hill, California	Johnny Alvarez Cases (17/M); unknown (15/M)	N/A	Unknown	Unknown	Academic	N/A	Plot was foiled when a student who overheard the suspects discussing their plans to cut her arms and legs off during the attack alerted the assistant principal.
	Two teenage friends were arrested for plotting an attack on their high school. The teenagers obtained ammunition and improvised explosive devices which they practiced detonating in the Antelope Valley Desert. ^{dcclxxxvi}								
21 September 2005	1	Pickens Middle School in Pickens, South Carolina	Unknown (11/M); unknown (12/M)	N/A	2	2 handguns (one .45-caliber semi-automatic and one .25-caliber)	Academic	N/A	A suspect's sister alerted her parents about her brother's plot.

<p>16 March 2005</p>	<p>Two boys were arrested for planning a shooting at their middle school. The students planned to shoot a school resource officer before randomly firing on students. One of the suspects had already caught the attention of authorities after firing a handgun in his bedroom. ^{dcclxxvii}</p>						<p>Plot was foiled when one of the suspects confided in a school counselor and admitted to the plot.</p>	
	<p>1</p>	<p>St. John Bosco High School in Bellflower, California</p>	<p>Unknown (16/M); unknown (16/M)</p>	<p>N/A</p>	<p>1</p>	<p>Rifle (.22-caliber)</p>	<p>Academic</p>	<p>N/A</p>
<p>10 February 2004</p>	<p>Two students were arrested for plotting to open fire in their high school. Upon searching the boys' homes, authorities discovered a rifle as well as maps and notes detailing the plot. ^{dcclxxviii}</p>						<p>Plot was foiled when a parent overheard a conversation about the plot and alerted authorities.</p>	
	<p>1</p>	<p>Laguna Creek High School in Elk Grove, California</p>	<p>Unknown (15/M); unknown (15/M)</p>	<p>N/A</p>	<p>1</p>	<p>Rifle (.22-caliber)</p>	<p>Academic</p>	<p>N/A</p>
<p>November 2001</p>	<p>Two high school students were arrested for plotting to shoot fellow students and detonate explosive devices on campus. The students had planned to burglarize a store, obtain weapons, and use those weapons to shoot fellow students. One of the teenagers obtained a map of the school and stole his parents' .22-caliber rifle from their home. ^{dcclxxix}</p>						<p>Plot was foiled when a student alerted authorities to the plot after hearing a rumor on campus about an imminent shooting.</p>	
	<p>1</p>	<p>New Bedford High School in New Bedford, Massachusetts</p>	<p>Eric McKeehan (17/M); Unknown (15/M); Unknown (15/M)</p>	<p>N/A</p>	<p>Unknown</p>	<p>Other</p>	<p>Academic</p>	<p>N/A</p>

<p>14 February 2001</p>	<p>1</p>	<p>Southside High School in Elmira, New York</p>	<p>Jeremy Getman (18/M)</p>	<p>N/A</p>	<p>20</p>	<p>Shotgun; Handgun (.22-caliber); Other</p>	<p>Academic</p>	<p>N/A</p>	<p>Plot was foiled when a student received a threatening note from the suspect claiming that he had a gun. She then alerted authorities to the suspect's cache of weapons.</p>
<p>8 February 2001</p>	<p>1</p>	<p>Preston Junior High School in Fort Collins, Colorado</p>	<p>Alexander Vukodinovich (14/M); Scott William Parent (14/M); Chad Meininger (15/M)</p>	<p>N/A</p>	<p>6</p>	<p>2 handguns (one TEC-9 semi-automatic and one .38-caliber); 2 rifles; Shotgun; Other</p>	<p>Academic</p>	<p>N/A</p>	<p>Plot was foiled when four girls alerted police to a phone conversation they had with one of the suspects in which he threatened their lives and discussed the plot.</p>

6 February 2001	1	Royal Valley High in Hoyt, Kansas	Unknown (16/M); Unknown (17/M); Unknown (18/M)	N/A	Unknown	Rifle (modified assault); Other	Academic	N/A	Plot was foiled when a student notified school officials after hearing rumors about the students’ alleged plan.
29 January 2001	1	De Anza Community College in Cupertino, California	Al DeGuzman (19/M)	N/A	54	3 rifles; Shotgun; 50 others (30 pipe bombs and 20 Molotov cocktails)	Academic	N/A	Plot was foiled when a drugstore photo clerk notified police that a customer had developed photos of himself surrounded by guns and bombs.
23 April 1999	1	Danforth Junior High School in Wimberley, Texas	Unknown (14/M); Unknown (14/M);	N/A	Unknown	Unknown	Academic	N/A	Students alerted authorities after overhearing

16 November 1998	1	Burlington High School in Burlington, Wisconsin	Unknown (14/M); Unknown (14/M)						the suspects bragging about their planned attack.
<p>Four boys were arrested for plotting to attack their junior high school with guns and explosives. Authorities discovered gunpowder and bomb-making instructions in the suspects' homes. Reports state that the students drafted a list of teachers and students they wished to target. ^{dccixxxvii}</p> <p>Plot was foiled when the girlfriend of a suspect told her parents about the alleged plot. Rumors of the plot had been circulating among the student body after one of the suspects told certain individuals not to be in school on the day of the proposed attack.</p> <p>Five teenagers were arrested for plotting to kill staff members and students at their high school. Reports state that the teenagers planned on using guns stolen from one of the suspects' home and intended to target people who had bullied them in school. ^{dcdlxxxviii}</p>									

<p>7 October 1997</p>	<p>1</p>	<p>Pearl High School in Pearl, Mississippi</p>	<p>Marshall Grant Boyette Jr. (18/M); Donald Brooks Jr. (17/M); Justin Sledge (16/M), Wesley Brownell (17/M); Daniel Thompson (16/M); Delbert Shaw (16/M)</p>	<p>N/A</p>	<p>Unknown</p>	<p>Unknown</p>	<p>Academic</p>	<p>N/A</p>	<p>Plot was foiled when police were advised by students and parents to investigate Woodham's friends following his attack. One particular suspect came to the attention of authorities for publicly defending Woodham during a candlelight vigil for victims of Woodham's shooting rampage. Six teenagers were arrested in Mississippi for plotting to kill classmates at their high school. The arrest came nearly a week after their friend, Luke Woodham, killed two students and wounded seven in a shooting at the same school. The six students planned to terrorize the school by starting fires, cutting telephone lines and killing classmates. Reports state that they then planned to flee to Louisiana, Mexico and Cuba. Several suspects documented their plot.^{dcclxxxix}</p>
-------------------------------	----------	--	---	------------	----------------	----------------	-----------------	------------	--

Foiled Plots at Other Locations

Date	Number of Attack Locations	Location Information	Attacker Information	Casualties	Number of Weapons	Weapon Information	Closest Relationship to Victims	Date Attack Concluded	Resolution
8 May 2007	1	Fort Dix Army base in Burlington County, New Jersey	Mohamad Ibraim Shnewer (22/M); Dritan Duka (28/M); Eljvir Duka (23/M); Shain Duka (26/M); Serdar Tatar (23/M); Agron Abdullahu (24/M)	N/A	N/A	Rifles (AK-47 assault weapons, M-16s); Other	None	N/A	Plot was foiled when a shopkeeper at a video store alerted authorities to the men after he had been asked to copy a suspicious video onto a DVD. The video displayed 10 young men shooting weapons at a firing range while calling for jihad

24 June 2009	1	Duke Energy Convention Center in Cincinnati, Ohio	John Rosser (28/M)	N/A	Unknown	Unknown	Professional	N/A	Plot was foiled when Rosser told his landlord about the plot, who then alerted authorities. Officers captured Rosser, who was armed with a gun, about 100 yards from the Convention Center
John Rosser was arrested for plotting to kill his former boss at the Duke Energy Convention Center. Rosser was fired from the Convention Center two years before the plot was uncovered. ^{dcxciv}									

ⁱ [“Everything We Know About the San Bernardino Terror Attack Investigation So Far,” Los Angeles Times](#). 14 December 2015.

ⁱⁱ [“What Investigators Know About the San Bernardino Shooting,” New York Times](#). 10 December 2015.

ⁱⁱⁱ Nelson, Shellie and Simmons, Shane [“Apparent Domestic Violence at Center of Davenport and Bettendorf Active Shooter Incidents,” ABC News](#). 27 October 2015.

^{iv} Cook, Linda and Becker, Tara [“Shooter in Davenport Law Office Kills Himself in Bettendorf,” Quad City Times](#). 26 October 2015.

- v “[Gun Arsenal Seized from Idaho man Accused of Killing Adopted Mother, Landlord, and Arby’s Manager](#),” Associated Press. 11 January 2015.
- vi Nakano, Erisa. [Phoenix Office Complex Shooting: Steve Singer and Mark Hummels Killed, Another Wounded in Shooting](#). ABC News. 1 February 2013.
- vii Gaynor, Tim. [Arizona Shooting Suspect Found Dead in Apparent Suicide](#). Reuters. 31 January 2013.
- viii Hansen, Ronald and Reagor, Catherine. [Phoenix Office Shooting: Lawsuit May Have Been a Factor, Records Show](#). Arizona Central. 1 February 2013.
- ix Karnowski, Steve Andrew Engeldinger, Minnesota Gunman, Said ‘Oh Really’ Before He Started Shooting [Huffington Post](#). 6 October 2012.
- x Haag, Matthew. [‘I Enjoy Watching People Beg for their Life,’ McKinney Shooter Patrick Sharp told Facebook Friend](#). [Dallas Morning News](#). 19 August 2010
- xi CNN Staff. [Heavily Armed Man Orchestrates Attack on Texas Police Building](#). [CNN](#). 17 August 2010
- xii Edecio Martinez. [Emcore Shooter Robert Reza Kills Two, Self, Say Police](#). [CBS News](#). 12 July 2010
- xiii Jennings, Trip. [Two Women Killed by Shooter Monday were Victims of Chance, APD Chief Says](#). [The New Mexico Independent](#). 13 July 2010.
- xiv Davenport, Christian. [Officers who Shot Pentagon Gunman Recall Moments of Mayhem](#). [The Washington Post](#). 9 March 2010
- xv Associated Press. [Gunman Had Multiple Weapons, Police Say](#). [KPTV](#). 10 November 2009
- xvi Oram, Bill. [Gunman Kills Estranged Wife at Tualatin Lab, Injures Two, Kills Self](#). [The Oregonian](#). 10 November 2009
- xvii Dewan, Sheila. [Lawyer Cites Mental Illness in Orlando Shooting](#). [The New York Times](#). 7 November 2009.
- xviii Orlando Sentinel Staff. [Jason Rodriguez: Shooting at Downtown Orlando Office Building Leaves 5 Hurt, 1 Dead](#). [The Orlando Sentinel](#). 6 November 2009.
- xix Harvey, Michael. [Tech Engineer Kills Three Bosses at Silicon Valley Start-Up after Being Sacked](#). [The Times Online](#). 16 November 2009
- xx Brown, Abbey and Warren Hayes. [Standoff at Louisiana Law Firm Leaves 3 Dead](#). [USA Today](#). 5 October 2007.
- xxi Associated Press. [Louisiana Police Kill Gunman Who Killed 2, Wounded 3 in Law Office](#). [Fox News](#). 5 October 2007
- xxii Bode, Nicole, Kerry Burke, and Tine Moore. [Bronx Slay Suspect Paulino Valenzuela Claiming Self-Defense](#). [The NY Daily News](#). 3 September 2007
- xxiii WCBS Staff. [Bronx Workplace Shooting Leaves 1 Dead, 2 Wounded](#). [WCBSTV](#). 30 August 2007.
- xxiv Pilgiani, Ellen and Libby Sandler. [Shooting at Accounting Firm Leaves One Dead and 2 Hurt](#). [The New York Times](#). 10 April 2007
- xxv Taylor, Adam, Terri Sanginiti, and Andrew Tangel. [Bear Man Kills 3, Himself over Deal Gone Bad](#). [The Delaware Online](#).
- xxvi Jones, Richard G. [Gunman Kills 3 Members of Investment Firm and Himself](#). [The New York Times](#). 14 February 2007.
- xxvii Chicago Tribune Staff. [Deadly Pursuit](#). [Chicago Tribune](#). 11 December 2006.
- xxviii Clark, Amy S. [Shooting May Be Over ‘Truck Toilet’ Patent](#). [CBS News](#).
- xxix Associated Press. [Police: Ill, Gunman Felt Cheated Over Invention](#). [MSNBC](#). 9 December 2006.
- xxx [Press Release: Warrants Issued on 48 Year Old Man Suspected of Office Shooting in Earth City](#). [St. Louis County Police](#). 22 October 2004.
- xxxi Associated Press. [Nation in Brief](#). [The Washington Post](#). 24 October 2004
- xxxii WRAL Staff. [Hendersonville ESC Office Set to Reopen](#). [WRAL](#). 8 April 2004.
- xxxiii Deseret, Jesse Hyde. [‘Gentle Giant’ Loved Family](#). [Deseret News](#). 4 February 2004.
- xxxiv Deseret, Jesse Hyde. [Shooting Suspect Offered a Plea Deal](#). [Deseret News](#). 12 April 2005.
- xxxv The New York Times Staff. [Gunman Kills Four at Alabama Job Agency](#). [The New York Times](#). 26 February 2003.
- xxxvi Associated Press. [Four Dead in Shooting in Alabama](#). [Gunman Surrenders](#). [USA Today](#). 25 February 2003.
- xxxvii Goldberg, Carey. [A Deadly Turn to a Normal Work Day](#). [The New York Times](#). 28 December 2000.
- xxxviii The New York Times Staff. [Man Convicted of Killing 7 Co-workers](#). [The New York Times](#). 25 April 2002.
- xxxix Song, Jaymes K. [7 Dead in Nimitz Hwy. Xerox Shooting](#). [The Star Bulletin](#). 2 November 1999.
- xl CNN Staff. [Alabama Man Faces Murder Charges for Office Shooting Sprees](#). [CNN](#). 5 August 1999.
- xli Sack, Kevin. [Shooting in Atlanta: The Overview](#). [The New York Times](#). 30 July 1999.
- xlii Associated Press. [Ex-Patient Kills Psychiatrist, Self](#). [The Los Angeles Times](#). 12 June 1999

- ^{lxiii} Associated Press. [Family, Friends Remember Slain Psychiatrist as Mentor, Teacher](#). Lundington Daily News. 14 June 1999.
- ^{lxiv} Campbell, Becky. [DA Vows to Fight ‘Tooth and Nail’ to Keep Man Who Shot Johnson City Attorney, Judge Behind Bars](#). *Times News*. 6 March 2009.
- ^{lxv} Dethman, Leigh. [Woman in Triad Case Still Cannot Be Tried](#). *Desert Morning News*. 1 September 2005.
- ^{lxvi} Ogata, Wendy. [Infamous Shooting Incidents in Lake County](#). *Desert News*. 14 January 1999.
- ^{lxvii} Rabinovitz, Jonathan. [Connecticut Lottery Worker Kills 4 Bosses, then Himself](#). *The New York Times*. 7 March 1998.
- ^{lxviii} The New York Times Staff. [9 Fataally Shot in California in 2 Incidents over 2 Days](#). *The New York Times*. 20 July 1995.
- ^{lxix} Fields, Julie. [Gunman Kills 4, Is Slain by Police](#). *The Los Angeles Times*. 3 December 1993.
- ^l Mydans, Seth. [5 Die in Gunman’s Rampage in 2 California Cities](#). *The New York Times*. 3 December 1993.
- ^{li} Kiskien, Tom. [Shattered Lives](#). *Ventura County Star*. 30 November 2003.
- ^{lii} Reinhold, Robert. [Seeking Motive in the Killing of 8: Insane Ramblings Are Little Help](#). *The New York Times*. 4 July 1993.
- ^{liii} Sward, Susan. [101 California – Legacy of Horror / Highrise Massacre Left behind Change, Challenges](#). *SFGate*. 30 June 1998.
- ^{liiv} Smothers, Ronald. [Florida Gunman Kills 8 and Wounds 6 in Office](#). *The New York Times*. 18 June 1990.
- ^{li v} Word, Ron and Associated Press. [10th GMAC Victim Dies](#). *The St. Petersburg Times*. 28 June 1990.
- ^{li vi} Time Staff. [California: Another Fatal Attraction](#). *Time Magazine*. 29 February 1998.
- ^{li vii} [An Obsession with Laura](#). *National Institute for the Prevention of Workplace Violence*.
- ^{li viii} Fechter, Joshua, Police: ‘Paranoid’ H-E-B Employee Shoots Four Colleagues, Killing One at South Texas Store. *Houston Chronicle*. 28 November 2016.
- ^{li x} Downs, Caleb. [4 H-E-B Employees Shot, 1 Killed in Drive-By Shooting at Store near Texas-Mexico Border](#). *The Dallas Morning News*. 28 November 2016.
- ^{li x i} Green, Sara Jean, Arcan Cetin, Man Accused of Killing 5 in Cascade Mall Shooting, Dies in Jail. *The Seattle Times*. 17 April 2017.
- ^{li x ii} Solis, Steph. [What We Know About Arcan Cetin, Washington State Shooting Suspect](#). *USA Today*. 25 September 2016.
- ^{li x iii} Kaleem, Jaweed and Shyong, Frank, [What We Know about Gavin Eugene Long the Baton Rouge Shooter](#). *Los Angeles Times*. 17 July 2016.
- ^{li x iv} Hensley, Nicole; Ng, Fred; and Greene, Leonard, [Baton Rouge Shooter Gavin Eugene Long—Marine—Was Outraged at Police for Alton Sterling](#). *New York Daily News*. 18 July 2016.
- ^{li x v} [Orlando Nightclub Shooting: How the Attack Unfolded](#). BBC News. 15 June 2016.
- ^{li x vi} Zambelich, Ariel and Hurt, Alyson. [3 Hours in Orlando: Piecing Together an Attack and Its Aftermath](#). NPR. 26 June 2016.
- ^{li x vi i} [Who is Eulalio Tordil?](#) NBC News. 6 May 2016.
- ^{li x vi ii} Bui, Lynh; Hendrix, Steve; and Heim, Joe. [Man Arrested in Md. Killing Spree Allegedly Menaced His Wife, Stepdaughters](#). *Washington Post*. 6 May 2016.
- ^{li x vi iii} Carrero, Jacquellena and Siemaszko, Corky. [Two Dead in Shooting at Knight Transportation Building in Katy, Texas](#). NBC News. 4 May 2016.
- ^{li x i x} Police: [Katy Gunman Targeted Supervisor During Retaliation](#). NBC News. 5 May 2016.
- ^{li x x} [Lafayette Shooting: Gunman ID’d as ‘Kind of a Drifter’](#). Associated Press. 24 July 2015.
- ^{li x xi} Winter, Tom and Connor, Tracy. [Louisiana Theater Shooting: Gunman John Houser ‘Disturbed,’ Family Said in Docs](#). MSNBC. 24 July 2015.
- ^{li x x ii} [Suspect Identified in Shooting at Grand Forks Walmart](#). WDAZ-TV. 29 May 2015.
- ^{li x x iii} [Police: North Dakota Wal-Mart Shooter used Personal Handgun, Not Military-Issued Weapon](#). Associated Press. 29 May 2015.
- ^{li x x iv} [Officer-Involved Shooting Leaves Suspect Dead](#). KENS 5 Eyewitness News. 14 March 2015.
- ^{li x x v} Jacobsen, Lauren. [SAPD Officer Kills Man who Opened Fire at North Side Bar](#). *San Antonio Sun Times*. 15 March 2015.
- ^{li x x vi} Cathcart, Corinne. [PA Mall Shooting Suspect Fired ‘Indiscriminately’ in Crowded Store, Cops Say](#). ABC News. 8 February 2015.
- ^{li x x vi i} Murphy, Doyle. [Pittsburgh Mall Shooting Suspect Identified from Instagram Post](#). New York Daily News. 8 February 2015.
- ^{li x x vi ii} Tziperman Lotan, Gal and Harris, David. [Cops: Man Killed Trying to Move Mall Shooting Victim Out of Harm’s Way](#). *Orlando Sentinel*. 18 January 2015.
- ^{li x x x} [Florida Mall to Reopen After Shooting that Left 2 Dead, 1 Injured](#). *Chicago Tribune*. 18 January 2015.

- lxxx Stewart, Sherrel Wheeler. Two Victims Identified in Shooting at UPS Facility in Alabama. Reuters.
- lxxxi CBS Staff and Associated Press. 1 Dead; 2 Wounded in Arizona Casino Shooting. AZ Family News. 3 August 2014
- lxxxii Southall, Ashley and Fitzsimmons, Emma. Five Dead in Shooting Rampage in Las Vegas. New York Times. 8 June 2014.
- lxxxiii Karimi, Faith. Authorities had Three Encounters This Year with Couple in Las Vegas Shooting. CNN. 12 June 2014.
- lxxxiv Sifer, Stephanie. Cops: Columbia, Md. Mall Shooter Had a Columbine Obsession. CBS News. 12 March 2014.
- lxxxv Knickerbocker, Brad. Mall in Columbia: Shooter ID'd as Teenager Darion Marcus Agular. The Cristian Science Monitor. 26 January 2014.
- lxxxvi Sege, Adam and Nickeas, Peter. Victims Identified in Fatal Shooting at Supermarket. Chicago Tribune. 16 January 2014.
- lxxxvii Brown, Stephanie Rex. Crazed Indiana Supermarket Shooter Mused on Facebook about Serial Killers and Going to Hell. New York Daily News. 16 January 2014.
- lxxxviii Upstate New York Shooting Update: Suspected Gunman ID'd as Kurt Myers, Police Say. CBS News. 14 March 2013.
- lxxxix McKinley, Jesse and Santora, Marc. Upstate Man Who Fatally Shot Four Dies in Standoff; Motive Remains Unclear. New York Times. 14 March 2013.
- xc Dowty, Douglass. Herkimer County Deadly Shootings: What You Need to Know. Syracuse.com. 14 March 2013.
- xcI Campbell, Jon and Stanglin, Doug. Cops Kill Suspect in Deadly N.Y. Shooting Rampage. USA Today. 14 March 2013.
- xcII Castillo, Mariano and Holly Yan. Details, But No Answers, in Oregon Mall Shooting. CNN. 13 December 2012
- xcIII Castellano, Anthony. Wisconsin Spa Shooting: Radcliffe Haughton's Estranged Wife Told the Court She Feared Her Husband. ABC News. 23 October 2012
- xcIV CBS Staff. Fla. Salon Manager Filed a Restraining Order Against Alleged Shooter, Bradford Baument, Police Say. CBS News. 19 October 2012
- xcV Hightower, Kyle and Suzette Laboy. Casselberry Salon Shooting: Gunman Kills 3 Women, Self at Las Dominicanas M & M Beauty Salon in Florida. The Huffington Post. 18 October 2012.
- xcVI McGeehan, Patrick. Man Kills Co-Workers and Himself in New Jersey. The New York Times. 31 August 2012.
- xcVII Goode, Erica, Serge F. Kovalski, Jack Healy and Dan Frosch. Before Gunfire, Hints of 'Bad News'. The New York Times. 26 August 2012
- xcVIII Seattle Times Staff. Seattle Shootings: Day of Horror, Grief in a Shaken City. The Seattle Times. 30 May 2012
- xcIX CBS Staff. Ala. Postal Worker Opens Fire in Mail Room. CBS News. 2 December 2011
- c Wade, Natalie. Montgomery Man Indicted on Federal Charges in December Postal Facility Shooting. Montgomery News. 1 March 2012
- cI Santa Cruz, Nicole. Prosecutors Seek Death Penalty in Salon Shooting Case. The Los Angeles Times. 29 November 2011.
- cII Ferral, Katelyn. Suspect Charged in Durham IHOP Shooting. News Observer. 14 October 2011.
- cIII ABC Staff. Man Arrested, Charges in Fatal IHOP Shooting. ABC News. 11 November 2011.
- cIV Keegan, Steve. Gunman Kills 4 at Nevada Pancake House, Shoots Self. Reuters. 7 September 2011
- cV Whale, Robert. Prosecutors Charge Alleged Casino Shooter with Seven Counts of First-Degree Assault. The Auburn Reporter. 3 August 2011
- cVI Associated Press. Assault Charges for WA Man in Casino Shooting. The Seattle Times. 27 July 2011.
- cVII Le, Phuong. 20 Injured in 2 Separate Seattle Shootings. The Washington Times, 25 July 2011
- cVIII Dean, Mensah M. Defendant in Bar Shooting Held for Trial. The Inquirer. 14 December 2011.
- cIX CBS News Staff. Philadelphia Police Charge Suspect in Deadly Nicetown Bar Shooting. CBS News. 28 June 2011
- cX Martinez, Michael and Kyung Lah. Loughner Pleads Guilty to 19 Counts in Tucson, Arizona Mass Shooting. 8 August 2011
- cXI Gryta, Matt and Lou Michel. Grand Jury Indicts McCray in City Grill Killings; Bail Revoked. Buffalo News. 1 September 2010
- cXII Associated Press. Suspect in Deadly Buffalo, NY, Street Shooting Pleads Not Guilty to 4 Counts of Murder. Fox News. 26 August 2010
- cXIII Black, Caroline. Florida Man Kills Four Women in Restaurant Shooting. CBS News. 7 June 2010
- cXIV Red, Christian. Former Yankee, Mets Pitcher Orlando 'El Duque' Hernandez 'in Shock' over Half-Brother's Shootings. The NY Daily News. 9 June 2010
- cXV CBS Staff. Hialeah Shooting, Spree Survivor Recalls Crime. CBS4 News. 16 June 2010

- cxvi Blatt, Shane, Alexis Stevens, Ralph Ellis. [Cobb Shooter Chose Victims at Random, Company Official Says](#). *Cobb County News*. 14 January 2010
- cxvii Gillooly, Jon. [Accused Penske Killer of 3 Enters Plea of Not Guilty](#). *Marietta Daily Journal*. 24 July 2010
- cxviii MyFox Atlanta Staff. [Man Pleads Not Guilty in Penske Shooting](#). *MyFox Atlanta*. 23 July 2010.
- cxix Seattle Times Staff. [Lakewood Police shooting Suspect Killed by Officer in South Seattle Early Today](#). *The Seattle Times*. 1 December 2009
- cxix Yardley, William. [Tacoma Suspect Said to Threaten to Shoot Officers](#). *The New York Times*. 30 November 2009.
- cxxi Kamb, Lewis. [Clemmons' Last Days: A Timeline of Tragedy](#). *News Tribune*. 3 December 2009.
- cxixii Associated Press. [Police Identify Gunman in Saipan Rampage](#). *CBS News*. 22 November 2009
- cxixiii De La Torre, Ferdie. [Gunman Fired Guns More than 40 Times, Saipan Tribune](#). 26 November 2009.
- cxixiv De La Torre, Ferdie. [Shooting Rampage Stuns CNMI](#). *Saipan Tribune*.
- cxixv Associated Press. [Suspect in Wall Bar Shooting Faces Murder Charge](#). *The Washington Times*. 9 November 2009.
- cxixvi Potter, Beth. [One Dead in Vail Bar Shooting; Suspect Jailed](#). *The Denver Post*. 8 November 2009.
- cxixvii Huffington Post Staff. [Richard Moreau Murder Charges: Vail Bar Killer May Have Had PTSD](#). *The Huffington Post*. 8 November 2009.
- cxixviii CTV Staff. [Gunman in Health Club Shooting a 48-Year-Old Loner](#). *CTV*. 5 August 2009.
- cxixix Ferran, Lee, Chris Cuomo, Sarah Netter, and Lindsay Goldwert. [Pa. Gunman 'Hell-Bent' on Killing, Had 4 Guns](#). *ABC News*. 5 August 2009
- cxixxx Pacheco, Walter. [Naked Man Arrested after Shooting at Bar](#). *The Orlando Sentinel*. 10 September 2009.
- cxixxxi WFTV Staff. [Accused Orlando Bar Gunman Denied Bond](#). *WFTV*. 10 September 2009
- cxixxxii WFTV Staff. [Suspect Arrested in Shooting at Downtown Orlando Club](#). *WFTV*. 10 September 2009
- cxixxxiii ABC Staff. [Nightclub Employee Killed in Shooting](#). *ABC News*. 25 July 2009.
- cxixxxiv Supgul, Alexander. [Images from Night of Deadly Club Shooting](#). *MyFox News*. 29 July 2009.
- cxixxxv Stout, David. [Museum Gunman a Longtime foe of Government](#). *The New York Times*. 10 June 2009.
- cxixxxvi Associated Press. [Guard Died after Holocaust Museum Shooting](#). *MSNBC*. 10 June 2009.
- cxixxxvii Guilfoil, John M. [One Dead, Several Injured in Springfield Strip Club Rampage](#). *The Boston Globe*. 30 May 2009.
- cxixxxviii Esposito, Richard. [Binghamton Rampage Leaves 14 Dead, Police Don't Know Motive](#). *ABC News*. 3 April 2009
- cxixxxix Rivera, Ray and Nate Schweber. [Before Killings, Hints of Plans and Grievance](#). *The New York Times*. 4 April 2009
- cxl Perry, Tony. [Man Shoots 2 Co-workers; 1 Died](#). *The Los Angeles Times*. 25 March 2009.
- cxli Stickney, R. and Monica Dean. [MIS Shooter, Victim Identified](#). *NBC San Diego*. 24 March 2009
- cxliii 10 News Staff. [Motive Remains Mystery in Bus Depot Shooting](#). *San Diego 10 News*. 25 March 2009
- cxliiii Dade, Corey. [Mardi Gras Revives, but Shooting Scars Party](#). *The Wall Street Journal*. 25 February 2009
- cxliiv [United Stated of America v. Mark Brooks](#). 10-202. U.S. District Court Eastern District of Louisiana.
- cxliv Filosa, Gwen. [Jury Frees 19-year-old New Orleans Man of 2009 Mardi Gras Parade Shooting Charge](#). *Times-Picayune*. 26 August 2010.
- cxlvi Filosa, Gwen. [Prosecutors Work to Keep Cases Touched by Danziger Bridge Investigation on Track](#). *Times-Picayune*. 8 April 2010.
- cxlvii Miletich, Steve. [Washington Exchange Student from Peru among Portland Shooter's Victims](#). *The Seattle Times*. 26 January 2009
- cxlviii Associated Press. [Gunman in Portland, Oregon Shooting Spree Dies](#). *MSNBC*. 27 January 2009.
- cxlix Journal Staff. [Four, Including Gunman, Killed in Bank Shooting](#). *McComb-Enterprise Journal*. 12 March 2008.
- cl Times Online Staff. [Police Baffled by Mystery of Gunman Who Shot Dead Firefighter at Wendy's](#). *The Times Online*. 4 March 2008
- clii Associated Press. [Teen's Downward Spiral Ends in Gunfire, Death](#). *MSNBC*. December 6, 2007
- cliii CNN Staff. [Police: Nine Killed in Shooting at Omaha Mall, Including Gunman](#). *CNN*. 6 December 2007
- cliii Associated Press. [Omaha Mall, Scene of Mass Killing, Reopens](#). *CBS News*. 8 December 2007.

- cliv Associated Press. [Police: Kansas City Mall Shooter Disgruntles over Denied Security Job License](#). *Fox News*. 30 April 2007.
- clv KMBC Staff. [Police: Gunman Wanted to Cause Havoc at Mall](#). *KMBC*. 30 April 2007
- clvi [The Estate of Luke A. Nilges, Joann Nilges, and Wayne Nilges v. Shawnee Gun Shop](#). Kansas State Court of Appeals. 103, 175.
- clvii Alfano, Sean. [Police: Off-Duty Cop Saved Lives in Mall](#). *CBS News*. 13 February 2007
- clviii Stolz, Martin. [After a Rampage, Trying to Grasp What Led a Son to Kill](#). *The New York Times*. 20 February 2007.
- clix Associated Press. [Man Kills Woman, 2 Others](#). *MSNBC*. 18 April 2006.
- clx The New York Times Staff. [National Briefing, Midwest: Missouri: Another Victim in Shooting Rampage](#). *The New York Times*. 22 April 2008
- clxi Kohler, Jeremy. [I Could Have Stopped Them](#). *St. Louis Post-Dispatch*. 20 April 2006
- clxii Collins, Chris. [Shooting Car Was Allegedly Suspect's Last Act](#). *Baker City Herald*. 7 April 2006.
- clxiii Mid-Hudson News Staff. [Bonelli to Appear in Court](#). *Mid-Hudson News*. 15 March 2006.
- clxiv CNN Staff. [Shooter Wounds Two at New York Mall](#). 13 February 2005.
- clxv Lyman, Rich and Albert Sawato. [After a Concert Shooting, a Who but Not a Why](#). *The New York Times*. 10 December 2004.
- clxvi Esterbrook, John. [Inside the Mind of a Killer](#). *CBS News*. 10 December 2004.
- clxvii Thompson, Jamie and Carrie Johnson. [Gunman Kills Two, Self at Gateway Mall](#). *St. Petersburg Times*. 19 November 2004.
- clxviii Thompson, Jamie and Carrie Johnson. [Shooting is Last Act of a Traumatic Violent Life](#). *St. Petersburg Times*. 19 November 2004.
- clxix Associated Press. [Low Dead in a Tennessee Store Shooting](#). *The Los Angeles Times*. 30 August 2003
- clxx Seattle Times Staff. [Man Kills Shop Owner, Self in Pursuit of Ex-Girlfriend](#). *The Seattle Times*. August 31, 2003
- clxxi WPBF Staff. [Man Shoots Estranged Wife, Co-Worker at Garden Center](#). *WPBF*. 29 July 2003
- clxxii Associated Press. [Two Women Dead, One Hurt in San Antonio Office Shooting](#). *Fox News*. 24 July 2003.
- clxxiii Venturo, Jim. [Police: Shooter Was 'Control Freak'](#). *Laredo Morning Times*. 25 July 2003
- clxxiv Curry, Matt. [Guilty Verdict in Car Wash Killings](#). *ABC News*. 26 September 2000.
- clxxv Associated Press. [Postal Worker Kills Self after Fatal Rampage](#). *The Los Angeles Times*. 20 December 1997.
- clxxvi Associated Press. [Gunman Kills 2, Takes Own Life](#). *The Victoria Advocate*. 8 October 1997
- clxxvii Brown, Chip. [Three Dead, One Wounded in Shooting at San Antonio Business](#). *Associated Press*.
- clxxviii New York Times Staff. [Postal Worker Shoots 2 and then Kills Himself](#). *The New York Times*. 3 September 1997
- clxxix CNN Staff. [Gunman Shoots 7, Kills Self at Empire State Building](#). *CNN*. 24 February 1997.
- clxxx Time Staff. [Post Office Murder](#). *Time Magazine*. 17 May 1993.
- clxxxi New York Times Staff. [Ex-Postal Employee Is Arrested in Deaths of Two in California](#). *The New York Times*. 9 May 1993
- clxxxii Cone, Marle and Jodi Wilgoren. [Fired Mail Carrier Said to be Manic-Depressive](#). *The Los Angeles Times*. 7 May 1993.
- clxxxiii Levin, Doron P. [Ex-Postal Worker Kills 3 and Wounds 6 in Michigan](#). *The New York Times*. 15 November 1991
- clxxxiv Hayes, Thomas C. [Gunman Kills 22 and Himself in Texas Cafeteria](#). *The New York Times*. 17 October 1991
- clxxxv New York Times Staff. [Services Conducted in New Jersey for Slain Postal Service Workers](#). *The New York Times*. 15 October 1991.
- clxxxvi Gorman, Tom and Richard Serrano. [Postal Employee Kills Wife, 2 Co-Workers](#). *The Los Angeles Times*. 11 August 1989
- clxxxvii Associated Press. [Mail Handler Shoots 3 at Post Office](#). *The Los Angeles Times*. 15 December 1988
- clxxxviii Washington Post Staff. [3 Shot in New Orleans as Suspect Holes Up](#). 15 December 1988
- clxxxix Bell, Rachael. [Workplace Homicide](#). *TruTV*.
- cxcc Barringer, Felicity. [Postal Officials Examine System after 2 Killings](#). *The New York Times*. 8 May 1993
- cxci Associated Press. [ClearKills Fellow Worker, Wounds Two in Shooting Spree at Atlanta Post Office](#). *The Los Angeles Times*. 7 March 1985.

- ^{ccxi} Gresko, Jessica. [20 Years Later, San Ysidro McDonald's Massacre Remembered](#). *Associated Press*. 18 July 2004.
- ^{ccxiii} Coleman, Loren. [The Copycat Effect: How the Media and Popular Culture Trigger the Mayhem in Tomorrow's Headlines](#) (New York: Simon and Schuster, 2004), pg. 151.
- ^{ccxiv} Associated Press. [Postal Worker Held in Death of Postmaster, Ocala Star-Banner](#). 3 December 1983
- ^{ccv} Barringer, Felicity. [Postal Officials Examine System after 2 Killings](#). *The New York Times*. 8 May 1993
- ^{ccvi} Ames, Mark. [Excerpt: Breaking Down at the Post Office](#). *AlterNet*. 3 October 2005
- ^{ccvii} Times Staff. [Murderer's Row](#). *Times Magazine*. 30 August 1982.
- ^{ccviii} Walsh, Anthony. [Race and Crime: A Biosocial Analysis](#) (Nova Science Publishers, Inc., 2004, pp. 38-39.
- ^{ccix} Hustmyre, Chuck. [Notorious Murders: Mark Essex](#). *TruTV*.
- ^{cc} Friedenberg, Amy, [Two Dead, Three Injured in Shooting at FreightCar America in Roanoke](#). *The Roanoke Times*. 25 October 2016.
- ^{cci} Associated Press, [Workplace Shooting at Virginia Rail Car Plant Leaves Two Dead, Including Gunman](#). *Fox News*. 25 October 2016.
- ^{ccii} Silverstein, Jason, [Two People Dead in Murder-Suicide Shooting Attack at Car Manufacturing Plant](#). *New York Daily News*. 25 October 2016.
- ^{cciii} Silverstein, Jason ["South Dakota Man Jeffrey DeZeeux Shoots Two Steel Workers After Dispute, Killing One, then Kills Himself: Cops"](#). *New York Daily News*. 14 February 2015.
- ^{cciv} Walker, Mary and Leader, Argus ["Authorities ID Shooter, Victims in Lennox Shooting"](#). *Argusleader.com*. 13 February 2015.
- ^{ccv} Bult, Laura; Ng, Alfred; and Moore, Tina. [Gunman, 54, Shoots Two, Kills Self in Brooklyn: Cops](#). *New York Daily News*. 1 July 2014.
- ^{ccvi} Goodman, David and Surico, John. [Job Seeker Wounds 2 Then Kills Himself at Brooklyn Workshop, Police Say](#). *New York Times*. 30 June 2014.
- ^{ccvii} Watkins, Tom Police: [FedEx Worker Wounds 6 in Georgia, then Kills Himself](#). *CNN*. 30 April 2014.
- ^{ccviii} Ganns, William. [Georgia FedEx Gunman Used Shotgun to Injure Six, Shoot Himself, Police Said](#). *ABC News*. 29 April 2014.
- ^{ccix} Marcum, Diana. [Man Shoots Four Co-Workers, Two Fatally, at Fresno Poultry Plant](#). *The Los Angeles Times*. 7 November 2012.
- ^{ccx} Marcum, Diana. [Fresno Chicken Plant Gunman Tried to Shoot Fifth Co-Worker, Police Say](#). *The Los Angeles Times*. 7 November 2012.
- ^{ccxi} Adkisson, Jim Brumm and Michelle Nichols. [Untitled](#). *Reuters*. 13 January 2012.
- ^{ccxii} Donald, Brooke. [Shareef Allman Killed Himself](#). *The Huffington Post*. 12 October 2011
- ^{ccxiii} La Ganga Maria L., Lee Romney, and Sam Quinones. [Manhunt Continues for Suspect in California Quarry Shooting](#). *The Los Angeles Times*. 6 October 2011.
- ^{ccxiv} Graham, Troy, Mike Newall, and Michael Brocker. [Before Kraft Shooting Rampage Growing Alarm over Suspect's Behavior](#). *The Philadelphia Inquirer*. 11 September 2010.
- ^{ccv} Alfano, Sean. [Suspended Female Employee Guns down Two in Shooting Spree at Kraft Factory in Philadelphia](#). *The NY Daily News*. 10 September 2010.
- ^{ccvi} River, Ray and Christin Haughney. [Amid Mourning, Eerie Details Emerge about Connecticut Shooting](#). *The New York Times*. 4 August 2010.
- ^{ccvii} Associated Press. [Police: Conn. Warehouse Gunman Targeted Manager](#). *Fox News*. 4 August 2010
- ^{ccviii} Associated Press. [9 Dead in Shooting at Connecticut Beer Distributor](#). *MSNBC*. 4 August 2010.
- ^{ccix} Friedman, Emily. [911 Tapes from Connecticut Shooting describe Gunman's Deadly Rampage](#). *ABC News*. 4 August 2010.
- ^{ccx} CNN Staff. [Police Investigating Motive for Shooting in St. Louis that Left 1 Dead](#). *CNN*. 8 January 2010.
- ^{ccxii} Robbins, Liz. [Gunman Kills 3 Co-Workers in St. Louis Factory and then Himself](#). *The New York Times*. 7 January 2010.
- ^{ccxiii} CBS Staff. [Former Employee Arrested in Deadly Pa. Shooting](#). *CBS News*. 2 August 2008
- ^{ccxiv} ABC Staff. [Former Employee Kills Two at Bristol Warehouse](#). *ABC News*. 2 August 2008.
- ^{ccxv} Driehaus, Bob. [Man in Kentucky Kills 5 Co-Workers](#). *The New York Times*. 25 June 2008.
- ^{ccxvi} Channel Staff. [1 Dead, 1 Wounded in Workplace Shooting](#). *The Boston Channel*. 1 April 2008.
- ^{ccxvii} Enterprise News Staff. [Family of Randolph Shooting Victim Gropes for Answers](#). *Enterprise News*. 1 April 2008.

- ccxxvii Keyt Staff. [Lee Leeds Makes Court Appearance](#). *Keyt*. 1 April 2008
- ccxxviii Associated Press. [Son of Owner Held in Santa Maria Maria Wrecking Yard Slayings](#). *North County Times*. 20 March 2008.
- ccxxix Associated Press. [2 Die in Shootings at Water Plant](#). *The Los Angeles Times*. 28 April 2007.
- ccxxx Garvey, Megan. [Man Wounds 3 Co-workers and then Kills Himself in Signal Hill](#). *The Los Angeles Times*. 6 March 2007
- ccxxxi Associated Press. [4 Hurt in Ind. Workplace Shooting](#). *USA Today*. 11 January 2007.
- ccxxxii Denver Channel Staff. [Suspect, Victims in Safeway Shooting Rampage Identified](#). *The Denver Channel*. 27 June 2006.
- ccxxxiii Associated Press. [Gunman Killed after Fatal Denver Shooting](#). *The New York Times*. 26 June 2006.
- ccxxxiv Associated Press. [Suspended Worker Opens Fire at Plant](#). *Milwaukee Journal Sentinel*. 21 April 2006.
- ccxxxv Associated Press. [Police Look for Motive in Deadly Postal Shooting](#). *MSNBC*. 31 January 2006.
- ccxxxvi Archibold, Randal C. [Death Toll Climbs to 8 in California Postal Plant Rampage](#). *The New York Times*. 2 February 2006.
- ccxxxvii Associated Press. [Fired Man Shoots Supervisors, Himself](#). *USA Today*. 23 November 2005.
- ccxxxviii Horseman, Jeff and Penny Riordan. [Shooting Victims Out of Hospital](#). *The Maryland Gazette*. 26 November 2005.
- ccxxxix Holl, John. [Shot on Job, Woman Dies 4 Days Later](#). *The New York Times*. 1 October 2005.
- ccxl Doherty, John and Alexa James. [Fired Sex Offender Shoots 3, Kills Self](#). *Times Held-Record*. 27 September 2005
- ccxli O'Donnell, Michelle and John Holl. [Ex-Employee Kills Himself after Shooting 3 in Factory](#). *The New York Times*. 27 September 2005.
- ccxlii Lost Angeles Times Staff. [Two Hurt in Shipyard Shooting; Worker Held](#). *The Los Angeles Times*. 22 February 2005.
- ccxliiii Associated Press. [Suspect in Miss. Shipyard Shooting Held](#). *Fox News*. 21 February 2005.
- ccxliv Associated Press. [Autoworker's Grudge Turns Deadly](#). *CBS News*. 27 January 2005.
- ccxlv Windau, George. [Pressure Led to Shootings at Jeep](#). *Labor Notes*. 1 March 2005.
- ccxlii Associated Press. [Six Dead in Kansas Workplace Shooting](#). *MSNBC*. 3 July 2004.
- ccxliiii Moaveni, Azadeh. [Man Fatally Shoots Worker, then Himself](#). *The Los Angeles Times*. 10 December 2003.
- ccxliiiii Kropko, R. [Man Threatened Suicide before Factory Shooting, His Parents Say](#). *Associated Press*. 21 August 2003.
- ccxlix Murphy, Jarrett. [Six Dead in Mississippi Massacre](#). *CBS News*. 9 July 2003.
- ccli Sioca, Paul. [Three Killed, Several Injured in Shooting at Missouri Manufacturing](#). *Associated Press*. 2 July 2003.
- cclii Wilgoren, Jodi. [Indiana Factory Shooting Leaves 2 Dead and 6 Hurt](#). *The New York Times*. 7 December 2001.
- ccliiii Fountain, John W. [Factory Feud Is Cited in Shooting in Indiana](#). *The New York Times*. 8 December 2001.
- ccliiiii Hull, Katina. [Factory Gunman in Indiana Rampage is 'Love Triangle'](#). *Laredo Morning Times*. 8 December 2001.
- cclv Associated Press. [Five Workers Die in Shooting Rampage at Chicago Navistar Plant](#). *Lubbock Avalanche-Journal*. 6 February 2001.
- cclvi [State v. Wise](#). 25819, South Carolina Judicial Department, May 11, 2004
- cclvii Collins, Jeffrey. [Hastings Wise a Volunteer for Execution; His Is Scheduled for This Evening](#). *The Times and Democrat*.
- cclviii Quinn, Joshua. [Arthur Hastings Wise Put to Death for Aiken Murders](#). *NBC Augusta*. 16 August 2007.
- cclviiii Gold, Matea and John Cox. [Gunman Felt He Was Taunted, Police Say](#). *The Los Angeles Times*. 7 June 1997.
- cclix New York Times Staff. [6 Dies in Texas Office Shooting](#). *The New York Times*. 4 April 1995.
- cclix Shannon, Kelly. [Employee Kills 5, Self at Texas Refinery](#). *Associated Press*. 5 April 1995.
- ccli Associated Press. [Some Recent Workplace Shootings](#). *Seattle Times*. 31 July 1999.
- ccliii [Across the Nation](#). *Seattle Times*. 15 March 1994.
- ccliiii Associated Press. [Worker on Disability Leave Kills 7, then Himself, in Printing Plant](#). *The New York Times*. 15 September 1989.
- ccliiv Associated Press. [Records Show Killer Having Mental Illness](#). *The Victoria Advocate*. 24 September 1989.

- ccixv McPherson, Mark. [Video of Antigo Prom Shooting Released: Officer Cleared](#). ABC News. 14 July 2016.
- ccixvi McLaughlin, Elliott. [Suspect in Wisconsin Prom Shooting Dies, Police Say](#). CNN. 24 April 2016.
- ccixvii [Sheriff: Madison Jr./ Sr. High School Shooter Got Gun from a Family Member](#). WCPO Cincinnati. 9 February 2016.
- ccixviii Knight, Cameron. [School Shooter: Family Trouble Led to Gunfire](#). Cincinnati.com. 17 June 2016.
- ccixix Healy, Jack and Lovett, Ian. [Oregon Killer Described as Man of Few Words, Except on Topic of Guns](#). [New York Times](#). 2 October 2015.
- ccxx Mai-Duc, Christine. [Gun-Obsessed, Timid and His Mom Called Him 'Baby': What We Know of Chris Harper-Mercer](#). [Los Angeles Times](#). 2 October 2015.
- ccxxi [Oregon Shooting on College Campus Leaves 10 Dead](#), Associated Press. 1 October 2015.
- ccxxii Racine, Hope. [What Kind of Guns Did the Oregon Shooter Use? Christ Harper Mercer Was Found with More Than One Weapon](#). [Bustle.com](#). 2 October 2015.
- ccxxiii Waters, TaMaryn and Dobson, Byron. [FSU's Strozler Library Shooter: A Look Insider Myron May's Inner Turmoil](#). [Tallahassee.com](#). 9 January 2015.
- ccxxiv Goldstein, Sasha. [Florida State Surveillance Video Shows Gunman Myron May Unload on Victims at Strozler Library](#). [The New York Daily News](#). 29 January 2015.
- ccxxv Javier, Liza. [Marysville Shooting Victim Andrew Fryberg, 15, Dies, K5 NBC News](#). 7 November 2014.
- ccxxvi Johnson, Kirk. [Washington School Gunman Used Texts to Gather Victims at Lunch, Police Say](#). [The New York Times](#). 27 October 2014.
- ccxxvii Landler, Mark and Van Der Voo, Lee. [Oregon Shooting Draws Obama's Outrage on Gun Laws](#). [New York Times](#). 10 June 2014.
- ccxxviii DiBlasio, Natalie; Bacon, John; and Winter, Michael. ['A Very Tragic Day': Student, Teen Gunman Dead at Oregon High School](#). [USA Today](#). 10 June 2014.
- ccxxix Johnson, Kirk. [Shooting Leaves One Dead at Seattle Pacific University](#). [New York Times](#). 5 June 2014.
- ccxxx [Murder Charges Filed in Seattle Pacific University Shooting](#). CBS News. 10 June 2014.
- ccxxxi KOAT Staff. [Roswell School Shooter Received Maximum Sentence](#). [KOAT 7 ABC](#). 5 January 2015.
- ccxxxii Martinez, Michael. [1 Student Critical, 1 Stable after Boy Opens Fire in New Mexico Middle School Gym](#). [CNN](#). 15 January 2014.
- ccxxxiii Muskal, Michael. [Coroner: Colorado School Shooter Killed Himself with Shotgun Blast](#). [Los Angeles Times](#). 16 December 2013.
- ccxxxiv [Sheriff: Wounded Colorado Student a Victim of Evil Act](#). CBS News. 14 December 2013.
- ccxxxv Carter, Chelsea and Watkins, Tom. [Colorado School Shooter Wanted 'Revenge' on Faculty, Sheriff Says](#). [CNN](#). 13 December 2013.
- ccxxxvi McAndrew, Siobhan. [Friends, Family Say Middle School Shooter was Gentle Boy](#). [USA Today](#). 11 November 2013.
- ccxxxvii [Parents of Nevada School Shooter Say He was Teased](#). CBS News. 4 November 2013.
- ccxxxviii Botelho, Greg and Friedman, Chandler. [Police: Student Shot Two Women at Virginia Community College Before Being Subdued](#). [CNN](#). 12 April 2013.
- ccxxxix Powerll, Melissa. [Macinnis to Serve 38 Years for Shooting at New River Mall](#). [The Roanoke Times](#). 23 June 2014.
- ccxc Associated Press. [Teen Shooter who Opened Fire at Taft Union High School in California to be Tried as an Adult](#). [New York Daily News](#). 14 January 2013.
- ccxci Wilson, Stan and Martinez, Michael. [Teen Pleads Not Guilty in California School Shooting](#). [CNN](#). 15 January 2013.
- ccxcii [California School Shooting: Alleged Gunman, Bryan Oliver, Pleads Not Guilty to Attempted Murder](#). CBS News. 16 January 2013.
- ccxciii Barron, James. [National Reels After Gunman Massacres 20 Children at School in Connecticut](#). [The New York Times](#). 14 December 2012.
- ccxciv Jaffe, Greg. [Adam Lanza Is Recalled as a 'Rambunctious Kid' with Family Problems](#). [The Washington Post](#). 15 December 2012.
- ccxcv Stoller, Gary and Oren Norrell. [Classmate Says Adam Lanza Attended Sandy Hook School](#). [USA Today](#). 19 December 2012.
- ccxcvi Onishi, Norimitsu and Malia Wollan. [Troubled History emerges for Suspect in Oakland Shootings](#). [The New York Times](#). 3 April 2012.
- ccxcvii CBS Staff. [One L. Goh, Oikos University Gunman, Kills 7 People 'Execution Style' Say Police](#). [CBS News](#). 3 April 2012.
- ccxcviii Muskal, Michael. [Ohio School Shooting: T.J. Lane Pleads Not Guilty of Killing 3](#). [The Los Angeles Times](#). 8 June 2012.
- ccxcix Welch, Chris. [Slain Assistant Principal Sent Student Home Because of Trespass Charge](#). [CNN](#). 6 January 2011.
- ccc Associated Press. [School Board Shooting: Clay Duke Kills Self after Pulling Gun at Meeting](#). [The Washington Post](#). 15 December 2010.

cccī Mandell, Nine, Meena Hartenstein, and Michael Sheridan. [School Board Shooting: Florida Man Clay Duke Opens Fire at Meeting, Kills Himself, Police Say](#). NY *Daily News*.

cccii Krueger, Paul, Lindsay Hood, Eric S. Page, and Michelle Wayland. [Details Emerge about School-Shooting Suspect](#). *NBC San Diego*. 11 October 2010

ccciii Spagat, Elliot. [School Shooting Suspect Pleads Not Guilty](#). *SFGate*. 14 October 2010.

ccciv Associated Press. [Texas: Gunfire at a University](#). *The New York Times*. 29 September 2010.

cccv Associated Press. [Student Opens Fire at UT Austin, Kills Self](#). *CBS News*. 28 September 2010.

cccvi Smith, Rain. [We Have a Man with a Gun at Central High School...He's Ready to Shoot... Listen to the 911 Calls](#). *Times News*. 31 August 2010

cccvii Smith, Rain. [Police Officers Kill Gunman at Sullivan Central](#). *Times News*. 30 August 2010.

cccviii Urbina, Ian. [Ohio State Employee Kills Co-Worker, the Self, Police Say](#). *The New York Times*. 9 March 2010.

cccix Mason, Everdeen. [Updated: OSU Janitor Kills a Supervisor, Wounds Another, then Shoots and Kills Himself](#). *The Lantern*.

cccx Bartley, Nancy and Christine Clarridge. [Slain Tacoma Teacher Has Been Harassed by Gunman for Years](#). *Seattle Times*. 26 February 2010.

cccxi DeGuerin Miller, Carlin. [David Benke, Hero Teacher: Hailed for Tackling Gunman](#). *CBS News*. 25 February 2010.

cccxi Mitchell, Kirk. [Suspect's Dad Laments Lack of Mental-Health Care](#). *Denver Post*. 28 February 2010.

cccxi USA Today Staff. [Alabama Campus Reels after Shooting](#). *USA Today*. 15 February 2010.

cccxi DiGiacomo, Janet. [Three Wounded in Hampton University Shooting](#). *CNN*. 26 April 2009.

cccxi Associated Press. [Richmond Man charged in Hampton University Shooting](#). *WSAV*. 11 March 2009.

cccxi Click On Detroit Staff. [3 Arraigned on Murder Charges for Shooting](#). *Click On Detroit*. 20 October 2008.

cccxi MSNBC Staff. [College Shooter's Deadly Rampage Baffles Friends](#). *MSNBC*. 16 February 2008.

cccxi Associated Press. [List of Recently Deadly Campus Shootings](#). *USA Today*. 15 February 2008.

cccxi Simpson, Doug. [Student Kills 2, Self at L.A. College](#). *Associated Press*. 8 February 2008.

cccxi Newman, Maria and John Holusha. [Man Committed Both Colo. Shootings, Police Say](#). *The New York Times*. 10 December 2007.

cccxi Associated Press. [Colorado Church Gunman Sought Revenge after He Was Kicked out of Missionary Training](#). *Fox News*. 11 December 2007.

cccxi Marrapodi, Eric. [Colorado Gunman Killed Himself](#). *CNN*. 11 December 2007.

cccxi Maag, Chris and Ian Urbina. [Student, 14, Shoots 4 and Kills Himself in Cleveland School](#). *The New York Times*. 11 October 2007.

cccxi Associated Press. [Victim in Delaware State University Shooting Dies of Injuries](#). *Fox News*. 23 October 2007.

cccxi Kinzie, Susan. [Freshman Charged in Shooting of Two at Delaware State](#). *The Washington Post*. 25 September 2007.

cccxi <http://www.governor.virginia.gov/TempContent/techPanelReport.cfm> Report of the Virginia Tech Review Panel. *Virginia Tech Review Panel*.

cccxi CNN Staff. [Fifth Girl Dies after Amish School Shooting](#). *CNN*. 3 October 2006.

cccxi Associated Press. [Wisconsin Principal Dies after School Shooting](#). *USA Today*. 30 September 2006.

cccxi New York Times Staff. [Teenager is Accused of Multiple Shootings](#). *The New York Times*. 1 September 2006.

cccxi Karas, Beth. [Man Obsesses with Columbine Convicted of Murder](#). *CNN*. 21 August 2009.

cccxi Avarid, Christian. [Beyond Abuse: Putting the Essex Murders in Context](#). *Vermont Guardian*. 1 September 2006.

cccxi Associated Press. [Suspect in Vermont School Shooting Rampage Pleads Not Guilty](#). *Fox News*. 25 August 2006.

cccxi Associated Press. [Two Hurt in Middle School Shooting](#). *Fox News*. 14 March 2006.

cccxi Associated Press. [Boy in School Shooting May Be Tried as an Adult](#). *MSNBC*. 9 November 2005.

cccxi Associated Press. [High School Shooting Sprees Leaved 10 Dead](#). *Fox News*. 22 March 2005.

cccxi BBC Staff. [Town Reels from Teenage Killing](#). *BBC News*. 22 March 2005.

cccxi Santora, March. [Student Opens Fire at High School near Albany, Hitting a Teacher](#). *The New York Times*. 10 February 2004.

- cccxviii Associated Press. [Teen Convicted of Murder in Rocori High School Shootings](#). *Minnesota Public Radio*. 18 July 2005.
- cccxviii Associated Press. [Veteran Teacher Called Hero in Cold Spring School Shootings](#). *Minnesota Public Radio*. 25 September 2003.
- cccxli Associated Press. [School Board Meeting Onlookers Thwart Attack by Maintenance Worker](#). *Tuscaloosa News*. 19 July 2003.
- cccxlii Hakim, Danny. [Ex-Employee Held in Campus Attack](#). *The New York Times*. 11 May 2003.
- cccxliii Broder, M. [Arizona Gunman Chose Victims in Advance](#). *The New York Times*. 30 October 2002.
- cccxliiii Lueck, Thomas J. [3 Slain at Law School; Student is Held](#). *The New York Times*. 17 January 2002.
- cccxliiv Cook, Rebecca. [Professor Shot in Tacoma](#). *ABC News*.
- cccxlv Krikorian, Greg. [Violence Marks Life of School Gunfire Suspect](#). *The Los Angeles Times*. 23 April 2001.
- cccxlvi CNN Staff. [Suspect Had Talked about Shooting at School](#). *CNN*. 5 March 2001.
- cccxlvii Michigan Daily Staff. [2 Dead, 12 Hurt in Rampage](#). *Michigan Daily*. 6 March 2001.
- cccxlviii Ruble, Renee. [Four Wounded in Oklahoma School Shooting; Suspect in Custody](#). *Associated Press*. 6 December 1999.
- cccxlix Time Staff. [Just a Routine School Shooting](#). *Time Magazine*. 31 May 1999.
- cccl Lindenberger, Michael A. [Ten Years after Columbine, It's Easier to Bear Arms](#). *Time Magazine*. 20 April 2009.
- cccli Toppo, Greg. [10 Years Later, the Real Story behind Columbine](#). *USA Today*. 14 April 2009/
[School Violence](#). *University of Michigan*.
- cccliii O'Meara, Kelly Patricia. [Doping Kids](#). *Insight on the News*. 28 June 1999.
- cccliv Avila, Jim, Reynolds Holding, Terri Whitcraft and Beth Tribolet. [School Shooter: I Didn't Realize They Would Die](#). *ABC News*. 11 June 2008.
- ccclv Verhiovek, Sam Howe. [Teenager to Spend Life in Prison for Shootings](#). *The New York Times*. 11 November 1999.
- ccclvi Bragg, Rick, et. al. [From Wild Talk and Friendship to Five Deaths in a School Yard](#). *The New York Times*. 29 March 1998.
- ccclvii Heard, Kenneth. [Public Defenders Agency to Pay for Jonesboro Shooters Civil Case](#). *Arkansas Democrat Gazette*. 27 July 1999.
- ccclviii Bragg, Rick. [Judge Punishes Arkansas Boys Who Killed 5](#). *The New York Times*. 12 August 1998.
- ccclix Bragg, Rick. [5 Are Killed at School; Boys, 11 and 13 are Held](#). *The New York Times*. 25 March 1998.
- ccclx Times Staff. [Boy, 14, Charged in Shooting at School](#). *The Los Angeles Times*. 20 December 1997.
- ccclxi Grace, Julie. [When the Silence Fell](#). *Time Magazine*. 24 June 2001.
- ccclxii CNN Staff. [Third Student Dies in Kentucky School Shooting](#). *CNN*. 2 December 1997.
- ccclxiii Chua-Eoan, Howard. [Mississippi Gothic](#). *Time Magazine*. 24 June 2001.
- ccclxiv CNN Staff. [Teen Pleads Innocent in High School Shooting](#). *CNN*. 2 October 1997.
- ccclxv Avila, Jim, Reynolds Holding, Terri Whitcraft and Beth Tribolet. [School Shooter: I Didn't Realize They Would Die](#). *ABC News*. 11 June 2008.
- ccclxvi CBS Staff. [Rage: A Look at a Teen Killer](#). *CBS News*. 7 March 2001.
- ccclxvii Coleman, Loren. [The Copycat Effect: School Shootings and Recommendations](#). *The Public Entity Risk Institute*. 2004.
- ccclxviii Lieberman, Joseph A. [School Shootings: What Every Parent and Educator Needs to Know to Protect our Children](#) (New York: Kensington Publishing Corp., 2008), P. 37
- ccclxix Childs, Celin. [Barry Loukaitis: Teenage Killer](#). *Associated Content*. 28 November 2007.
- ccclxx Tizon, Alex. [Scarred by Killings, Moses Lake Asks: What Has This Town Become?](#) *Seattle Times*. 23 February 1997.
- ccclxxi Fitten, Ronald K. and Arthur Santana. [Teen's Trial a No-Win Case – Loukaitis' Attorney Calls for New Kind of Verdict: Guilty but Mentally Ill](#). *Seattle Times*. 25 September 1997.
- ccclxxii Leung, Rebecca. [Student Serving Life Sentence for Killing Two Teacher, One Friend](#). *CBS News*. 14 April 2004
- ccclxxiii Goodstein, Laurie and William Glaberson. [The Well-Marked Roads to Homicidal Rage](#). *The New York Times*. 10 April 2000.

- ccclxxiv Langford, James R. [Teen's Life Full of Contradictions – The 15-Year-Old Who Shot Two Teachers and Then Himself Hinted That He Would Not Be Alive Much Longer](#). *August Chronicle*. 22 October 1995.
- ccclxxv Lieberman, Joseph A. *School Shootings: What Every Parent and Educator Needs to Know to Protect our Children* (New York: Kensington Publishing Corp., 2008) p. 339.
- ccclxxvi New York Times Staff. [Man Fired Shotgun in School, Killing One and Injuring 3](#). *The New York Times*. 8 November 1994.
- ccclxxvii Buckley, Jerry. [The Tragedy in Room 108](#). *U.S. News*. 31 October 1993.
- ccclxxviii Lieberman, Joseph A. *School Shootings: What Every Parent and Educator Needs to Know to Protect our Children* (New York: Kensington Publishing Corp., 2008) p. 336.
- ccclxxix DePalma, Anthony. [Questions Outweigh Answers in Shooting Spree at College](#). *The New York Times*. 28 December 1992.
- ccclxxx [RLI Insurance Company vs. Simon's Rock Early College & Others](#). *FindLaw*.
- ccclxxxi Lieberman, Joseph A. *School Shootings: What Every Parent and Educator Needs to Know to Protect our Children* (New York: Kensington Publishing Corp., 2008) p. 336.
- ccclxxxii Stuter, Lynn M. [Weapons of Violence in Schools since 1990](#). *Learn USA*. March 2005.
- ccclxxxiii Gladstone, Mark and Carl Ingram. [Man Surrenders after Terrorizing School](#). *The Los Angeles Times*. 2 May 1992.
- ccclxxxiv Sommerfield, Meg. [Classes to Resume at California School where Gunman Killed 4 and Wounded 9](#). *Education Week*. 13 May 1992.
- ccclxxxv Marriot, Michel. [Iowa Gunman Was Torn by Academic Challenge](#). *The New York Times*. 4 November 1991.
- ccclxxxvi Maravetz, Steve. [Remembering November 1: A University Tragedy 10 Years Later](#). *FYI Faculty & Staff News*. October 2001.
- ccclxxxvii Reinhold, Robert. [After Shooting, Horror but Few Answers](#). *The New York Times*. 19 January 1989.
- ccclxxxviii Time Staff. [Slaughter in a School Yard](#). *Time Magazine*. 24 June 2001.
- ccclxxxix Larson, Erik. [The Story of a Gun](#). *The Atlantic*. January 1993.
- ccclcx Lieberman, Joseph A. *School Shootings: What Every Parent and Educator Needs to Know to Protect our Children* (New York: Kensington Publishing Corp., 2008) p. 336.
- ccclcxii Associated Press. [Man Held in School Shooting Is Depicted as Jobless](#). *The New York Times*. 28 September 1988.
- ccclcxiii Associated Press. [Second Victim Dies after School Shooting Incident](#). *The New York Times*. 30 September 1988.
- ccclcxiv ABC Staff. [School Shooting Remembered 20 Years Later](#). *ABC News*. 20 May 2008.
- ccclcxv Walsh, Mark. [Winnetka School's Staff Is Praised for Courage amid Shooting Spree](#). *Education Week*. 1 June 1988
- ccclcxvi Halperin, Jennifer. [The Education of a Crusader](#). *Northern Illinois University Libraries*. 14 December 1993
- ccclcxvii Associated Press. [Failing Grade Is Linked to Shooting of Teacher](#). *The New York Times*. 6 December 1986.
- ccclcxviii Iwanski, Len. [Student on Rampage Kills Teacher, Hurts 3](#). *The Free-Lance Star*. 5 December 1986.
- ccclcxix Lieberman, Joseph A. *School Shootings: What Every Parent and Educator Needs to Know to Protect our Children* (New York: Kensington Publishing Corp., 2008) p. 336.
- cd Associated Press. [Connecticut Student Held in Shooting Death of Custodian](#). *The Los Angeles Times*. 11 December 1985.
- cdi Associated Press. [13-year-old Fatally Guns down School Custodian, Injured Two](#). *The Reading Eagle*. 11 December 1985.
- cdii Associated Press. [14-year-old Charged in Shooting Spree](#). *The Free-Lance Star*. 22 January 1985.
- cdiii Star Staff. [School Violence around the World](#). *The Indianapolis Star*. 2 October 2006.
- cdiv Unites Press International. [Around the Nation: 8th Grader Kills Youth, then Himself at School](#). *The New York Times*. 21 January 1983.
- cdv Ribbing, Mark. [Fatal Junior High Shooting Still Haunts 16 Years Later](#). *The Baltimore Sun*. 2 May 1999.

- cdvi Rowe, Peter. [1979 School Shooting Inspired Boy to Teach. San Diego Union-Tribune](#). 6 October 2007
- cdvii Associated Press. [Parole Denied in School Shooting. USA Today](#). 19 June 2001.
- cdviii Lynch, Rene. [Slaver of Seven is Sent Back to Atascadero. The Los Angeles Times](#). 17 December 1992.
- cdix Associated Press. [Library Shooting Kills 7. Anchorage Daily News](#). 19 July 1976.
- cdx Lovinger, Caitlin. [The Nation: After the Madness, Violence, Even Before the Internet. The New York Times](#). 25 April 1999.
- cdxi St. Petersburg Times Staff. [Sniper Suspect Found Hanged in New York Jail Cell. St. Petersburg Times](#). 2 November 1975.
- cdxii Fessenden, Ford. [They Threaten, Seethe, and Unhinge, then Kill in Quantity. The New York Times](#). 9 April 2000.
- cdxiii Time Staff. [The Madman in the Tower. Time Magazine](#). 12 August 1966.
- cdxiv Bhatia, Shekhar, Little Jesse, Who Gunned Down his Father and Two Schoolboys, both Six, Had Been Expelled for Bringing in Machete and Hatchet to Class 'Because He Was Bullied.' [Daily Mail](#). 29 September 2016.
- cdxv Lee, Anna; Dixon, Romando; and Barnett, Ron, [Townville Elementary Shootings Linked to Nearby Slaying. The Greenville News](#). 28 September 2016.
- cdxvi [Houston Shooter who Cops Say Wore Nazi Emblem was in Jewish Fraternity. CBS News](#). 28 September 2016.
- cdxvii Bacon, John, [Porsche-Driving Lawyer was Houston Shooter. USA Today](#). 27 September 2016.
- cdxviii Hassan, Carma and Visser, Steve, [Philadelphia Gunman Left Rambling Letter, Police Commissioner Says. CNN](#). 17 September 2016.
- cdxix Wootson, Cleve, Philadelphia Gunman, ['Driven by Hatred' Ambushed Officer, then Went on Deadly Rampage. Washington Post](#). 18 September 2016.
- cdxxx Fausset, Richard; Fernandez, Manny; and Blinder, Alan. [Micah Johnson, Gunman in Dallas, Hones Military Skills to a Deadly Conclusion. New York Times](#). 9 July 2016.
- cdxxi Sullivan, Kevin; Hauslohner, Abigail; and Keith, Alexander, [Dallas Gunman Studied 'Shoot and Move' Tactics, Black Nationalism. Washington Post](#). 9 July 2016.
- cdxxii [Police: Houston Shooter Chose Spot for Tactical Advantage. CBS News](#). 31 May 2016.
- cdxxiii [HPD: Suspect Fired 212 Rounds During Mass Shooting. ABC News](#). 31 May 2016.
- cdxxiv [DPS: Suspect in Shootings along Beeline Highway Taken into Custody. ABC News](#). 25 May 2016.
- cdxxv [Suspect in Shootings on Phoenix-area Highway had Body Armor. U.S. & World News Report](#). 25 May 2016.
- cdxxvi Staahl, Derek. [DPS Releases 911 Calls about Beeline Highway Shooting Spree. ABC News](#). 30 June 2016.
- cdxxvii Hermann, Peter; Portnoy, Jenna; and Jouvenal, Justin, [Virginia Trooper Killed in Shooting at Greyhound Bus Station in Richmond. Washington Post](#). 31 March 2016.
- cdxxviii Burkett, Jon. [Richmond Greyhound Shooting: Trooper, Suspect Dead; Two People Wounded. ABC News](#). 31 March 2016.
- cdxxix Associated Press. [Maryland Police Station Ambush Suspect Charged with Murder. 16 March 2016.](#)
- cdxxx Silverstein, Jason and Salingier, Tobias. [Maryland Police Officer Killed by Friendly Fire as Men Film Their Brother's Attempted Suicide 'as if It Was a Game'. New York Daily News](#). 15 March 2016.
- cdxxxi Berlinger, Joshua and Ford, Dana. [Kansas Shooting: Gunman Kills 3, Wounds 14 at Lawn Care Company. CNN](#). 26 February 2016.
- cdxxxii Brennan, Christopher. [Who is Cedric Ford, the Suspected Excel Industries Shooter? New York Daily News](#). 25 February 2016.
- cdxxxiii [Report Details Police Response to Kalamazoo Mass Shooting. Fox News](#). 6 May 2017.
- cdxxxiv Conlon, Kevin and Valencia, Nick. [Uber Driver Picked up Fares Between Killings, Source Said. CNN](#). 22 February 2016.
- cdxxxv Politi, Daniel. [Uber Driver Suspected of Killing Six People in Random Michigan Shooting Rampage. Slate Magazine](#). 21 February 2016.
- cdxxxvi Murdock, Sebastian; Grenoble, Ryan; and Campbell, Andy. [Three Dead After Gunman Opens Fire Inside Colorado Planned Parenthood. Huffington Post](#). 30 November 2015.
- cdxxxvii Fieldstadt, Elisha. [Who is Robert Dear? Planned Parenthood Shooting Suspect Seemed Strange, Not Dangerous, Neighbors Say. The Associated Press](#). 30 November 2015.

- cdxxxviii ["Colorado Springs Massacre Shooter Identified,"](#) CBS News. 2 November 2015.
- cdxxxix Silverstein, Jason ["Colorado Gunman who Killed Three Ranted About Religion, Family in Blog and Video Two Days Before Shooting,"](#) *The New York Daily News*. 2 November 2015.
- cdxl Morrison, Aaron ["Vester Lee Flanagan Update: Virginia Killer Legally Purchased Two Firearms Last Month, Officials Say,"](#) *International Business Times*. 27 August 2015.
- cdxli Gambino, Lauren and Swaine, Jon ["Virginia TV Shooter Vester Lee Flanagan Was a 'Disturbed' and 'Unhappy Man,'"](#) *The Guardian*. 26 August 2015.
- cdxlii Stahl, Jeremy ["Suspected WDBJ7 Shooter Blames Victim for Alleged Racism, Filed Previous Complaints,"](#) Slate. 26 August 2015.
- cdxliiii Zamost, Scott; Khorram, Yasmin; Prokupez, Shimon; and Perez, Evan ["Chattanooga Shooting: New Details Emerge About the Gunman,"](#) CNN. 20 July 2015.
- cdxliv Khorram, Yasmin; Brumfield, Ben; and Zamost, Scott ["Chattanooga Shooter Changed After Mideast Visit, Friend Says,"](#) CNN. 15 September 2015.
- cdxlv ["Mohammad Youssuf Abdulazeez: What We Know About Chattanooga Gunman,"](#) BBC. 17 July 2015.
- cdxlvi Bien, Cally ["Video: Moments Leading Up to Deadly Shooting at Omni Hotel,"](#) NBC News. 6 May 2016.
- cdxlvii Jankowski, Phillip ["Omni Hotel Shooter Michael Holt had Filed to Run for U.S. President,"](#) *American Statesman*. 7 July 2015.
- cdxlviii ["Charleston Shooting Updates: Suspect Dylann Roof's Gun was Birthday Gift, Official Says,"](#) *Los Angeles Times*. 18 June 2015.
- cdxlix Robles, Frances ["Dylann Roof Photos and a Manifesto are Posted on Website,"](#) *New York Times*. 20 June 2015.
- cdl Ford, Matt and Chandler, Adam ["Hate Crime: A Mass Killing at a Historic Church,"](#) *The Atlantic*. 19 June 2015.
- cdli Chandler, Adam ["Terror Attack in Texas,"](#) *The Atlantic*. 4 May 2015.
- cdlii Associated Press. ["UPDATE: Menasha Police Release Report on Fatal Bridge Shooting,"](#) WMTV NBC 15. 11 June 2015.
- cdliiii Ziezulewicz, Geoff, ["Uber Driver, Licensed to Carry Gun, Shoots Gunman in Logan Square,"](#) *Chicago Tribune*. 20 April 2015.
- cdliiv ["Uber Driven with Shotgun Wounds Chicago Shooter, Report Says,"](#) CBS News. 20 April 2015.
- cdliv Hensley, Nicole ["Alabama College Students among Seven Shot at Florida Spring Break Party: Police,"](#) *New York Daily News*. 28 March 2015.
- cdlivi ["Seven People Shot at Panama City Beach Spring Break Party,"](#) NBC News. 28 March 2015.
- cdliiii Queally, James ["Ryan Giroux, Suspect in Arizona Shooting Rampage, Has Long Criminal History,"](#) *Los Angeles Times*. 19 March 2015.
- cdliiii Harris, Craig, Ruelas, Richard, and Cassidy, Megan ["Mesa Shooting: Ryan Giroux Confirmed as Suspect,"](#) *The Arizona Republic*. 2 June 2015.
- cdliix ["Man Who Shot 2 Minneapolis Police Officers After Swearing-In Ceremony Had History of Threats,"](#) *Huffington Post*. 27 January 2015.
- cdlix Horner, Sarah ["New Hope Shooting Suspect No Stranger to Local Cops,"](#) *TwinCities.com*. 28 January 2015.
- cdlxi Ellis, Blake and Hicken, Melanie ["Four Crimes Committed with Guns Seized and Sold by Police,"](#) CNN.com. 21 October 2015.
- cdlxii Ohlheiser, Abby and Izadi, Elahe ["Police: Austin Shooter was a 'Homegrown American Extremist,'"](#) *Washington Post*. 1 December 2014.
- cdlxiii Botelho, Greg ["Man who Shot at Consulate, Federal Courthouse, Austin Police HQ Killed,"](#) CNN. 28 November 2014.
- cdlxiv Rossman, Sean; Portman, Jennifer; and Etters, Karl ["Police Identify Gunman, Florida Deputy Killed in Shootout,"](#) *USA Today*. 23 November 2015.
- cdlxv Portman, Jennifer ["Autopsy: Curtis Wade Holley Shot Five Times,"](#) *The Tallahassee Democrat*. 28 January 2015.
- cdlxvi Mathis, Joel ["It Happened: A Good Guy with a Gun Stopped a Bad Guy with a Gun,"](#) *Philadelphia Magazine*. 25 July 2014.
- cdlxvii Kemp, Joe and Goldstein, Sasha ["Gun-Toting Psychiatrist Shoots Suspect who Killed Pennsylvania Hospital Employee: Police,"](#) *The Daily News*. 24 July 2015.
- cdlxviii Botelho, Greg; McLaughlin, Elliott; and Hanna, Jason. ["Authorities: Georgia Courthouse Attacker Prepared to Inflict Mayhem,"](#) CNN. 6 June 2014.
- cdlxix Salzar, James. ["Forsyth Deputy Shot in Courthouse Assault, May Have Stopped Slaughter,"](#) *The Atlanta Journal-Constitution*. 6 June 2014.
- cdlxx Flores, Adolfo; Mather, Kate; and Gold, Scott, ["A Killer's Rampage in Isla Vista,"](#) *Los Angeles Times*. 25 May 2014.
- cdlxxi Dorell, Oren and Welch, William. ["Police Identify California Shooting Suspect as Elliot Rodger,"](#) *USA Today*. 24 May 2014.
- cdlxxii Yan, Holly; Brumfield, Ben; and Carter, Chelsea. ["Inside the Gunman's Head: Rejection, Jealousy, and Vow to Kill 'Beautiful Girls,'"](#) CNN. 27 May 2014.
- cdlxxiii Freaney, Nolan. ["Gunman Among Four Dead in Jonesboro, Arkansas Shooting,"](#) *Time Magazine*. 4 May 2014.

- cdlxixv [Arkansas Gunman Released from Hospital before Killing Three: police](#). Reuters. 4 May 2014.
- cdlxixvi [Kansas City Area Jewish Center Shootings Suspect Frazier Glenn Miller: Who is the Man with Two Names?](#) CBS News. 14 April 2014.
- cdlxixvii [White Supremacist Frazier Glenn Miller Will Plead Guilty in Jewish Center Killings](#). NBC News. 27 April 2015.
- cdlxixviii [Montgomery, Dave; Fernandez, Manny; and Southall, Ashley. Iraq Veteran at Fort Hood Kills 3 and Himself in Rampage](#). *New York Times*. 2 April 2014.
- cdlxixx [Hlad, Jennifer. Fort Hood Targeted in Another Shooting](#). *Stripes.com*. 23 December 2014.
- cdlxixxi [Woman Arrested In Deadly Rampage At NorCal Indian Tribal Headquarters; 4 Dead, 2 Critically Hurt](#). CBS Local. 20 February 2014.
- cdlxixxii [Family Members of Accused Shooter Among Dead at Cedarville Rancheria Tribal Office, Native News Online](#). 21 February 2014.
- cdlxixxiii [Rickert, Tom. Reno Shooting Suspect Complained of Botched Vasectomy](#). *USA Today*. 18 December 2013.
- cdlxixxiv [Bellisle, Martha. Los Angeles Airport Shooting: Suspect Charged with Murder as He Fights for Life](#). *The Guardian*. 2 November 2013.
- cdlxixxv [Police Confirm Reno Hospital Shooter was a Patient There](#). CBS News. 25 December 2013.
- cdlxixxvi [Neill, Barry. LAX: Gunman Opens Fire at LA Airport](#). *New York Daily News*. 25 January 2014.
- cdlxixxvii [Lohmann, Patrick. Car Chase Suspect was Shot 8 Times](#). *Albuquerque Journal*. 5 February 2014.
- cdlxixxviii [Velasquez, Anna. Who Was Shooting Suspect Christopher Chase](#). ABC News. 28 October 2013.
- cdlxixxix [Bacon, John; Welch, William; and Leger, Donna. Shooting Rampage at Navy Yard in D.C. Leaves 12 Dead](#). *USA Today*. 16 September 2013.
- cdlxxxx [Shear, Michael and Schmidt, Michael. Gunman and 12 Victims Killed in Shooting at D.C. Navy Yard](#). *New York Times*. 16 September 2013.
- cdlxxxi [Starr, Barbara; Pamela Brown; and Shoichet, Catherine. 12 Victims Slain in Navy Yard Shooting Rampage; Suspect ID'ed](#). CNN. 16 September 2013.
- cdlxxx [Gorman, Ryan and Helen Pow. Hero Who Tackled Pennsylvania Gunman after He Opened Fire at Town Planning Meeting as Three Victims are Named](#). *Daily Mail*. 6 August 2013.
- cdlxci [Evanko, Melissa. Three Confirmed Dead in Ross Township Municipal Shooting](#). *Pocono Record*. 5 August 2013.
- cdlxcii [Mazzei, Patricia; Perez, Maria; and Sanchez, Melissa. Hialeah Killer Showed Signs of Trouble Before Mass Shooting](#). *The Miami Herald*. 3 August 2013.
- cdlxciiii [Hialeah Man Called 9-1-1 Before Going on Shooting Spree](#). CBS Miami. 31 July 2013.
- cdlxciiv [Fagenson, Zachary. Motive a Mystery in Miami Area Mass Shooting that Killed 7](#). Reuters. 29 July 2013.
- cdlxci [North Carolina Wal-Mart Shooting Planned, Police Say](#). *Washington Post*. 23 June 2013.
- cdlxci [Associated Press. Police Identify Suspect in Friday Shootings](#). *The San Diego Union Tribune*. 23 June 2013.
- cdlxci [Bacon, John. Santa Monica Shootings Claim Fifth Victim](#). *USA Today*. 9 June 2013.
- cdlxci [Nye, James and Associated Press. Santa Monica College Gunman John Zawahri, 23, Who Went on Shooting Rampage Killing Four Because He was Angry at Parents Divorce](#). *Daily Mail*. 8 June 2013.
- cdlxci [Johnson, Alex and Connor, Tracy. Marine Killed Wife, Went on Shooting Spree, Say Police](#). NBC News. 26 May 2013.
- d [Esteban Smith Shooting Update: Marine's Slain Wife Surprised Him with Visit Before he Killed Her, Went on Shooting Rampage](#). CBS News. 30 May 2013.
- di [Clarridge, Christine and Broom, Jack. Witnesses Among Five Dead in Federal Way](#). *The Seattle Times*. 23 April 2013.
- dii [Sullivan, Chris. Federal Way Killer Had History of Violence](#). *MyNorthwest.com*. 24 April 2013.
- diii [Goode, Erica. Wixom, Michigan, Shooting Suspect Is Arrested](#). *The New York Times*. 8 November 2012.
- d [Goode, Erica and Kovaleski, Serge F. Wisconsin Killer Fed and Was Fueled by Hate-Driven Music](#). *The New York Times*. 6 August 2012.
- dvi [Robinson, Carol. Tuscaloosa Bar Shooting, Suspect to Jasper Police: 'I Wanted the Tuscaloosa Police Department to Kill Me'](#). 17 July 2012.
- dvii [CBS Atlanta Staff. Tuscaloosa Gunman Charges with 18 Counts of Attempted Murder](#). *CBS Atlanta*.
- dviii [CBS Staff. 3 Dead, 2 Wounded in Tulsa Shooting Spree](#). *CBS News*. 7 April 2012.
- dix [Juozapavicius, Justin. Tulsa Shootings 2012: Alvin Watts, Jake England Charges with Murdering 3](#). *The Huffington Post*. 9 April 2012
- dix [Hamill, Sean D. and Moriah Balingit. Officials Believe Shick Should Have Been Committed for an Evaluation](#). *Pittsburgh Post-Gazette*. 9 May 2012

- dx Rubinkam, Mike and Kathy Matheson and JoAnn Loviglio. [Police ID Sunman in Deadly Pitt Clinic Shooting](#). *USA Today*. 9 March 2012
- dxl CBS News Staff. [Suspect in Fatal Queens Bus Shooting Faces Multiple Charges](#). *CBS News*. 4 December 2011.
- dxlii Celona, Larry, Rebecca Harshbarger, and Dan Mangan. [One Dead, One Injured after Gunman Opens Fire on Queens Bus](#). *The New York Post*. 3 December 2011.
- dxliiii Whitwell, Laurie. [Chilling Video Reveals Brazen Gunman on Hunt for Judge Firing Shots in Arkansas Courtroom as Workers Cover for Cover](#). *The Daily Mail*. 22 September 2011
- dxliv CNN Staff. [Police Shoot Arkansas Courthouse Gunman Dead](#). *CNN*. 14 September 2011
- dxv Jabali-Nash, Naimah. [Detroit Precinct Shooting Update: Gunman Lamar Moore Was Suspect in Sexual Assault](#). *CBS News*. 25 January 2011
- dxvi Candiotti and Ross Levitt. [Detroit Police: Precinct Shooter Sexually Assaulted Teen Girl](#). *CNN*. 30 January 2011.
- dxvii Associated Press. [Police: Fla. Gunman Kills Father, Self, Wounds 5](#). *MSNBC*. 5 October 2010.
- dxviii Smith, Chad, Cindy Swirko and Karen Voyles. [Details Emerge About Gunman in Shooting](#). *The Gainesville Sun*. 6 October 2010.
- dxix Associated Press. [Hospital Shooter Thought Doc Implanted Chip](#). *CBS News*. 20 April 2010.
- dxx Morrison, Chloe. [Parkwest Shooter Was Mentally Ill, Left Note at Home](#). *Daily Times*. 21 April 2010.
- dxxi Fries, Steve. [Two Killed in Las Vegas Courthouse](#). *The New York Times*. 4 January 2010.
- dxxii Powers, Ashley. [Shootout at Las Vegas Courthouse Kills 2](#). *The Los Angeles Times*. 4 January 2010
- dxxiii McKinley Jr. and James Dao. [Fort Hood Gunman Gave Signals before His Rampage](#). *The New York Times*. 8 November 2009.
- dxxiv CNN Staff. [Investigators Look for Missed Signals in Fort Hood Probe](#). *CNN*. 10 November 2009.
- dxxv Associated Press. [Victim ID'd in SoCal Dental Office Shooting](#). *CBS News*. 2 July 2009.
- dxxvi Associated Press. [1 Dead, 3 Injured in Simi Valley Shooting](#). *CBS News*. 2 July 2009.
- dxxvii Keyt Staff. [A Suspected Lover's Quarrel Spurred Simi Valley Shooting](#). *Keyt*. 2 July 2009.
- dxxviii Barnes, Steve and James Dao. [Gunman Kills Soldier outside Recruiting Station](#). *The New York Times*. 1 June 2009.
- dxxix Wagner, James and Jessica Garrison. [Long Beach Hospital Shootings Make 'No Sense'](#). *The Los Angeles Times*. 18 April 2009.
- dxxxx Associated Press. [California Hospital Shooter Described as Family Man](#). *MSNBC*. 17 April 2009.
- dxxxi Dewan, Shaila. [Alleged Gunman's Wife Worked at Nursing Home](#). *The New York Times*. 30 March 2009.
- dxxxii Bulwa, Demian and Jaxon Van Derbeken. [Killer of 4 Officers Wanted to Avoid Prison](#). *The San Francisco Chronicle*. 23 March 2009.
- dxxxiii Matier, Phillip and Andrew Ross. [Doomed SWAT Sergeants Didn't Expect an AK-47](#). *The San Francisco Chronicle*. 23 March 2009.
- dxxxiv Dobbins, Ben. [Frank Garcia Guilty of Murder Rampage](#). *The Huffington Post*. 16 December 2009.
- dxxxv Dobbins, Ben. [Frank Garcia Guilty: Valentine's Day Killer Convicted](#). *The Huffington Post*. 30 November 2009.
- dxxxvi Dewan, Shaila. [Hatred Said to Motivate Tenn. Shooter](#). *The New York Times*. 28 July 2008.
- dxxxvii Stamburgh, J.J. [Takedown of Alleged Shooter Recounted](#). *Knox News*. 29 July 2008.
- dxxxviii Associated Press. [Police: Killer Targeted Church for Liberal Views](#). *MSNBC*. 28 July 2008.
- dxxxix Times Staff. [Missouri Man, Charles Lee Thornton, Shoots Dead Five in Row Over Kirkwood Council Fines](#). *Times Online*. 8 February 2008.
- dxl CBS Staff. [Six Dead in Missouri City Council Shooting](#). *CBS News*. 8 February 2008.
- dxli Davey, Monica. [Gunman Kills 5 People at City Council Meeting](#). *The New York Times*. 8 February 2008.
- dxlii Loftus, Bill and William Yardley. [Idaho Gunman Also Killed Wife, Police Say](#). *The New York Times*. 22 May 2007.
- dxliiii Wiley, John K. [Police Prober Idaho Shooter's Arsenal](#). *Fox News*. 23 May 2007.
- dxliv Associated Press. [Idaho Police Officer Injured in Shooting Dies](#). *MSNBC*. 21 May 2007.
- dxlv Van Derbeken, Jaxon and Wyatt Buchanan. [Colleagues Recall Clashes with man Held in Slaying](#). *The San Francisco Chronicle*. 18 May 2005.
- dxlvi Becessa, Hector. [L.A. River Marker System is Getting Back on Track](#). *The Los Angeles Time*. 16 November 2005.

- dxlvii Lee, Natasha. [2 Are Shot to Death at Maintenance Yard](#). *The Los Angeles Time*. 25 February 2005.
- dxlviii ABC Staff. [Two Dead, Three Wounded in Ohio Shooting](#). *ABC News*. 6 November 2003.
- dxlix Johnson, Rob. [VA Pharmacist Treated Troubled Man](#). *Tennessean*. 7 March 2005.
- dl Demsky, Ian. [Friends Support Suspect in Shooting at VA Hospital](#). *Tennessean*. 25 October 2003.
- dli Johnston, Lauren. [Murder-Suicide in Atlanta Church](#). *CBS News*. 6 October 2003.
- dlii Gettleman, Jeffrey. [Pastor and 2 Others Are Killed in Shooting at Atlanta Church](#). *The New York Times*. 6 October 2003.
- dliiii CNN Staff. [NYC Councilman Killed by Political Rival](#). *CNN News*. 24 July 2003.
- dliiv Stambaugh, J. J. [Takedown of Alleged Shooter Recounted](#). *Knox News*. 29 July 2008.
- dli v Porteus, Liza. [Timeline: Tracking the Sniper's Trail](#). *Fox News*. 29 October 2002.
- dli vi Cosgrove-Mather, Bootie. [Cops: Airport Shooter Acted Alone](#). *CBS News*. 23 May 2002.
- dli vii Free Republic Staff. [Man Declared Insane in N.O. Airport Killing](#). *Free Republic*. 11 July 2005
- dli viii CNN Staff. [Los Angeles Airport Shooting Kills 3](#). *CNN*. 5 July 2002.
- dlix Baily, Eric and Robin Fields. [Shootout Vowed in Chilling Video](#). *The Los Angeles Times*. 11 September 2001.
- dlx Gumbel, Andrew. [Gunman's Suicide End Sacramento Rampage](#). *The Independent*. 11 September 2001.
- dlxi New York Times Staff. [Suspect Sought in Killings of 4 in Sacramento](#). *The New York Times*. 9 September 2001.
- dlxii CNN Staff. [Gunman was 'Hellbent on Killing More'](#). *CNN*. 11 September 2001.
- dlxiii Goffard, Christopher. [He Killed... For No Reason](#). *St. Petersburg Times*. 18 April 2002.
- dlxiv Law Enforcement News Staff. [Shooting Gallery](#). *Law Enforcement News*. 15 December 1999
- dlxv Murtaugh, Elizabeth. [Cruz Gets Life in Prison for Shipyard Slayings](#). *Associated Press*. 8 March 2002.
- dlxvi Bartley, Nancy. [Testimony Begins in Trial for '99 Shipyard Slayings: Victim Reported 'Threats'](#). *The Seattle Times*. 3 January 2002.
- dlxvii Carter, Mike, Steve Miletich, Nancy Bartley, and Dave Birkland. [Manhunt in Seattle — Shooting Not Random — Killer Had a Target](#). *Police Say*. *The Seattle Times*. 4 November 1999.
- dlxviii Markey, Bob. [Shooting Victim Battles Serious Injuries to Leg](#). *Sun Sentinel*. 1 August 2001.
- dlxix BNET Staff. [Construction Worker Opens Fire; 1 Dead](#). *BNET*. 24 July 2001
- dlxx CBS News Staff. [3 Dead in Hospital Shooting](#). *CBS News*. 14 September 1999.
- dlxxi Leonard, Jack and Scott Gold. [Police Study Motives for Hospital Shooting](#). *The Los Angeles Times*. 16 September 1999.
- dlxxii [Anaheim Police Department History: 1900](#). City of Anaheim.
- dlxxiii Egan, Timothy. [Racist Shootings Test Limits of Health Systems, and Laws](#). *The New York Times*. 14 August 1999.
- dlxxiv Carter, Mike and Keiko Morris. [Furrow's Gun Originally a Police Weapon](#). *The Seattle Times*. 13 August 1999.
- dlxxv Gibney Jr, Frank, Pat Dawson, Julie Grace, David Jackson, Michael Krantz, Flora Tartakovsky, and Dick Thompson. [The Kids Got in the Way](#). *Times Magazine*.
- dlxxvi Brooke, James. [3 Are Killed and 5 Hurt in Shootout in Utah City](#). *The New York Times*. 16 April 1999.
- dlxxvii Weil, Martin. [Gunman Shoots His Way into Capitol: Two Officers Killed, Suspect Captured](#). *The Washington Post*. 25 July 1998
- dlxxviii CNN Staff. [Weston: A Man with a History of Mental Illness](#). *CNN*. 26 July 1998.
- dlxxix [The New York Times Staff. Dismissed Worker Kills 4 and then is Slain](#). *The New York Times*. 20 December 1997.
- dlxxx Anderson, Nick, David Reyes, and Esther Schrader. [4 Workers, Gunman Die in Caltrans Yard Attack](#). *The Los Angeles Times*. 19 December 1997.
- dlxxxi Anderson, Nick, Lee Romney and David Haldane. [Aftermath of a Killer's Fury](#). *The Los Angeles Times*. 29 December 1997.
- dlxxxii Associated Press. [Firefighter Kills Wife and 4 Official](#). *The New York Times*. 25 April 1996.
- dlxxxiii Associated Press. [Firefighter Guns Down Wife, Superiors](#). *Eugene Register Guard*. 25 April 1996.

- dxxxiv Associated Press. [Florida Killer Said Victims Were Racists, Police Say](#). *The New York Times*. 11 February 1996.
- dxxxv Clines, Fancis X. [DEATH ON THE L.I.R.R.: The Rampage: Gunman in a Train Aisle Passes out Death](#). *The New York Times*. 9 December 1993
- dxxxvi Legal Information Institute. [The 'Insanity Defense' and Diminished Capacity: Colin Ferguson – the Long Island Railroad Gunman](#). Cornell Law School.
- dxxxvii Milton, Pat. [Ferguson Guilty in LIRR Massacre](#). *Associated Press*. 18 February 1995.
- dxxxviii Samuel, Henry. [Charlie Hebdo Shootings: Automatic Rifles Used in Paris Attacks Traced to Shop in Slovakia](#). *The Telegraph*. 18 February 2015.
- dxix Graham-Harrison, Emma. [Paris Attacks Highlight France's Gun Control Problems](#). *The Guardian*. 15 November 2015.
- dxci Ethier, Beth. [Belgian Arms Dealer Surrenders to Police, Confesses to Role in Charlie Hebdo Attack](#). *Slate*.
- dxcii Withnall, Adam and John Lichfield. [Charlie Hebdo Shooting: At Least 12 Killed as Shots Fired at Satirical Magazine's Paris Office](#). *The Independent*. 7 January 2015.
- dxciii Blandy, Fran. [12 Dead in 'Terrorist' Attack at Paris Paper](#). *Yahoo*. 7 January 2015.
- dxciiv Associated Press. [Dead Toll from Swiss Menzau Shooting Rises to Five](#). *The Independent*. 5 April 2013.
- dxciv Thomasson, Emma. [Several Killed in Shooting at Swiss Factory](#). *Reuters*. 27 February 2013.
- dxcivi Euronews Staff. [Four Dead in Swiss Gun Attack](#). *Euronews*. 27 February 2013.
- dxci vii Rothwell, James and Luke Heighton. [Who Are the Victims of the Munich Shopping Mall Shooting?](#) *The Telegraph*. 24 July 2016
- dxci viii BBC Staff. [Munich Shooting: Manhunt after Deadly Attack at Shopping Centre](#). *BBC News*. 23 July 2016.
- dxci ix BBC Staff. [Burkina Faso Attack: foreigners Killed at Luxury Hotel](#). *BBC News*. 16 January 2016
- dxci x Foster, Peter. [Burkina Faso Attacks: Four Al-Qaeda Terrorists - 'Including Two Women' - Killed after Special Forces Free 126 Hostages in Hotel Siege](#). *The Telegraph*. 16 January 2016.
- dxci xi BBC Staff. [What Happened at the Bataclan?](#) *BBC News*. 9 December 2015.
- dxci xii Reuters Staff. [Timeline of Paris Attacks According to Public Prosecutor](#). *Reuters*. 14 November 2015
- dxci xiii Le Monde Staff. [Attaques à Paris : le point sur l'enquête et le déroulé des attaques](#). *Le Monde*. 13 November 2015
- dxci xiiii Marcus, Mary Brophy. [Injuries from Paris Attacks Will Take Long to Heal](#). *CBS News*. 19 November 2015.
- dxci xv Robson, Steve. [Tunisia Parliament Attack: RECAP](#). *Mirror*. 18 March 2015.
- dxci xvi Botelho, Greg and Jethro Mullen. [ISIS Apparently Claims Responsibility for Tunisia Museum Attack; 9 Arrested](#). *CNN*. 19 March 2015.
- dxci xvii Kirkpatrick, David D. [Museum Attack Is Blow to Nation's Democratic Shift](#). *The New York Times*. 18 March 2015.
- dxci xviii Waterfield, Bruno. [Paris Attack Guns 'Bought by Amedy Coulibaly Used in Belgium'](#). *The Telegraph*. 14 January 2015
- dxci xix The Guardian Staff. [Interviews with Kouachi & Coulibaly Released](#). *The Guardian*. 9 January 2015
- dxci xx Wyke, Thomas. [Paris Shootings: Hostages Killed at Jewish Supermarket Named](#). *International Business Times*. 10 January 2015.
- dxci xxi Onyanga-Omara, Jane. [Video Shows Paris Gunman Pledging Allegiance to Islamic State](#). *USA Today*. 11 January 2015.
- dxci xxii JTA. [Report: Israeli Couple among Brussels Jewish Museum Shooting Victims](#). *The Jerusalem Post*. 25 May 2014.
- dxci xxiii Rawlinson, Kevin. [Jewish Museum Shooting Suspect 'IS Islamic State Torturer'](#). *The Guardian*. 6 September 2014.
- dxci xxiv BBC Staff. [Brussels Jewish Museum Killings: Suspect 'Admitted Attack'](#). *BBC News*. 1 June 2014.
- dxci xxv Okari, Dennis. [Kenya's Westgate Attack: Unanswered Questions One Year on](#). *BBC News*. 22 September 2014.
- dxci xxvi McConnell, Tristan. ['Close Your Eyes and Pretend to Be Dead': Foreign Policy](#).
- dxci xxvii Daily Nation Staff. [Westgate Killers: The Face of Terror](#). *Daily Nation*. 20 September 2014.
- dxci xxviii RT Staff. [Belograd Shooting Suspect Still at Large after Killing 6, Including 14yo Girl](#). *RT*. 22 April 2013.
- dxci xxix Sputnik News Staff. [Alleged Belograd Shooter Says Killings Due to Personal Insult](#). *Sputnik News*. 6 August 2013.
- dxci xxx Kington, Tom. [Florence Gunman Shoots Senegalese Street Vendors Dead](#). *BBC News*. 13 December 2011.

- dcxxx Bilefsky, Dan. [Slovakia Stunned by Rampaging Gunman](#). *The New York Times*. 30 August 2010
- dcxxxi Gurbisz, Rafael. [Police: Slovak Shooter Angry Over Neighbors' Noise](#). *The Washington Times*. 31 August 2010
- dcxxxii Burns, John F. [Cameron Rejects Rush to Tighten Gun Laws](#). *The New York Times*. 3 June 2010
- dcxxxiii Macdonald, Alistair and Paul Stone. [U.K. Mulls Tighter Gun-Control Laws After Shooting](#). *The Wall Street Journal* 4 June 2010.
- dcxxxiv Tozer, James, Chris Brooke, and Paul Sims. [Timetable of Mass Murder: Derrick Bird's Slaughter in the Lake District Reconstructed](#). *The Daily Mail*. 4 June 2010
- dcxxxv Eulich, Whitney. [Leige Attack: Gunman in Belgium Targeted Crowds with Grenades, Firearms](#). *Christian Science Monitor*. 13 December 2011.
- dcxxxvi Deighton, Ben. [Belgium Gunman Also Killed a Cleaning Woman](#). *Christian Science Monitor*. 14 December 2011.
- dcxxxvii Corder, Mike and Toby Sterling. [Dutch Mall Shooting Leaves 7 Dead, 15 Wounded](#). *The Huffington Post*. 10 April 2011.
- dcxxxviii BBC News staff. [Dutch Gunman Van der Vlis Faced Illegal Weapons Probe](#). *BBC News*. 10 April 2011.
- dcxxxix Kahn, Jeremy and Robert F. Worth. [Mumbai Attackers Called Part of Larger Band of Recruits](#). *The New York Times*. 9 December 2008.
- dcxxxx China Daily Staff. [India Charges Mumbai Gunman with Murder](#). *China Daily*. 25 February 2009
- dcxxxxi Associated Press. [Australian Gunman Called a Loner with a Mental History](#). *The New York Times*. 30 April 1996
- dcxxxii Bellamy, Patrick. [Suddenly One Sunday](#). *TruTv.com*.
- dcxxxiii Associated Press. [A Masked Gunman Kills 6 at a Mall in Australia](#). *The New York Times*. 18 August 1991.
- dcxxxiv The Age Staff. [Melbourne Remembers Queen Street Massacre](#). *The Age*. 6 December 2007
- dcxxxv Polk, Kenneth. *When Men Kill: Scenarios of Masculine Violence*. (Cambridge, Cambridge University Press, 1994) p. 137
- dcxxxvi Hurd, Douglas. [Report of Mr. Colin Smith CVO QPM Chief Constable Thames Valley Police to the RT Hon Douglas Hurd CBE, MP, Secretary of State for the Home Department](#). *Economics Expert*. August 1987
- dcxxxvii Tendler, Stewart, Andrew Morgan, David Sapsted, and Michael McCarthy. [Times Archive, 1987: 14 Die as Gunman Runs Amok](#). *Times Online*. 20 August 1987
- dcxxxviii Ford, Richard. [Factfile: British Shooting Massacres](#). *Times Online*. August 1987
- dcxxxix BBC Staff. [Toulouse Gunman Mohamed Merah](#). *BBC*. 22 March 2012
- dcxl MSNBC Staff. [Jewish School Slayings Suspect Dead after France Cops Storm Apartment, Officials Say](#). *MSNBC*. 22 March 2012
- dcxli Mith-Spark, Laura. [Who Was French Gunman Mohammed Merah?](#) *CNN*. 23 March 2012.
- dcxlii Gaier, Rodrigo Via. [Brazil Gunman Kills 12, Self at Rio School](#). *Reuters*. 8 April 2011
- dcxliiii BBC Staff. [Students Return to Brazil School where Gunman Shot 12](#). *BBC*. 18 April 2011.
- dcxliv CNN Staff. [Hero Officer Kept Brazilian School Massacre from Being Even Worse](#). *CNN*. 8 April 2011.
- dcxlv CNN Staff. [German Rampage victims Mostly Female](#). *CNN*. 12 March 2009.
- dcxlvi BBC Staff. [Finnish College Gunman Kills 10](#). *BBC News*. 23 September 2008.
- dcxlvii [Terror Shooting at Mercar Harav Kook Yeshiva in Jerusalem](#). *Israel Ministry of Foreign Affairs*. 6 March 2008.
- dcxlviii BBC Staff. [Finland Mourns Shooting Victims](#). *BBC News*. 8 November 2007.
- dcxlix YLE Staff. [Nine Dead in School Shooting](#). *YLE*. 7 November 2007.
- cd Gulf Times Staff. [School Shooter in Germany Shot Himself](#). *Autopsy Shows*. *Gulf Times*. 22 November 2006.
- cdli CBS Staff. [Montreal Gunman Called Himself 'Angel of Death'](#). *CBS News*. 14 September 2006.
- cdlii Associated Press. [4 Die in Argentina School Shooting](#). *CBS News*. 28 September 2004.
- cdliiii China Daily Staff. [Teen Opens Fire in Argentine School: 4 Dead](#). *China Daily*. 29 September 2004.
- cdliiv Cormier, Bill. [School Shooting in Argentina Kills Four](#). *Associated Press*. 29 September 2004.
- cdlv Associated Press. [One Killed, Several Injured in Southern Thailand School Shooting](#). *High Beam*. 6 June 2003.

- dcclvi [Second Student Dies of Gunshot Wound](#). *Asia Africa intelligence Wire*. 9 June 2003.
- dcclvii Murphy, Padraic, Misha Ketchell, and Andrew Heasley. [Two Die as Gunman Attacks His Own Class](#). *Sydney Morning Herald*. 22 October 2002.
- dcclviii Barry, Jamie. [Student Believed Montash Killings Were His Destiny](#). *The Age*. 12 September 2003.
- dcclix New York Times Staff. [Bosnia Student Kills Teacher and Himself](#). *The New York Times*. 30 April 2002.
- dcclx CNN Staff. [Brave Teacher Stopped Gun Rampage](#). *CNN*. 27 April 2002.
- dcclxi Andrews, Edmund L. [Shooting Rampage at German School](#). *The New York Times*. 27 April 2002.
- dcclxii Coleman, Lroen. [The Copycat Effect: How the Media and Popular Culture Trigger the Mayhem in Tomorrow's Headlines](#) (New York: Simon and Schuster, 2004), pg. 177.
- dcclxiii [A School Principal Is Killed by Gunfire. Key to Safer Schools](#).
- dcclxiv Associated Press. [Family Feud Behind Dutch School Shooting](#). [Police Say](#). *The Victoria Advance*. 9 December 1999.
- dcclxv Deutsch, Anthony. [Student Wounds Four in Denmark](#). *Laredo Morning Times*. 8 December 1999.
- dcclxvi [School Shootings. Emergence Disaster Management, Inc.](#)
- dcclxvii [Calgary Herald Staff. Grim Record of School Killings](#). *Calgary Herald*. 5 December 2009
- dcclxviii CBS Staff. [Tragedy in Taber](#). *CBS News*. 27 April 2004.
- dcclxix CNN Staff. [Gunman Kills Eight at Two Schools in Yemen](#). *CNN*. 30 March 1997.
- dcclxx Seattle Times staff. [Around the World](#). *The Seattle Times*. 2 April 1997.
- dcclxxi Bell, Rachael. [The Dunblane Massacre](#). *TruTv*.
- dcclxxii The Star Staff. [Shooting Violence in Canadian Schools 1975-2007](#). *The Star*. 23 May 2007
- dcclxxiii Cairns, Alan. [Green Is No Stranger to Justice, Perception of Fairness Is Crucial](#). [Says New Judge](#). *Toronto Sun*. 17 August 2006.
- dcclxxiv Cowan, John Scott. [Lessons from the Fabrikant File: A Report to the Board of Governors of Concordia University](#). May 1994.
- dcclxxv Lyon, Darid R., Stephen D. Hart, and Christopher D. Webster, "Violence and Risk Assessment," in *Introduction to Psychology and Law: Canadian Perspectives* (Toronto: University of Toronto Press Incorporated, 2001), chap. 11, pp. 314-315.
- dcclxxvi Wilfred Cude, "The Rogue Professor," in *The Ph.D Trap Revisited* (Toronto: Dundurn Press, 2001), chap. 5, pp. 114-130
- dcclxxvii Sourour, Teresa Z. [Report of Coroner's Investigation](#). 10 May 1991.
- dcclxxviii Lieberman, Joseph A. *School Shootings: What Every Parent and Educator Needs to Know to Protect our Children* (New York: Kensington Publishing Corp., 2008). P. 334
- dcclxxix Associated Press. [Student Opens Fire on Class, Kills Self](#). *The Miami News*. 27 October 1975.
- dcclxxx Hanon, Andrew. [Canada's First School Shooting Recalled](#). *Edmonton Sun*. 12 March 2009.
- dcclxxxi Associated Press. [Teenager Takes Own Life after Killing 2, Wounding 13](#). *Bulletin*. 29 May 1975.
- dcclxxxii Associated Press. [School Killer 'Sought Revenge' Ocala Star-Banner](#). 28 May 1975.
- dcclxxxiii Time Staff. [Middle East: Bullets, Bombs, and a Sign of Hope](#). *Time Magazine*. 27 May 1974.
- dcclxxxiv Khoury, Jack. [U.S. Filmmakers Plan Documentary on Ma'a lot Massacre](#). *Haaretz*. 7 March 2007
- dcclxxxv BBC Staff. [1974: Teenagers Die in Israeli School Attack](#). *BBC*.
- dcclxxxvi Willgress, Lydia, Thomas Burrows and Jennifer Smith. [Filmed from a Hotel Balcony, the Chilling Moment ISIS Gunman is Seen Sprinting across Tunisian Beach after Killing 38 Innocent Tourists](#). *The Daily Mail*. 28 June 2015
- dcclxxxvii Turner, Camilla. [Tunisia Attack: Gunman's Links to Britain](#). *The Telegraph*. 30 June 2015.
- dcclxxxviii Webb, Sam. [Tunisia Hotel Attack: RECAP after Authorities Reveal 'Majority' of Victims Are British](#). *Mirror*. 28 June 2015
- dcclxxxix Sang Hun, Choe. [Soldier Accused of Killing 5 Is Captured in South Korea](#). *The New York Times*. 23 June 2014.

- dcxc Kwon, K.J. [5 Dead in Shooting on South Korean Military Outpost](#). *CMN*. 21 June 2014.
- dcxci [McCurry, Justin](#). [South Korean Soldier in Standoff with Army after Shooting Rampage](#). *The Guardian*. 22 June 2014.
- dcxcii [Hassan, Syed Raza](#). [Karachi Airport Attack Signals Tactical Shift by Taliban](#). *Yahoo*. 12 June 2014.
- dcxciii [Hassan, Syed Raza](#). [Taliban Claims Responsibility for Attack on Jinnah International Airport in Karachi](#). *The Huffington Post*. 9 August 2014.
- dcxciv [Associated Press](#). [Canadian Police Charge Suspect over Shooting Deaths of three Mounties](#). *The Guardian*. 6 June 2014.
- dcxcv [CBC Staff](#). [Moncton Shootings: Slain RCMP Officers Mourned by Families](#). *CBC News*. 6 June 2014.
- dcxcvi [CBC Staff](#). [Justin Bourque: Latest Revelations about Man Charged in Moncton Shooting](#). *CBC News*. 5 June 2014.
- dcxcvii [Boyle, Louise](#). [Doctors Deliver Baby Boy after Gunman Shoots Pregnant Mother Dead in Church Attack](#). *The Daily Mail*. 1 October 2011.
- dcxcviii [Jameson, Dave](#). [Pregnant Woman and Baby Killed in Church Shooting](#). *Costa News*. 7 October 2011.
- dcxcix [BBC Staff](#). [Anders Behring Breivik: Norway Court to Deliver Verdict](#). *BBC News*. 23 August 2012.
- dc New York Times Staff. [Anders Behring Breivik](#). *The New York Times*. 24 August 2012.
- dccl [BBC Staff](#). [Norway Police Could Have Stopped Breivik Sooner](#). *BBC News*. 13 August 2012.
- dcclii [Ha-Won, Jung](#). [South Korea Marine Judged Unstable before Shooting](#). *AFP*. 4 July 2011.
- dccliii [Glionna, John M. and Jung-yoon Choi](#). [Barracks Shooting Prompts South Koreans to Call for Military Reform](#). *The Los Angeles Times*. 17 July 2011.
- dccliv [BBC Staff](#). [Frankfurt Airport Gunman Jailed for Life](#). *BBC News*. 10 February 2012
- dcclv [BBC Staff](#). [Kosovan Admits Shooting US Airmen at Frankfurt Airport](#). *BBC News*. 31 August 2011
- dcclvi [Hall, Allan](#). [Woman Who Opened Fire at Hospital Had Killed Family](#). *News.Scotsman*. 21 September 2010.
- dcclvii [BBC Staff](#). [Fatal Shooting at German Hospital](#). *BBC News*. 19 September 2010.
- dcclviii [Yardley, Jim and Hari Kumar](#). [Taiwanese Tourists Shot in New Delhi](#). *The New York Times*. 19 September 2010.
- dcclix [Associated Press](#). [Tourists Shot Near Delhi Mosque](#). *BBC*. 19 September 2010.
- dcclx [Childress, Sarah](#). [Militants Kill at Least 31 in Somalia](#). *The Wall Street Journal*. 25 August 2010.
- dcclxi [Raghavan, Sundarsan](#). [Al-Qaeda-Linked Somali Militants Storm Mogadishu Hotel, Kill at Least 33](#). *The Washington Post*. 24 August 2010
- dcclxii [Gentleman, Jeffrey](#). [At Least 30 Killed in Somalia Hotel Attack](#). *The New York Times*. 24 August 2010.
- dcclxiii [Canadian Press](#). [Suspect in Workplace Shooting Has Bail Hearing](#). *CTV*. 8 May 2004
- dcclxiv [Mitchell, Bob](#). [Family Wants Killer in Maximum Security](#). *The Star*. 24 January 2007.
- dcclxv [Daley, Suzanna](#). [Man Who Fatally Shot 8 French Officials Jumps to His Death](#). *The New York Times*. 29 March 2002.
- dcclxvi [CNN Staff](#). [Paris Killer Leap: Police Cleared](#). *CMN*. 6 April 2002
- dcclxvii [BBC Staff](#). [Eight Dead in Paris Shooting](#). *BBC News*. 27 March 2002
- dcclxviii [BBC Staff](#). [Egypt Tourist Massacre](#). *BBC News*. 17 November 1997.
- dcclxix [BBC Staff](#). [Massacre at Luxor](#). *BBC News*. 6 December 2002.
- dcclxx [Reuters Staff](#). [TIMELINE-Shooting Incident in Finland](#). *Reuters*. 31 December 2009.
- dcclxxi [The Local Staff](#). [Mass Murderer Denied Request for Reduced Sentence](#). *The Local*. 3 September 2008
- dcclxxii [The Local Staff](#). [Court Affirms Mass Murderer's Life Sentence](#). *The Local*. 27 October 2008.
- dcclxxiii [Pitches, Adrian](#). [Town Struggles to Recall Shooting](#). *BBC News*. 2 May 2009.
- dcclxxiv [Pattinson, Rob](#). [Monkseaton Mourns Victim of Gunman Robert Sartin](#). *Sunday Sun*. 26 April 2009.
- dcclxxv [Reuters Staff](#). [Australia Killer Gets 460 Years in Prison](#). *The Los Angeles Times*. 11 November 1988.
- dcclxxvi [Hunt, Elisa](#). [Huddle St. Killer Julian Knight Has Legal Win in Parole Bid](#). *The Herald Sun*. 11 August 2010.
- dcclxxvii [Australian Government Attorney General's Department](#). [The Australian Journal of Emergency Management](#), November 2004

- dc000xviii [Hoddle Street](#). Victoria Police Magazine, August 2007, pg. 6-11
- dc000xix Suro, Robert. [Palestinian Gets 30 Years for Rome Airport Attack](#). *The New York Times*. 13 February 1988.
- dc000xx [Significant Terrorist Incidents, 1961-2003: A Brief Chronology](#). U.S. Department of State, Bureau of Public Affairs, Office of the Historian.
- dc000xxi Suro, Robert. [Palestinian Gets 30 Years for Rome Airport Attack](#). *The New York Times*. 13 February 1988.
- dc000xxii [Significant Terrorist Incidents, 1961-2003: A Brief Chronology](#). U.S. Department of State, Bureau of Public Affairs, Office of the Historian.
- dc000xxiii [BBC Staff](#). [1973: Athens Attack Leaves Three Dead](#). *BBC News*.
- dc000xxiv [Israel: Terrorist on Trial](#). *Time Magazine*. 24 July 1972.
- dc000xxv [BBC Staff](#). [1972: Japanese Kill 26 at Tel Aviv Airport](#). *BBC News*.
- dc000xxvi Olsen, Jan M. [Iraqi Suspect Says Unaware of Danish Terror Plot](#). *The Washington Post*. 31 December 2010.
- dc000xxvii Goodman, J. David. [Police Arrest 5 in Danish Terror Plot](#). *The New York Times*. 29 December 2010.
- dc000xxviii Rolander, Niclas and Paul Sonne. [Alleged Terror Plot Foiled in Denmark](#). *The Wall Street Journal*. 29 December 2010
- dc000xxix Graczyk, Michael. [Trey Selser Studied Serial Killers before allegedly Shooting His Texas Family](#). *The Huffington Post*. 22 March 2012.
- dc000cxi Cox, Erin and Jessica Anderson. [Former UM Student Accused of Campus Threat Pleads Guilty](#). *The Baltimore Sun*. 7 August 2012.
- dc000cxii Arizona Republic Staff. [Boy Accused of Threatening Litchfield Park School Arrested](#). *The Arizona Republic*. 3 October 2011.
- dc000cxiii Galofaro, Claire. [Lakeshore High Shooting Plot Case Concludes with teen's Plea to Reduced Charge](#). *The Times Picayune*. 3 February 2012.
- dc000cxlii KMOV Staff. [Facebook Post Leads Police to Second Teen Accused in Missouri School Shooting Plot](#). KMOV. 7 April 2011
- dc000cxliii Vander Velde, Jessica. [Tip About Planned Shooting at Leto High School Leads to Arrest of 17-Year-Old](#). *St. Petersburg Times*. 26 August 2010.
- dc000cxliiii Logan, Bill. [Leto High Moves on after Mass Murder Threat](#). *ABC News*. 26 August 2010.
- dc000cxliiii Collington, Theresa. [Deputies: Mass Shooting Thwarted at Leto High School](#). *WTSP*. 26 August 2010.
- dc000cxliiii DeGuerin Miller, Carlin. [Columbine-Style Attack on Long Island High School Foiled, Two Teens Arrested, Say Police](#). *CBS News*. 10 May 2010.
- dc000cxliiii Associated Press. [Dana Saltzman, Christopher Franko Arrested in Plot to Attack Long Island High School: Columbine-Style Shooting Planned for Connetquot High School](#). *The Huffington Post*. 8 May 2010.
- dc000cxliiii Associated Press. [Brewster Teen charged in Alleged School Shooting Plot](#). *The Columbian*. 4 March 2010.
- dc000cxliiii Mehaffey, K. C. [Charges Reduced for Teen Police Say Planned Columbine-Type Shooting](#). *Wenatchee World*. 2 December 2010.
- dc000cxliiii Mazza, Crystal. [Student Arrested for Plotting Attack Against High School](#). *WOAI*. 15 February 2010.
- dc000cxliiii ABC KSAT Staff. [Alleged School Shooting Plot Foiled](#). *ABC News – KSAT*. 15 February 2010.
- dc000cxliiii Associated Press. [Police: 2 Teens Were Plotting School Shooting](#). *MSNBC*. 1 May 2009.
- dc000cxliiii Associated Press. [Sheriff: Teen Planned School Shooting](#). *CBS News*. 9 April 2009.
- dc000cxliiii Associated Press. [2 Teens Arrested in Shooting Plot at Dove Creek School](#). *Denver Post*. 9 April 2009.
- dc000cxliiii Adams and Shawn Day. [Beach Teen Charges with Making Explosives in Plot on School](#). *Virginia Pilot*. 8 April 2009.
- dc000cxliiii Day. [Sanity is an Issue in Case of Landstown Bomb Plot Teen](#). *Virginia Pilot*. 27 August 2009.
- dc000cxliiii Urban, Mike. [Student Charges in Planned Assault at Blue Mountain High School after Arms Cache is Found](#). *Reading Eagle*. 19 December 2008.
- dc000cxliiii CNN Staff. [Pennsylvania Teen Charged with Plotting to Kill School Enemies](#). *CNN*. 9 December 2008.
- dc000cxliiii Kelly, David. [Teens Allegedly Plotted Shooting](#). *The Los Angeles Times*. 31 October 2009.
- dc000cxliiii Associated Press. [Alleged 'Plot to Kill' Foiled at N.J. School](#). *CBS News*. 6 March 2008.
- dc000cxliiii Associated Press. [Hudson Valley High Students Arrested, Charged with Plotting School Attack](#). *The NY Daily News*. 28 November 2007.
- dc000cxliiii BBC Staff. [Germany 'Fails School Massacre'](#). *BBC News*. 19 November 2007.
- dc000cxliiii Schoetz, David and Russell Goldman. [Online, Teens 'Idolized Columbine Killers'](#). *ABC News*. 13 November 2007.

dcclxv Associated Press. [14-year-old Admits to Illegally Stockpiling Weapons](#). *MSNBC*. 26 October 2007.

dcclxvi Schoetz, David. [Samaritan Helps Foil Columbine-Style Shooting](#). *ABC News*. 13 July 2007

dcclxvii Dobnik, Verena. [2 NY Teens Charged with School Plot](#). *USA Today*. 14 July 2007.

dcclxviii Associated Press. [Wisconsin Teens Charged in Planned School-Shooting Plot](#). *Fox News*. 22 September 2006.

dcclxix Associated Press. [Student Plotting Washington School Shooting Charged](#). *Fox News*. 25 April 2006.

dcclxx Associated Press. [North Pole Unnerved by Alleged Plot to Kill Students](#). *Fox News*. 25 April 2006.

dcclxxi Associated Press. [School Slaughter Plot Foiled in Alaska](#). *Sydney Morning Herald*. 23 April 2006.

dcclxxii Associated Press. [5 Kan. Students Arrested in Alleged Plot](#). *USA Today*. 21 April 2006.

dcclxxiii Associated Press. [Charges Mullied in Alleged School Shooting Plot](#). *MSNBC* 23 April 2006.

dcclxxiv Associated Press. [New Jersey Teen Gets 6 Years in Prison for School Shooting Plot](#). *Fox News*. 6 October 2006.

dcclxxv Associated Press. [Camden: Teenagers Admit to Shooting Plan](#). *The New York Times*. 11 August 2006.

dcclxxvi Abrams, Jonathan. [Columbine II? Behind the Alleged Plot](#). *The Los Angeles Times*. 20 May 2006.

dcclxxvii Smith, Charmaine. [No Motive Apparent in Foiled School Shooting](#). *Anderson Independent-Mail*. 21 September 2005.

dcclxxviii Shields, Nicholas. [2 Boys Charged in Plot](#). *The Los Angeles Times*. 16 March 2005.

dcclxxix Daniels, Cynthia. [Teen Charged in Attack Plot at High School](#). *The Los Angeles Times*. 12 February 2004.

dcclxxx Butterfield, Fox and Robert D. McFadden. [3 Teenagers Held in Plot at Massachusetts School](#). *The New York Times*. 26 November 2001.

dcclxxxi Avila, Jim. [School Shooter: 'I Didn't Realize' They Would Die](#). *ABC News*. 11 June 2008.

dcclxxxii CBS Staff. [Arsenal in a Gym Bag](#). *CBS News*. 15 February 2001.

dcclxxxiii Vaughan, Kevin and Deborah Frazier. [Columbine Talk Escaped Adults](#). *Rocky Mountain News*. 9 February 2001.

dcclxxxiv ABC Staff. [In Kansas Police Stop School Attack](#). *ABC News*. 6 February 2001.

dcclxxxv Bay City News Staff. [Man Who Planned Massacre at de Anza College Commits Suicide](#). *Bay City News*. 9 August 2004.

dcclxxxvi Wong, May. [Police Thwart 'Columbine-Style' Campus Assault](#). *ABC News*. 30 January 2001.

dcclxxxvii Associated Press. [Five Texas Teens Charged in Assault Plot](#). *USA Today*. 24 April 1999.

dcclxxxviii Belluck, Pam. [Students Accused of Plotting Mass Slayings](#). *The New York Times*. 17 November 1998.

dcclxxxix Sack, Kevin. [Southern Town Stunned by Arrested in Murder Plot](#). *The New York Times*. 9 October 1997.

dcclxxc Fahim, Kareem. [Six Ordinary Lives that Took a Detour to the World of Terror](#). *The New York Times*. 9 May 2007

dcclxxci Kocieniewski, David. [Six Men Arrested in Terror Plot against Fort Dix](#). *The New York Times*. 9 May 2007.

dcclxxcii Associated Press. [Store Clerk Helps Fed Bust 6 in Alleged 'Jihad' Plot to Kill U.S. Soldier at Fort Dix](#). *Fox News*. 8 May 2007

dcclxxciii NPR Staff. [Plot to Attack Fort Dox Foiled, Authorities Say](#). *MPR*. 8 May 2007.

dcclxxciv [Cincy Police Foil Workplace Shooting](#). *United Press International*. 24 June 2009

"

"

"

"

GZJ ~~DKV~~'35"

"



**THE FINAL REPORT AND
FINDINGS OF THE
SAFE SCHOOL
INITIATIVE:**

IMPLICATIONS FOR
THE PREVENTION OF
SCHOOL ATTACKS IN
THE UNITED STATES

UNITED STATES SECRET SERVICE AND
UNITED STATES DEPARTMENT OF EDUCATION

WASHINGTON, D. C.
July 2004



**THE FINAL REPORT AND FINDINGS
OF THE *SAFE SCHOOL INITIATIVE*:**

IMPLICATIONS FOR THE PREVENTION OF
SCHOOL ATTACKS IN THE UNITED STATES

UNITED STATES SECRET SERVICE
AND
UNITED STATES DEPARTMENT OF EDUCATION

by

Bryan Vossekuil
Director
National Violence Prevention and Study Center

Robert A. Fein, Ph.D.
Director
National Violence Prevention and Study Center

Marisa Reddy, Ph.D.
Chief Research Psychologist and Research Coordinator
National Threat Assessment Center
U.S. Secret Service

Randy Borum, Psy.D.
Associate Professor
University of South Florida

William Modzeleski
Associate Deputy Under Secretary
Office of Safe and Drug-Free Schools
U.S. Department of Education

Washington, D. C.
June 2004

JOINT MESSAGE FROM THE SECRETARY, U.S. DEPARTMENT OF EDUCATION, AND THE DIRECTOR, U.S. SECRET SERVICE

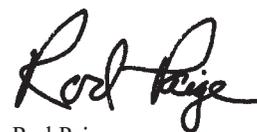
Littleton, Colo.; Springfield, OR; West Paducah, KY; Jonesboro, AR. These communities have become familiar to many Americans as the locations where school shootings have occurred in recent years. School shootings are a rare, but significant, component of school violence in America. It is clear that other kinds of problems are far more common than the targeted attacks that have taken place in schools across this country. However, each school-based attack has had a tremendous and lasting effect on the school in which it occurred, the surrounding community, and the nation as a whole. In the aftermath of these tragic events, educators, law enforcement officials, mental health professionals, parents, and others have asked: "Could we have known that these attacks were being planned?" and "What can be done to prevent future attacks from occurring?"

In June 1999, following the attack at Columbine High School, our two agencies—the U.S. Secret Service and the U.S. Department of Education—launched a collaborative effort to begin to answer these questions. The result was the *Safe School Initiative*, an extensive examination of 37 incidents of targeted school shootings and school attacks that occurred in the United States beginning with the earliest identified incident in 1974 through May 2000. The focus of the *Safe School Initiative* was on examining the thinking, planning, and other behaviors engaged in by students who carried out school attacks. Particular attention was given to identifying pre-attack behaviors and communications that might be detectable—or "knowable"—and could help in preventing some future attacks.

The *Safe School Initiative* was implemented through the Secret Service's National Threat Assessment Center and the Department of Education's Safe and Drug-Free Schools Program. The *Initiative* drew from the Secret Service's experience in studying and preventing assassination and other types of targeted violence and the Department of Education's expertise in helping schools facilitate learning through the creation of safe environments for students, faculty, and staff.

This document, the *Safe School Initiative's* final report, details how our two agencies studied school-based attacks and what we found. Some of the findings may surprise you. It is clear that there is no simple explanation as to why these attacks have occurred. Nor is there a simple solution to stop this problem. But the findings of the *Safe School Initiative* do suggest that some future attacks may be preventable if those responsible for safety in schools know what questions to ask and where to uncover information that may help with efforts to intervene before a school attack can occur.

Since it began in June 1999, our partnership has been a tremendous asset to each of our respective agencies and vital to the success of this study. It is our hope that the information we present in this final report is useful to those of you on the front lines of this problem—the administrators, educators, law enforcement officials, and others with protective responsibilities in schools—and to anyone concerned with children's safety. We encourage all of you in your efforts to keep our nation's children safe in school and hope this report helps you in those efforts.



Rod Paige
Secretary
U.S. Department of Education



W. Ralph Basham
Director
U.S. Secret Service

ACKNOWLEDGMENTS

The U.S. Secret Service and the U.S. Department of Education are grateful to many agencies and individuals for their assistance in planning and carrying out the *Safe School Initiative*. First and foremost, the authors of this report owe a debt of gratitude to the representatives of the numerous law enforcement and criminal justice agencies that permitted Secret Service personnel to review investigative files on the school attacks in their respective communities; provided other key information and materials relating to these attacks; and assisted and supported Secret Service personnel in seeking permission to interview 10 attackers. Moreover, the authors are grateful to the U.S. Department of Justice, Office of Justice Programs' National Institute of Justice for providing critical financial support that helped make the study possible.

In addition, Secret Service and Department of Education personnel benefited substantially from the contributions of several law enforcement, behavioral science and mental health professionals whose collective experience and expertise helped to inform the development of the project plan and research design. In alphabetical order, these individuals are: Gerardo Blue, Frederick Calhoun, Charles Ewing, Michael Gelles, Dennis McCarthy, Edward Mulvey, William Pollack, Larry Porte, Pam Robbins, Raymond Smyth, Sara Strizzi, and Andrew Vita.

This project would not have been possible without the support and guidance that the authors received from several key officials and personnel at the Department of Education and the Secret Service. Absent the expertise and insights of these individuals, the Secret Service's experience in researching and preventing targeted violence could not have been translated into a useful study of targeted school

violence. At the Department of Education, these individuals are: Secretary of Education Rod Paige, former Secretary of Education Richard Riley and Connie Deshpande. Secret Service officials who provided guidance and support for this project are: Director Brian Stafford, Assistant Director Terry Samway, Deputy Assistant Directors Bob Byers and Tom Riopelle, Special Agent in Charge George Luczko and Resident Agent in Charge John Berglund. Special thanks are extended to Social Science Research Specialist Karissa Kumm who assisted with project data collection and was instrumental in organizing information from the *Safe School Initiative* kick-off meeting. Our thanks go also to Dean Terry, Michael Gelles and Marty Allen for providing extensive assistance with project data collection.

The authors extend special thanks to Assistant Director Barbara Riggs, Office of Protective Research, U.S. Secret Service, for her support of the *Safe School Initiative* and the National Threat Assessment Center.

The authors wish to thank Assistant Special Agent in Charge Matt Doherty, Assistant to the Special Agent in Charge Cindy Rubendall and Special Agent Ignacio Zamora for giving generously of their time in reviewing earlier drafts of this document, and former Special Agent Nancy Fogarty, Social Science Research Specialists Derricka Dean and Megan Williams and interns Marissa Savastana, Becca Norwick and Colleen Spokis for their invaluable assistance with data collection, data entry and project management.

Finally, the Secret Service and the Department of Education gratefully acknowledge the contributions of Paul Kelly and Gwen Holden of the Nauset Group, whose insightful observations and comments helped to shape the *Final Report*. Special thanks go out to Gwen Holden, who edited the *Final Report*.

Bryan Vossekuil
Robert Fein
Marisa Reddy
Randy Borum
William Modzeleski
Washington, D.C.
May 2002

CHAPTER I: INTRODUCTION: *THE SAFE SCHOOL INITIATIVE*1
The Safe School Initiative3
 Defining "Targeted" School Violence4
 The Secret Service Threat Assessment Approach4
 The Prevalence of Violence in American Schools6
 Methodology7
 The Study Population8
 Sources of Information on Incidents of
 Targeted School Violence8
 Coding of Primary Source Materials.9
 Analysis of Responses to the Coded Study Questions10
 Organization of the Final Report10
 Overview of *Safe School Initiative* Findings11

**CHAPTER II: CHARACTERISTICS OF INCIDENTS OF
 TARGETED SCHOOL VIOLENCE13**
 Target and Victim Characteristics16

CHAPTER III: FINDINGS OF THE *SAFE SCHOOL INITIATIVE*17
 Characterizing the Attacker19
 Conceptualizing the Attack23
 Signaling the Attack25
 Advancing the Attack26
 Resolving the Attack27

**CHAPTER IV: IMPLICATIONS OF *SAFE SCHOOL INITIATIVE*
 FINDINGS FOR THE PREVENTION OF
 TARGETED SCHOOL VIOLENCE29**
 The Implications of Key Study Findings32

**CHAPTER V: CONCLUSION: THREAT ASSESSMENT AS A
 PROMISING STRATEGY FOR PREVENTING
 SCHOOL VIOLENCE39**
 Threat Assessment and Targeted School Violence Prevention . . .41

**APPENDIX A: INCIDENTS OF TARGETED SCHOOL VIOLENCE,
 BY STATE45**

**APPENDIX B: INCIDENTS OF TARGETED SCHOOL VIOLENCE,
 BY YEAR47**

APPENDIX C: RESOURCES49

CONTACT INFORMATION51

CHAPTER I

INTRODUCTION:

THE SAFE SCHOOL INITIATIVE



Littleton, CO; Springfield, OR; West Paducah, KY; Jonesboro, AR. These communities have become familiar to many Americans as among the locations of those schools where shootings have occurred nationwide in recent years. In the aftermath of these tragic events, educators, law enforcement officials, mental health professionals and parents have pressed for answers to two central questions: "Could we have known that these attacks were being planned?" and, if so, "What could we have done to prevent these attacks from occurring?"

This publication, *The Final Report and Findings of the Safe School Initiative: Implications for the Prevention of School Attacks in the United States*, is a recent product of an ongoing collaboration between the U. S. Secret Service and the U. S. Department of Education to begin to answer these questions.¹ It is the culmination of an extensive examination of 37 incidents of targeted school violence that occurred in the United States from December 1974 through May 2000.²

The Safe School Initiative

Following the attack at Columbine High School in April 1999, the Secret Service and the Department of Education initiated, in June 1999, a study of the thinking, planning and other pre-attack behaviors engaged in by attackers who carried out school shootings. That study, the *Safe School Initiative*, was pursued under a partnership between the Secret Service and the Department of Education, and implemented through the Secret Service's National Threat Assessment Center and the Department of Education's Safe and Drug-Free Schools Program. In its execution, the *Safe School Initiative* drew from the Secret Service's experience in studying and preventing targeted violence and from the Department of Education's expertise in helping schools facilitate learning through the creation of safe environments for students, faculty and staff.

The objective of the *Safe School Initiative* was to attempt to identify information that could be obtainable, or "knowable," prior to an attack. That information would then be analyzed and evaluated to produce a factual, accurate knowledge base on targeted school attacks. This knowledge could be used to help communities across the country to formulate policies and strategies aimed at preventing school-based attacks.

Key features of the *Safe School Initiative* were its focus on "targeted" school violence and its adaptation of earlier Secret Service research on assassination for its examination of incidents of school-based attacks.

¹ This report is an update and expansion of the earlier *Interim Report on the Prevention of Targeted Violence in Schools*, which was released in October 2000. This *Final Report* supercedes the *Interim Report* and should be used and referenced in place of the *Interim Report*.

² See Section I, "INTRODUCTION: THE SAFE SCHOOL INITIATIVE, Methodology," for a discussion of the approach used by the Secret Service to identify incidents of school-based attacks.

Defining "Targeted" School Violence

The *Safe School Initiative* examined incidents of "targeted violence" in school settings—school shootings and other school-based attacks where the school was deliberately selected as the location for the attack and was not simply a random site of opportunity. The term "targeted violence" evolved from the Secret Service's five-year study of the behavior of individuals who have carried out, or attempted, lethal attacks on public officials or prominent individuals. That study, the Secret Service's *Exceptional Case Study Project* (ECSP), was initiated in 1992 under funding provided by the U. S. Department of Justice, Office of Justice Programs' National Institute of Justice.

The focus of the ECSP study was an operational analysis of the thinking and behavior of those who have assassinated, attacked or tried to attack a national public official or public figure in the United States since 1949. The ECSP defined "targeted violence" as any incident of violence where a known or knowable attacker selects a particular target prior to their violent attack.³ The purpose of the ECSP was to generate a better understanding of attacks against public officials that, in turn, would help Secret Service agents in their investigations of threats toward the president and others they protect and in the prevention of harm to these protected officials.⁴

The ECSP sought to identify what information might be knowable prior to an attack and to better enable intervention before an attack occurred. Findings from the ECSP helped to dispel several myths and misconceptions about assassination.

In addition to the ECSP's particular focus on incidents involving attacks on public officials and prominent individuals, other types of violence in which a victim is targeted specifically include assassinations, stalking, some forms of domestic violence, some types of workplace violence, and some types of school violence. In the case of targeted school violence, the target may be a specific individual, such as a particular classmate or teacher, or a group or category of individuals, such as "jocks" or "geeks." The target may even be the school itself.

The Secret Service Threat Assessment Approach

The findings of the ECSP also led to the Secret Service's development of a more thorough and focused process for conducting threat assessment investigations. As part of its mission, the Secret Service is responsible for protecting the president and vice president of the United States and their families and certain national and

international leaders, all of whom are referred to as "protectees." The Secret Service provides this protection by means of two distinct yet complementary strategies: the use of physical measures—including magnetometers, armored vehicles, perimeters of armed agents, and canine units—that are designed to both deter potential attacks and serve as protective barriers in the event someone tries to attack; and a second, far less visible component known as threat assessment.

Threat assessment is a process of identifying, assessing and, managing the threat that certain persons may pose to Secret Service protectees. The goal of threat assessment is to intervene before an attack can occur. The threat assessment process involves three principal steps—all before the person has the opportunity to attack:

- identifying individuals who have the idea or intent of attacking a Secret Service protectee;
- assessing whether the individual poses a risk to a protectee, after gathering sufficient information from multiple sources; and,
- managing the threat the individual poses, in those cases where the individual investigated is determined to pose a threat.

The Secret Service considers threat assessment to be as important to preventing targeted violence as the physical measures it employs.

In 1998, the Secret Service established the National Threat Assessment Center, an entity within the Secret Service that is dedicated to continuing efforts agency-wide to better understand and prevent targeted violence, and to share this developing knowledge with other constituencies responsible for public safety and violence prevention. Adaptation of its threat assessment protocols for use in addressing the problem of school-based attacks is the most recent of the Secret Service's initiatives to share this body of knowledge and expertise with other constituencies engaged in developing strategies to address targeted violence issues. In the late 1990s, the Secret Service and the Justice Department's National Institute of Justice joined forces to make information on the Secret Service's threat assessment protocols available to a wider law enforcement audience. *Protective Intelligence & Threat Assessment Investigations: A Guide for State and Local Law Enforcement Officials*, released in July 1998, offers state and local police officials insights into the elements of carrying out and evaluating the findings of threat assessment investigations.⁵

In addition, since the release of the *Safe School Initiative* Interim Report in October 2000, personnel from the Secret Service and the Department of Education have given over 100 seminars and briefings on the study to thousands of educators, law

³ Fein, R., Vossekuil, B., & Holden, G. (1995). Threat assessment: An approach to prevent targeted violence. *National Institute of Justice: Research in Action*, 1-7.

⁴ Fein, R., & Vossekuil, B. (1999). Assassination in the United States: An operational study of recent assassins, attackers, and near-lethal approachers. *Journal of Forensic Sciences*, 44, 321-333.

⁵ Fein, R. & Vossekuil, B. (1998). *Protective Intelligence & Threat Assessment Investigations: A Guide for State and Local Law Enforcement Officials*. U. S. Department of Justice, Office of Justice Programs, National Institute of Justice: Washington, D.C.

enforcement officials, mental health professionals and others across the United States. Several questions and discussion points raised by seminar attendees have been addressed in this final report.

Finally, the Department of Education and the Secret Service currently are completing work on a guide to investigating and responding to threats in schools. The guide is scheduled for publication in 2002. The guide will include recommendations for investigating and evaluating threats and other behaviors of concern in school; address considerations for developing policies and capacity to support threat assessment efforts in schools; and provide suggestions for approaches schools can adopt to foster school environments that reduce threats of targeted violence.

The Prevalence of Violence in American Schools

Public policy-makers, school administrators, police officials, and parents continue to search for explanations for the targeted violence that occurred at Columbine High School and other schools across the country, and seek assurance that similar incidents will not be repeated at educational institutions in their communities. While the quest for solutions to the problem of targeted school violence is of critical importance, reports from the Department of Education, the Justice Department, and other sources indicate that few children are likely to fall prey to life-threatening violence in school settings.⁶

To put the problem of targeted school-based attacks in context, from 1993 to 1997, the odds that a child in grades 9-12 would be threatened or injured with a weapon in school were 7 to 8 percent, or 1 in 13 or 14; the odds of getting into a physical fight at school were 15 percent, or 1 in 7.⁷ In contrast, the odds that a child would die in school—by homicide or suicide—are, fortunately, no greater than 1 in 1 million.⁸ In 1998, students in grades 9-12 were the victims of 1.6 million thefts and 1.2 million nonfatal violent crimes, while in this same period 60 school-associated violent deaths were reported for this student population.⁹

⁶ See, for example, Kaufman, P., et. al. (2000). *Indicators of School Crime and Safety, 2000*. U. S. Department of Education (NCES 2001-017) and U. S. Department of Justice (NCJ-184176): Washington, D. C. Online Vers.: <http://nces.ed.gov/pubsearch/pubinfo.asp?pubid=2001017>; Anderson, M., et. al. (2001). School-associated Violent Deaths in the United States, 1994-1999. *Journal of the American Medical Association*, 286, 2695-2702; and, National Research Council and Institute of Medicine, Committee on Law and Justice and Board on Children, Youth, and Families. (2001). *Juvenile Crime, Juvenile Justice*. Panel on Juvenile Crime: Prevention, Treatment, and Control. McCord, J., et. al. (Eds.). National Academy Press: Washington, D.C.

⁷ Snyder, H.N., & Sickmund, M. (1999). *Juvenile offenders and victims: 1999 National Report*. Washington, D.C.: Office of Juvenile Justice & Delinquency Prevention, U.S. Department of Justice. Available online at <http://www.ncjrs.org/html/ojjdp/nationalreport99/index.html>.

⁸ U.S. Department of Education and U.S. Department of Justice (1999). *1999 Annual Report on School Safety*. Washington, D.C.: Authors.

⁹ Ibid.

The findings of the *Safe School Initiative's* extensive search for recorded incidents of targeted school-based attacks underscore the rarity of lethal attacks in school settings. The Department of Education reports that nearly 60 million children attend the nation's 119,000+ schools.¹⁰ The combined efforts of the Secret Service and the Department of Education identified 37 incidents of targeted school-based attacks, committed by 41 individuals over a 25-year period.¹¹

Nevertheless, the impact of targeted school-based attacks cannot be measured in statistics alone. While it is clear that other kinds of problems in American schools are far more common than the targeted violence that has taken place in them, the high-profile shootings that have occurred in schools over the past decade have resulted in increased fear among students, parents, and educators. School shootings are a rare, but significant, component of the problem of school violence. Each school-based attack has had a tremendous and lasting effect on the school in which it occurred, the surrounding community, and the nation as a whole. In the wake of these attacks, fear of future targeted school violence has become a driving force behind the efforts of school officials, law enforcement professionals, and parents to identify steps that can be taken to prevent incidents of violence in their schools.

Methodology

The Secret Service and the Department of Education began work on the *Safe School Initiative* study in June 1999. Research protocols employed in carrying out and analyzing the findings of this work reflect an adaptation of the ECSP operational approach to examining targeted attacks against public officials and prominent individuals. Researchers used a similar operational focus for the *Safe School Initiative* to develop information that could be useful to schools in better understanding and preventing targeted violence in school settings. The emphasis of the study was on examining the attackers' pre-incident thinking and behavior, to explore information that could aid in preventing future attacks.

For the purposes of this study, an incident of targeted school violence was defined as any incident where (i) a current student or recent former student attacked someone at his or her school with lethal means (e.g., a gun or knife); and, (ii) where the student attacker purposefully chose his or her school as the location of the attack. Consistent with this definition, incidents where the school was chosen simply as a site of opportunity, such as incidents that were solely related to gang or drug trade activity or to a violent interaction between individuals that just happened to occur at the school, were not included.

¹⁰ U.S. Department of Education. National Center for Education Statistics (2002). *Digest of Education Statistics 2000*; Washington D.C.: Authors

¹¹ *Supra* note 2.

Under the study's research strategy, each incident of targeted violence was assigned to a study review team comprised of criminal investigators and social science researchers. At least two reviewers were assigned to each incident.

The Secret Service and the Department of Education made every effort to ensure that the *Safe School Initiative* would produce information that would be useful for school administrators, educators, law enforcement officials, and others working with schools. To that end, researchers consulted regularly with experts in the fields of education, school violence, and juvenile homicide, among others, in the course of developing the study design and protocols. Feedback from these various experts was incorporated into the final study design.

The Study Population

Researchers from the Secret Service and the Department of Education initiated their study of targeted school violence with an extensive search for information that would identify incidents of targeted school violence that have occurred in the United States. Beginning with June 2000 and working back in time, researchers explored all relevant, searchable databases maintained in the public domain or available by subscription, such as public news databases and professional publications, to identify incidents meeting the definition of the study population. Researchers also consulted with law enforcement officials and school violence experts to develop leads on incidents of school violence that might meet the criteria for inclusion in the study constituency.

In the end, researchers identified 37 incidents of targeted school violence involving 41 attackers that occurred in the United States from 1974, the year in which the earliest incident identified took place, through June 2000, when data collection for the study was completed.¹² The school-based attacks included in the *Safe School Initiative* represent all of the incidents of targeted school violence meeting the study criteria that Secret Service and Department of Education researchers were able to identify in that time frame.

Sources of Information on Incidents of Targeted School Violence

Information on each incident of targeted school violence identified by Secret Service and Department of Education researchers was drawn principally from primary

¹² It is possible that incidents of targeted school violence other than those identified by *Safe School Initiative* researchers might have occurred prior to the 1974 incident included in the study, or between 1974 and the completion of data collection for the study in June 2000. For example, incidents that met the study definition, but that were not identifiable under the study search strategy, or that were not reported as school-based crimes, would have been unlikely to come to the attention of Secret Service and Department of Education researchers. In addition, incidents of targeted school violence that have occurred since June 2000 were outside the scope of the study.

source materials concerning the incident. These primary source materials included investigative, school, court, and mental health records.

In addition, study researchers conducted supplemental interviews with 10 of the perpetrators of incidents of the school-based attacks identified by the Secret Service and the Department of Education. These interviews provided researchers with further opportunity to examine the incident from the point of view of the attacker and to "walk through the process of the attack" from its conceptualization to its execution. Insights gleaned from these interviews have been used by the Secret Service primarily in training venues to illustrate particular aspects of incidents of targeted school violence.

Coding of Primary Source Materials

Each member of the review team assigned to a particular incident independently answered several hundred questions about each case, entering his or her answers to the questions in a codebook. Review team members were instructed to record information gathered from primary sources as it appeared in those sources, and not to engage in interpretation of facts presented.

Information gathered and reflected in incident reviewers' responses to the coded study questions included facts about:

- the attacker's development of an idea to harm the target, and progression from the original idea to the attack;
- the attacker's selection of the target(s);
- the attacker's motive(s) for the incident;
- any communications made by the attacker about his or her ideas and intent, including any threats made to the target(s) or about the target(s);
- evidence that the attacker planned the incident;
- the attacker's mental health and substance abuse history, if any; and,
- the attacker's life circumstances/situation at the time of the attack, including relationships with parents and other family members; performance in school; and treatment by fellow students.

Information regarding the attacker's demographic characteristics and personal history, including criminal and school history, also were coded. When each reviewer had completed his or her response to the questions, the review team met as a whole to compare responses and produce a single "reconciled" coding of the incident.

Analysis of Responses to the Coded Study Questions

Findings presented in Chapter III of this report reflect researchers' careful analysis of the coded responses to the extensive questionnaire employed in recording information gathered on each of the 37 school-based attacks and 41 attackers that were examined in the *Safe School Initiative*. Researchers were cautious not to overreach in drawing conclusions from this information.

Primary source materials reviewed for the 37 incidents did not provide answers in every case to all of the areas of inquiry covered in the questionnaire. In general, researchers declined to draw a conclusion if information directly responsive to a particular area of inquiry was available for fewer than half of the incidents reviewed.

Moreover, even when answers to a particular coded study question were available for the majority of incidents, these responses collectively did not suggest in all cases a common or shared characteristic. Here again, researchers were cautious not to draw a conclusion in a particular area of inquiry if that conclusion was supported by fewer than the majority of the responses to the subject question.

However, in some cases, researchers believed that the absence of a common or shared characteristic or behavior in the coded responses to inquiries—most notably with respect to the characteristics and behaviors of the attackers—was sufficiently compelling to note those observations as findings as well.

Organization of the Final Report

The remainder of this report is organized into four chapters. Chapter II: "Characteristics of Incidents of Targeted School Violence," presents basic descriptive information about the attacks examined by the *Safe School Initiative*, including incident, target, and victim characteristics. Chapter III: "Findings of the *Safe School Initiative*," describes the conclusions reached by *Safe School Initiative* researchers after careful analysis of the facts and other information collected in the course of the Secret Service's and the Department of Education's study of targeted school violence.

Chapter IV: "Implications of *Safe School Initiative* Findings for the Prevention of Targeted School Violence," will be of particular interest to educators, law enforcement officials, and others who are seeking guidance to inform efforts to address the problem of targeted school violence. In this chapter, the authors focus in on 10 key findings of the *Safe School Initiative* that appear to have implications for

the development of strategies to prevent targeted school violence. These findings specifically concern what information was known—or "knowable"—about these incidents prior to the attack, and that, in turn, might be relevant to efforts to prevent future attacks. Discussion of these key findings also includes consideration of how this information might be applicable to investigating threats and other behavior in schools that may raise concerns.

In the final chapter of this report, Chapter V: "Threat Assessment as a Promising Strategy for Preventing School Violence," the authors offer some concluding observations on how threat assessment protocols might be incorporated into strategies to prevent targeted violence in schools.

Overview of *Safe School Initiative* Findings

The findings of the *Safe School Initiative* suggest that there are productive actions that educators, law enforcement officials, and others can pursue in response to the problem of targeted school violence. Specifically, *Initiative* findings suggest that these officials may wish to consider focusing their efforts to formulate strategies for preventing these attacks in two principal areas:

- developing the capacity to pick up on and evaluate available or knowable information that might indicate that there is a risk of a targeted school attack; and,
- employing the results of these risk evaluations or "threat assessments" in developing strategies to prevent potential school attacks from occurring.

Support for these suggestions is found in 10 key findings of the *Safe School Initiative* study. These findings are as follows:

- Incidents of targeted violence at school rarely were sudden, impulsive acts.
- Prior to most incidents, other people knew about the attacker's idea and/or plan to attack.
- Most attackers did not threaten their targets directly prior to advancing the attack.
- There is no accurate or useful "profile" of students who engaged in targeted school violence.¹³
- Most attackers engaged in some behavior prior to the incident that caused others concern or indicated a need for help.
- Most attackers had difficulty coping with significant losses or personal failures. Moreover, many had considered or attempted suicide.

¹³ Here the term "profile" refers to a set of demographic and other traits that a set of perpetrators of a crime have in common. Please refer to "Characterizing the Attacker" in Chapter III and to Reddy et al. (2001), "Evaluating risk for targeted violence in schools" in the Resources section for further explanation of the term "profile."

- Many attackers felt bullied, persecuted, or injured by others prior to the attack.
- Most attackers had access to and had used weapons prior to the attack.
- In many cases, other students were involved in some capacity.
- Despite prompt law enforcement responses, most shooting incidents were stopped by means other than law enforcement intervention.

CHAPTER II

CHARACTERISTICS OF INCIDENTS OF TARGETED SCHOOL VIOLENCE



The *Safe School Initiative* found that targeted school violence is not a new or recent phenomenon. The earliest case that researchers were able to identify occurred in 1974. In that incident, a student brought guns and homemade bombs to his school; set off the fire alarm; and shot at emergency and custodial personnel who responded to the alarm.

The *Safe School Initiative* identified 37 incidents involving 41 attackers that met the study definition of targeted school violence and occurred between 1974 and the end of the 2000 school year.¹⁴ These incidents took place in 26 states, with more than one incident occurring in Arkansas, California, Georgia, Kentucky, Missouri, and Tennessee.¹⁵

Analysis of the study findings identified the following characteristics of incidents of targeted school violence:

- In almost three-quarters of the incidents, the attacker killed one or more students, faculty, or others at the school (73 percent, n=27¹⁶). In the remaining incidents, the attackers used a weapon to injure at least one person at school (24 percent, n=9). In one incident, a student killed his family and then held his class hostage with a weapon.
- More than one-half of the attacks occurred during the school day (59 percent, n=22), with fewer occurring before school (22 percent, n=8) or after school (16 percent, n=6).
- Almost all of the attackers were current students at the school where they carried out their attacks (95 percent, n=39). Only two attackers were former students of the school where they carried out their attacks at the time of those attacks (5 percent, n=2).
- All of the incidents of targeted school violence examined in the *Safe School Initiative* were committed by boys or young men (100 percent, n=41).¹⁷
- In most of the incidents, the attackers carried out the attack alone (81 percent, n=30). In four of the incidents, the attacker engaged in the attack on his own but had assistance in planning the attack (11 percent, n=4). In three incidents, two or more attackers carried out the attack together (8 percent, n=3).

¹⁴ See Appendix B for a list of the dates of the incidents of targeted school violence examined by the Safe School Initiative.

¹⁵ See Appendix A for a list of the locations of the incidents of targeted school violence studied under the Safe School Initiative.

¹⁶ "N" refers to the number of attackers that corresponds to the reported percentage. Unless indicated otherwise, when the finding pertains to total attackers all Ns are out of a total of 41. When the finding pertains to total incidents (i.e., school-based attacks) all Ns are out of a total of 37 incidents.

¹⁷ While all the attackers in this study were boys, it would be misleading to read the findings of this study as suggesting that a girl could not or would not carry out a school-based attack. For example, an incident occurred after the completion of this study in which a girl shot her classmate at a parochial school in Williamsport, Pa. In addition, a well-publicized school shooting that occurred in San Diego, Calif., in 1976 was carried out by a woman. The San Diego incident was not included in this study because the attacker was not a current or former student of the school where she conducted her attack, but, rather, lived across the street from the school.

- Most attackers used some type of gun as their primary weapon, with over half of the attackers using handguns (61 percent, n=25), and nearly half of them using rifles or shotguns (49 percent, n=20).¹⁸ Three-quarters of the attackers used only one weapon (76 percent, n=31) to harm their victims, although almost half of the attackers had more than one weapon with them at time of the attack (46 percent, n=19).

Target and Victim Characteristics

Perpetrators of incidents of targeted school violence chose a range of targets for their attacks, including fellow students, faculty and staff, and the school itself. These incidents were usually planned in advance and for most part included intent to harm a specific, pre-selected target, whether or not the attacker's execution of the incident, in fact, resulted in harm to the target.

Target and victim characteristics identified by the *Safe School Initiative* were:

- In over half of the incidents (54 percent, n=22), the attacker had selected at least one school administrator, faculty member, or staff member as a target. Students were chosen as targets in fewer than half of the incidents (41 percent, n=15).
- In nearly half of the incidents, the attackers were known to have chosen more than one target prior to their attack (44 percent, n=16).
- Most attackers had a grievance against at least one of their targets prior to the attack (73 percent, n=30).¹⁹
- In almost half of the incidents (46 percent, n=17), individuals who were targeted prior to the attack also became victims (i.e., individuals actually harmed in the attack). However, other individuals at the school, who were not identified as original targets of the attack, were injured or killed as well. Among these non-targeted individuals, over half were other students (57 percent, n=21) and over one-third (39 percent, n=16) were school administrators, faculty, or staff.

¹⁸ These percentages include all weapons used (i.e., discharged) in the attack, and therefore total more than 100 percent.

¹⁹ For the purposes of this study, "grievance" was defined as "a belief that some other person or organization is directly or indirectly responsible for injury or harm to self and/or someone whom the subject cares about."

CHAPTER III

FINDINGS OF THE *SAFE SCHOOL INITIATIVE*



The findings of researchers' analysis of the 37 incidents of targeted school violence that were examined under the *Safe School Initiative* fall generally into five areas:

- characterizing the attacker;
- conceptualizing the attack;
- signaling the attack;
- advancing the attack; and,
- resolving the attack.

The findings in each of these areas are presented and explained below.

Characterizing the Attacker

Finding

There is no accurate or useful "profile" of students who engaged in targeted school violence.²⁰

Explanation

Although all of the attackers in this study were boys, there is no set of traits that described all—or even most—of the attackers. Instead, they varied considerably in demographic, background, and other characteristics.

- The attackers ranged in age from 11 to 21, with most attackers between the ages of 13 and 18 at the time of the attack (85 percent, n=35).
- Three-quarters of the attackers were white (76 percent, n=31). One-quarter of the attackers came from other racial and ethnic backgrounds, including African American (12 percent, n=5), Hispanic (5 percent, n=2), Native Alaskan (2 percent, n=1), Native American (2 percent, n=1), and Asian (2 percent, n=1).

The attackers came from a variety of family situations, ranging from intact families with numerous ties to the community, to foster homes with histories of neglect.

- Almost two-thirds of the attackers came from two-parent families (63 percent, n=26), living either with both biological parents (44 percent, n=18) or with one biological parent and one stepparent (19 percent, n=8).
- Some lived with one biological parent (19 percent, n=8) or split time between two biological parents (2 percent, n=1).
- Very few lived with a foster parent or legal guardian (5 percent, n=2).

²⁰ *Supra* note 13.

For those incidents for which information on the attackers' school performance was available, that information indicates that those attackers differed considerably from one another in their academic achievement in school, with grades ranging from excellent to failing (n=34).

- The attackers in the largest grouping were doing well in school at the time of the attack, generally receiving As and Bs in their courses (41 percent; n=17); some were even taking Advanced Placement courses at the time of the incident or had been on the honor roll repeatedly.
- Fewer of the attackers were receiving Bs and Cs (15 percent, n=6), or Cs and Ds (22 percent, n=9).
- Very few of the attackers were known to be failing in school (5 percent, n=2).

Attackers also varied in the types of social relationships they had established, ranging from socially isolated to popular among their peers.

- The largest group of attackers for whom this information was available appeared to socialize with mainstream students or were considered mainstream students themselves (41 percent, n=17).
- One-quarter of the attackers (27 percent, n=11) socialized with fellow students who were disliked by most mainstream students or were considered to be part of a "fringe" group.
- Few attackers had no close friends (12 percent, n=5).
- One-third of attackers had been characterized by others as "loners," or felt themselves to be loners (34 percent, n=14).
- However, nearly half of the attackers were involved in some organized social activities in or outside of school (44 percent, n=18). These activities included sports teams, school clubs, extracurricular activities, and mainstream religious groups.

Attackers' histories of disciplinary problems at school also varied. Some attackers had no observed behavioral problems, while others had multiple behaviors warranting reprimand and/or discipline.

- Nearly two-thirds of the attackers had never been in trouble or rarely were in trouble at school (63 percent, n=26).
- One-quarter of the attackers had ever been suspended from school (27 percent, n=11).
- Only a few attackers had ever been expelled from school (10 percent, n=4).

Most attackers showed *no marked change* in academic performance (56 percent, n=23), friendship patterns (73 percent, n=30), interest in school (59 percent, n=24), or school disciplinary problems (68 percent, n=28) prior to their attack.

- A few attackers even showed some *improvements* in academic performance (5 percent, n=2) or *declines* in disciplinary problems at school (7 percent, n=3) prior to the attack. In one case, the dean of students had commended a student a few weeks before he attacked his school for improvements in his grades and a decline in the number of disciplinary problems involving that student in school.

Finding

Many attackers felt bullied, persecuted, or injured by others prior to the attack.

Explanation

Almost three-quarters of the attackers felt persecuted, bullied, threatened, attacked, or injured by others prior to the incident (71 percent, n=29).²¹

In several cases, individual attackers had experienced bullying and harassment that was long-standing and severe. In some of these cases the experience of being bullied seemed to have a significant impact on the attacker and appeared to have been a factor in his decision to mount an attack at the school.²² In one case, most of the attacker's schoolmates described the attacker as "the kid everyone teased." In witness statements from that incident, schoolmates alleged that nearly every child in the school had at some point thrown the attacker against a locker, tripped him in the hall, held his head under water in the pool, or thrown things at him. Several schoolmates had noted that the attacker seemed more annoyed by, and less tolerant of, the teasing than usual in the days preceding the attack.

Finding

A history of having been the subject of a mental health evaluation, diagnosed with a mental disorder, or involved in substance abuse did not appear to be prevalent among attackers. However, most attackers showed some history of suicidal attempts or thoughts, or a history of feeling extreme depression or desperation.

Explanation

- Only one-third of attackers had ever received a mental health evaluation (34 percent, n=14), and fewer than one-fifth had been diagnosed with mental health or behavior disorder prior to the attack (17 percent, n=7).

²¹ It is important to note that the way in which information was gathered for the *Safe School Initiative* did not permit researchers to determine the exact proportion of attackers who had been victims of bullying specifically. Moreover, not every attacker in this study felt bullied.

²² The *Safe School Initiative's* approach to gathering information concerning incidents of targeted school violence did not permit researchers to determine conclusively whether the experience of being bullied—or perceptions that they had been bullied—caused the attacker to engage in targeted school violence.

- Although most attackers had not received a formal mental health evaluation or diagnosis, most attackers exhibited a history of suicide attempts or suicidal thoughts at some point prior to their attack (78 percent, n=32). More than half of the attackers had a documented history of feeling extremely depressed or desperate (61 percent, n=25).
- Approximately one-quarter of the attackers had a known history of alcohol or substance abuse (24 percent, n=10).
- The only information collected that would indicate whether attackers had been prescribed psychiatric medications concerned medication non-compliance (i.e., failure to take medication as prescribed). Ten percent of the attackers (n=4) were known to be non-compliant with prescribed psychiatric medications.

Finding

Over half of the attackers demonstrated some interest in violence, through movies, video games, books, and other media (59 percent, n=24). However, there was no one common type of interest in violence indicated. Instead, the attackers' interest in violent themes took various forms.

Explanation

- Approximately one-quarter of the attackers had exhibited an interest in violent movies (27 percent, n=11).
- Approximately one-quarter of the attackers had exhibited an interest in violent books (24 percent, n=10).
- One-eighth of the attackers exhibited an interest in violent video games (12 percent, n=5).
- The largest group of attackers exhibited an interest in violence in their own writings, such as poems, essays, or journal entries (37 percent, n=15).

Finding

Most attackers had no history of prior violent or criminal behavior.

Explanation

- Fewer than one-third of the attackers were known to have acted violently toward others at some point prior to the incident (31 percent, n=13).
- Very few of the attackers were known to have harmed or killed an animal at any time prior to the incident (12 percent, n=5).
- Approximately one-quarter of the attackers had a prior history of arrest (27 percent, n=11).

Finding

Most attackers were known to have had difficulty coping with significant losses or personal failures. Moreover, many had considered or attempted suicide.

Explanation

Most attackers appeared to have difficulty coping with losses, personal failures, or other difficult circumstances. Almost all of the attackers had experienced or perceived some major loss prior to the attack (98 percent, n=40). These losses included a perceived failure or loss of status (66 percent, n=27); loss of a loved one or of a significant relationship, including a romantic relationship (51 percent, n=21); and a major illness experienced by the attacker or someone significant to him (15 percent, n=6). In one case, the attacker, who was a former student at the school where the attack occurred, was laid off from his job because he did not have a high school diploma. The attacker blamed the job loss on the teacher who failed him in a senior-year course, which kept him from graduating. He returned to the school a year after leaving the school, killed his former teacher and two students, and then held over 60 students hostage for 10 hours.

For most attackers, their outward behaviors suggested difficulty in coping with loss (83 percent, n=34). For example, the mother, the brother, and a friend of the attacker who lost his job each had commented that the attacker became depressed and withdrawn following the lay-off. The friend also reported that he knew that the attacker blamed his former teacher for his problems and had begun planning how to retaliate.

Conceptualizing the Attack

Finding

Incidents of targeted violence at school *rarely* are sudden, impulsive acts.

Explanation

Several findings of the *Safe School Initiative* indicate clearly that the school-based attacks studied were rarely impulsive. Rather, these attacks typically were thought out beforehand and involved some degree of advance planning. In many cases, the attacker's observable behavior prior to the attack suggested he might be planning or preparing for a school attack.

In nearly all of the incidents for which information concerning the attacker's conceptualization of the attack was available, researchers found that the attacker had

developed his *idea to harm* the target(s) before the attack (95 percent, n=39). The length of time that attackers held this idea prior to the actual attack varied considerably. Some attackers conceived of the attack as few as one or two days prior to advancing that attack; other attackers had held the idea of the attack for as long as a year prior to carrying it out. For those incidents where information was available to determine how long the attacker had an idea to harm the target (n=33), the analysis showed that a little over half of the attackers developed their idea for the incident at least a month prior to the attack (51 percent, n=17).

In addition, almost all of the attackers *planned* out the attack in advance of carrying it out (93 percent; n=38). Moreover, there was evidence from the attacker's *behavior* prior to the attack that the attacker had a plan or was preparing to harm the target(s) (93 percent, n=38). For example, one attacker asked his friends to help him get ammunition for one of his weapons; sawed off the end of a rifle to make it easier to conceal beneath his clothes; shopped for a long trench coat with his mother; and cut the pockets out of the coat so that he could conceal the weapon within the coat while holding the weapon through one of the cut-out pockets. That attacker had a well-known fascination with weapons and had told his friends on several occasions that he thought about killing certain students at school.

The length of time between the planning and execution of the attacks also varied considerably for the targeted school violence incidents studied. Some attackers developed their plans on the day of their attack or only one or two days prior; others developed their plans between six and eight months prior to the attack. In cases where there was information available to establish the date planning began (n=29), analysis of available information revealed that most of the attackers developed a plan at least two days prior to the attack (69 percent, n=21).

Revenge was a motive for more than half of the attackers (61 percent, n=25). Other motives included trying to solve a problem (34 percent, n=14); suicide or desperation (27 percent, n=11); and efforts to get attention or recognition (24 percent, n=10). More than half of the attackers had *multiple* motives or reasons for their school-based attacks (54 percent, n=22). In addition, most of the attackers held some sort of grievance at the time of the attack, either against their target(s) or against someone else (81 percent, n=33). Many attackers told other people about these grievances prior to their attacks (66 percent, n=27).²³

²³ *Supra* note 19.

Signaling the Attack

Finding

Prior to most incidents, other people knew about the attacker's idea and/or plan to attack.

Explanation

In most cases, other people knew about the attack before it took place. In over three-quarters of the incidents, at least one person had information that the attacker was thinking about or planning the school attack (81 percent, n=30). In nearly two-thirds of the incidents, *more than one* person had information about the attack before it occurred (59 percent, n=22). In nearly all of these cases, the person who knew was a peer—a friend, schoolmate, or sibling (93 percent, n=28/30). Some peers knew exactly what the attacker planned to do; others knew something "big" or "bad" was going to happen, and in several cases knew the time and date it was to occur. An adult had information about the idea or plan in only two cases.

In one incident, for example, the attacker had planned to shoot students in the lobby of his school prior to the beginning of the school day. He told two friends exactly what he had planned and asked three others to meet him that morning in the mezzanine overlooking the lobby, ostensibly so that these students would be out of harm's way. On most mornings, usually only a few students would congregate on the mezzanine before the school day began. However, by the time the attacker arrived at school on the morning of the attack, word about what was going to happen had spread to such an extent that 24 students were on the mezzanine waiting for the attack to begin. One student who knew the attack was to occur brought a camera so that he could take pictures of the event.

Finding

Most attackers did not threaten their targets directly prior to advancing the attack.

Explanation

The majority of the attackers in the targeted school violence incidents examined under the *Safe School Initiative* did not threaten their target(s) directly, i.e., did not tell the target they intended to harm them, whether in direct, indirect, or conditional language prior to the attack. Only one-sixth of the attackers threatened their target(s) directly prior to the attack (17 percent, n=7).

Finding

Most attackers engaged in some behavior, prior to the incident, that caused others concern or indicated a need for help.

Explanation

Almost all of the attackers engaged in some behavior prior to the attack that caused others—school officials, parents, teachers, police, fellow students—to be concerned (93 percent, n=38). In most of the cases, at least one *adult* was concerned by the attacker’s behavior (88 percent, n=36). In three-quarters of the cases, at least three people—adults and other children—were concerned by the attacker’s behavior (76 percent, n=31). In one case, for example, the attacker made comments to at least 24 friends and classmates about his interest in killing other kids, building bombs, or carrying out an attack at the school. A school counselor was so concerned about this student’s behavior that the counselor asked to contact the attacker’s parents. The attacker’s parents also knew of his interest in guns.

The behaviors that led other individuals to be concerned about the attacker included both behaviors specifically related to the attack, such as efforts to get a gun, as well as other disturbing behaviors not related to the subsequent attack. In one case, the student’s English teacher became concerned about several poems and essays that the student submitted for class assignments because they treated the themes of homicide and suicide as possible solutions to his feelings of despair. In another case, the student worried his friends by talking frequently about plans to put rat poison in the cheese shakers at a popular pizza establishment. A friend of that student became so concerned that the student was going to carry out the rat poison plan, that the friend got out of bed late one night and left his house in search of his mother, who was not home at the time, to ask her what to do.

Advancing the Attack*Finding*

In many cases, other students were involved in the attack in some capacity.

Explanation

Although most attackers carried out their attacks on their own, many attackers were influenced or encouraged by others to engage in the attacks. Nearly half of the attackers were influenced by other individuals in deciding to mount an attack, dared or encouraged by others to attack, or both (44 percent; n=18). For example, one attacker’s original idea had been to bring a gun to school and let other students see

him with it. He wanted to look tough so that the students who had been harassing him would leave him alone. When he shared this idea with two friends, however, they convinced him that exhibiting the gun would not be sufficient and that he would have to *shoot at* people at the school in order to get the other students to leave him alone. It was after this conversation that this student decided to mount his school attack.

In other cases, friends assisted the attacker in his efforts to acquire a weapon or ammunition, discussed tactics for getting a weapon into school undetected, or helped gather information about the whereabouts of a target at a particular time during the school day.

Finding

Most attackers had access to and had used weapons prior to the attack.

Explanation

Experience using weapons and access to them was common for many attackers. Nearly two-thirds of the attackers had a known history of weapons use, including knives, guns, and bombs (63 percent, n=26). Over half of the attackers had some experience specifically with a gun prior to the incident (59 percent, n=24), while others had experience with bombs or explosives (15 percent, n=6). However, fewer than half of the attackers demonstrated any fascination or excessive interest with weapons (44 percent, n=18), and fewer than one-third showed a fascination with explosives (32 percent, n=13) prior to their attacks. Over two-thirds of the attackers acquired the gun (or guns) used in their attacks from their own home or that of a relative (68 percent, n=28).

Resolving the Attack*Finding*

Despite prompt law enforcement responses, most attacks were stopped by means other than law enforcement intervention.

Explanation

Most school-based attacks were stopped through intervention by school administrators, educators, and students or by the attacker stopping on his own. In about one-third of the incidents, the attacker was apprehended by or surrendered to administrators, faculty, or school staff (27 percent, n=10) or to students (5 percent, n=2). In just over one-fifth of the incidents, the attacker stopped on his own or left

the school (22 percent, n=8). In a few incidents, the attacker killed himself during the course of the incident (13 percent, n=5).

Just over one-quarter of the incidents were stopped through law enforcement intervention (27 percent, n=10). Law enforcement personnel discharged weapons in only three of the incidents of targeted school violence studied (8 percent, n=3).

Close to half of the incidents were known to last 15 minutes or less from the beginning of the shooting to the time the attacker was apprehended, surrendered or stopped shooting (47 percent, n=16).²⁴ One-quarter of the incidents were over within five minutes of their inception (27 percent, n=9). The fact that it was not through law enforcement intervention that most of the targeted school violence incidents studied were stopped appears in large part to be a function of how brief most of these incidents were in duration.

²⁴ Information on incident duration was not available for seven of the incidents (19 percent).

CHAPTER IV

IMPLICATIONS OF *SAFE SCHOOL INITIATIVE* FINDINGS FOR THE PREVENTION OF TARGETED SCHOOL VIOLENCE



After careful review of the case histories of the 37 incidents of targeted school violence examined under the *Safe School Initiative*, 10 key findings were identified that highlight information that may have been known or knowable prior to school-based attacks and that therefore might inform some type of intervention in or prevention of future attacks. In this chapter, the authors discuss the implications that these findings may have for schools and communities in developing strategies for preventing targeted violence in schools.

In focusing in on these findings for their potential relevance to the development of prevention and intervention strategies, the authors acknowledge that these findings may raise other issues for consideration in addressing the problem of targeted school violence beyond those noted here. Moreover, the authors recognize that the conditions, circumstances and facts underlying the findings highlighted here may not manifest themselves in the same way in every school. Schools and communities therefore are in the best position to determine whether and how these findings and the implications suggested may apply to their particular problems and needs.

The 10 key findings that the authors believe may have implications for the development of strategies to address the problem of targeted school violence are as follows:

- Incidents of targeted violence at school rarely are sudden, impulsive acts.
- Prior to most incidents, other people knew about the attacker's idea and/or plan to attack.
- Most attackers did not threaten their targets directly prior to advancing the attack.
- There is no accurate or useful profile of students who engaged in targeted school violence.
- Most attackers engaged in some behavior prior to the incident that caused others concern or indicated a need for help.
- Most attackers had difficulty coping with significant losses or personal failures. Moreover, many had considered or attempted suicide.
- Many attackers felt bullied, persecuted, or injured by others prior to the attack.
- Most attackers had access to and had used weapons prior to the attack.
- In many cases, other students were involved in some capacity.
- Despite prompt law enforcement responses, most shooting incidents were stopped by means other than law enforcement intervention.

The Implications of Key Study Findings

Key Finding 1

Incidents of targeted violence at school *rarely* are sudden, impulsive acts.

Implications

Students who engaged in school-based attacks typically did not "just snap" and then engage in impulsive or random acts of targeted school violence. Instead, the attacks examined under the *Safe School Initiative* appeared to be the end result of a comprehensible process of thinking and behavior: behavior that typically began with an idea, progressed to the development of a plan, moved on to securing the means to carry out the plan, and culminated in an attack. This is a process that potentially may be knowable or discernible from the attacker's behaviors and communications.

To the extent that information about an attacker's intent and planning is knowable and may be uncovered before an incident, some attacks may be preventable. However, findings from the *Safe School Initiative* suggest that the time span between the attacker's decision to mount an attack and the actual incident may be short. Consequently, when indications that a student may pose a threat to the school community arise in the form of revelations about a planned attack, school administrators and law enforcement officials will need to move quickly to inquire about and intervene in that plan.²⁵

Key Finding 2

Prior to most incidents, other people knew about the attacker's idea and/or plan to attack. In most cases, those who knew were other kids—friends, schoolmates, siblings, and others. However, this information rarely made its way to an adult.

Implications

First and foremost, this finding suggests that students can be an important part of prevention efforts. A friend or schoolmate may be the first person to hear that a student is thinking about or planning to harm someone. Nevertheless, for a variety of reasons, those who have information about a potential incident of targeted school violence may not alert an adult on their own. Schools can encourage students to report this information in part by identifying and breaking down barriers in the

²⁵ The Department of Education and the Secret Service have prepared a companion work to the Final Report, *Threat Assessment in Schools: A Guide to Managing Threatening Situations and Creating Safe School Climates*. This guide is scheduled for publication in May 2002. The guide will include recommendations for investigating and evaluating threats and other behaviors of concern in school; address considerations for developing policies and the capacity to support threat assessment efforts in schools; and provide suggestions for approaches schools can adopt to foster school environments that reduce violence.

school environment that inadvertently may discourage students from coming forward with this information. Schools also may benefit from ensuring that they have a fair, thoughtful, and effective system to respond to whatever information students do bring forward. If students have concerns about how adults will react to information that they bring forward, they may be even less inclined to volunteer such information.

In addition, this finding highlights the importance in an inquiry of attempts to gather all relevant information from anyone who may have contact with the student. Efforts to gather all potentially relevant pieces of information, however innocuous they may appear on their own, from all individuals with whom the student has contact may help to develop a more comprehensive picture of the student's ideas, activities, and plans. In the end, investigators may find that different people in the student's life have different pieces of the puzzle.

Key Finding 3

Most attackers did not threaten their targets directly prior to advancing the attack.

Implications

This finding underscores the importance of *not waiting* for a threat before beginning an inquiry. The *Safe School Initiative* found that most attackers in fact did not threaten their target directly and some made no threat at all. Instead, other behaviors and communications that may prompt concern, such as hearing that a child is talking about bringing a gun to school, are indicators that the child may pose a threat and therefore should prompt the initiation of efforts to gather information.

School administrators should respond to all students who make threats. The lack of response could be taken by the threatener as permission to proceed with carrying out the threat. In the end, however, it is important to distinguish between someone who *makes* a threat—tells people they intend to harm someone—and someone who *poses* a threat—engages in behaviors that indicate an intent, planning, or preparation for an attack. Those conducting inquiries should focus particular attention on any information that indicates that a student *poses* a threat, regardless of whether the student has told a potential target he or she intends to do them harm.

Key Finding 4

There is no accurate or useful profile of students who engaged in targeted school violence.

Implications

The demographic, personality, school history, and social characteristics of the attackers varied substantially. Knowing that a particular student shares

characteristics, behaviors, features or traits with prior school shooters does not help in determining whether that student is thinking about or planning for a violent act.

The use of profiles in this way likewise is not an effective approach to identifying students who may pose a risk for targeted school violence at school or for assessing the risk that a particular student may pose for a school-based attack, once a particular student has been identified. Reliance on profiles to predict future school attacks carries two substantial risks: (1) the great majority of students who fit any given profile of a "school shooter" will not actually pose a risk of targeted violence; and, (2) using profiles will fail to identify some students who in fact pose a risk of violence but share few if any characteristics with prior attackers.²⁶

Rather than trying to determine the "type" of student who may engage in targeted school violence, an inquiry should focus instead on a student's *behaviors and communications* to determine if that student appears to be planning or preparing for an attack. Rather than asking whether a particular student "looks like" those who have launched school-based attacks before, it is more productive to ask whether the student is engaging in behaviors that suggest preparations for an attack, if so how fast the student is moving toward attack, and where intervention may be possible.

Key Finding 5

Most attackers engaged in some behavior, prior to the incident, that caused others concern or indicated a need for help.

Implications

Several key findings point to the fact that kids send signals—both directly and indirectly—to others regarding their problems. The boys who engaged in the targeted school violence examined by the *Safe School Initiative* were not "invisible" students. In fact nearly all of these students engaged in behaviors—prior to their attacks—that caused concern to at least one person, usually an adult, and most concerned at least three people.

This finding highlights the range of behaviors in a student's life that may be noticeable and that could prompt some additional probing by a caring adult. A student's family, teachers, friends and others may have information regarding aspects of a student's behavior that has raised concern. As was true in some of the incidents covered in this study, individuals in contact with the attacker may have observed something of concern about that student's behavior, but not of sufficient concern for them to notify anyone in a position to respond.

²⁶ Please refer to Reddy et al. (2001), "Evaluating risk for targeted violence in schools: Comparing risk assessment, threat assessment, and other approaches," for a full discussion of assessment approaches currently available to schools. The full citation for the article is listed in Appendix C of this document.

Educators and other adults can learn how to pick up on these signals and make appropriate referrals.²⁷ By inquiring about any information that may have prompted some concern, an investigator may be able to develop a more comprehensive picture of the student's past and current behavior, and identify any indications that the student is intent on or planning to attack. However, discretion should be exercised in determining whom to talk to about the student, so as not to alienate or stigmatize the student of concern. A significant challenge facing schools is to determine how best to respond to students who are already known to be in trouble or needing assistance.

Key Finding 6

Most attackers had difficulty coping with significant losses or personal failures. Many had considered or attempted suicide.

Implications

Many students, not just those who engaged in school-based attacks, experience or perceive major losses in their lives. Most students who face a significant loss, or who have difficulty coping with such a loss, are not going to be at risk for a school-based attack. However, information that indicates a student is facing or having trouble dealing with a significantly difficult situation may indicate a need to refer the student to appropriate services and resources.

In cases where there is concern about the possibility that a student may engage in targeted violence, attention should be given to any indication that a student is having difficulty coping with major losses or perceived failures, particularly where these losses or failures appear to have prompted feelings of desperation and hopelessness. An inquiry also should anticipate changes in the life of a troubled student, and consider whether these changes might increase—or decrease—the threat the student poses.

Key Finding 7

Many attackers felt bullied, persecuted, or injured by others prior to the attack.

Implications

Bullying was not a factor in every case, and clearly not every child who is bullied in school will pose a risk for targeted violence in school. Nevertheless, in a number of the incidents of targeted school violence studied, attackers described being bullied in terms that suggested that these experiences approached torment. These attackers

²⁷ See "Early Warning, Timely Response," listed in Appendix C of this report, for more information about how to identify students who may need assistance.

told of behaviors that, if they occurred in the workplace, likely would meet legal definitions of harassment and/or assault.

The prevalence of bullying found in this and other recent studies should strongly support ongoing efforts to reduce bullying in American schools.²⁸ Educators can play an important role in ensuring that students are not bullied in schools and that schools not only do not permit bullying but also empower other students to let adults in the school know if students are being bullied.

Key Finding 8

Most attackers had access to and had used weapons prior to the attack.

Implications

Access to weapons among some students may be common. However, when the idea of an attack exists, *any* effort to acquire, prepare, or use a weapon or ammunition may be a significant move in the attacker's progression from idea to action. Any inquiry should include investigation of and attention to weapon access and use and communications about weapons. Attention should also be given to indications of any efforts by a student to build a bomb or acquire bomb-making components.

The large proportion of attackers who acquired their guns from home points to the need for schools and law enforcement officials to collaborate on policies and procedures for responding when a student is thought to have a firearm in school. In particular, schools should be aware of the provisions of the Federal Gun-Free Schools Act, which requires that all schools expel students who bring a gun to school and should report all violations to local law enforcement officials.²⁹

Key Finding 9

In many cases, other students were involved in the attack in some capacity.

Implications

This finding highlights the importance of considering what prompting or encouragement a student may receive from others in his life that influences his intent, planning, or preparations for a potential attack. Any investigation of potential targeted school violence should include attention to the role that a student's friends or peers may be playing in that student's thinking about and preparations for an

attack. It is possible that feedback from friends or others may help to move a student from an unformed thought about attacking to developing and advancing a plan to carry out the attack.

Key Finding 10

Despite prompt law enforcement responses, most attacks were stopped by means other than law enforcement intervention, and most were brief in duration.

Implications

The short duration of most incidents of targeted school violence argues for the importance of developing preventive measures in addition to any emergency planning for a school or school district. The preventive measures should include protocols and procedures for responding to and managing threats and other behaviors of concern.

²⁸ See, for example, Nansel, T., Overpeck, M., Pilla, R., Ruan, J., Simons-Morton, B., & Scheidt, P. (2001). Bullying behavior among U.S. youth. *Journal of the American Medical Association*, 285, pp. 2094-2100.

²⁹ Elementary and Secondary Education Act of 1965, as amended by No Child Left Behind Act of 2001, Title IV, Part A, Subpart 3, Section 4141.

CHAPTER V

CONCLUSION: THREAT
ASSESSMENT AS A PROMISING
STRATEGY FOR PREVENTING
SCHOOL VIOLENCE



Taken together, the findings from the *Safe School Initiative* suggest that some future attacks may be preventable. Most incidents of targeted school violence were thought out and planned in advance. The attackers' behavior suggested that they were planning or preparing for an attack. Prior to most incidents, the attackers' peers knew the attack was to occur. And most attackers were not "invisible," but already were of concern to people in their lives.

In light of these findings, the use of a threat assessment approach may be a promising strategy for preventing a school-based attack. Educators, law enforcement officials and others with public safety responsibilities may be able to prevent some incidents of targeted school violence if they know what information to look for and what to do with such information when it is found. In sum, these officials may benefit from focusing their efforts on formulating strategies for preventing these attacks in two principal areas:

- developing the capacity to pick up on and evaluate available or knowable information that might indicate that there is a risk of a targeted school attack; and,
- employing the results of these risk evaluations or "threat assessments" in developing strategies to prevent potential school attacks from occurring.

Threat Assessment and Targeted School Violence Prevention

Threat assessment, as developed by the Secret Service and applied in the context of targeted school violence, is a fact-based investigative and analytical approach that focuses on what a particular student is doing and saying, and not on whether the student "looks like" those who have attacked schools in the past. Threat assessment emphasizes the importance of such behavior and communications for identifying, evaluating and reducing the risk posed by a student who may be thinking about or planning for a school-based attack. The Department of Education and the Secret Service currently are completing work on a publication that will provide school administrators and law enforcement officials with guidance on planning and implementing a threat assessment approach within school settings.³⁰

In relying on a fact-based threat assessment approach, school officials, law enforcement professionals and others involved in the assessment will need tools, mechanisms and legal processes that can facilitate their efforts to gather and analyze information regarding a student's behavior and communications. For example, school and law enforcement personnel should be offered training regarding what information to gather, how to gather and evaluate it, and how they might try to intervene in cases where the information collected suggests a student may be planning or preparing for a school-based attack.

³⁰ *Supra* note 25.

Several states have enacted legislation that makes it easier for schools to share student information with law enforcement agencies and others who are trying to determine whether a student might be moving toward a school-based attack.³¹ Localities and states may wish to explore such options for supporting threat assessment components in schools and facilitating sharing information across school, law enforcement and community systems participating in the threat assessment process.

Finally, educators can play a part in prevention by creating an environment where students feel comfortable telling an adult whenever they hear about someone who is considering doing harm to another person, or even whether the person is considering harming themselves. Once such an environment is created, it will remain important that the adults in that environment listen to students and handle the information they receive in a fair and responsible manner.

³¹ See "Legal Issues" in Appendix C of this report for listings of documents that include descriptions of state statutes in this area.

APPENDIX



Appendix A
INCIDENTS OF
TARGETED SCHOOL
VIOLENCE, BY STATE

Appendix B
INCIDENTS OF
TARGETED SCHOOL
VIOLENCE, BY YEAR

Appendix C
RESOURCES

**Contact
Information**



INCIDENTS OF TARGETED SCHOOL VIOLENCE, BY STATE

STATE	TOWN OR COUNTY
Alabama	Lanett
Alaska	Bethel
Arkansas	Jonesboro, Stamps
California	Anaheim, Napa, Olivehurst, Palo Alto, Redlands
Colorado	Jefferson County (Littleton)
Florida	Lake Worth
Georgia	Conyers, Scottsdale
Idaho	Notus
Iowa	Manchester
Kansas	Goddard
Kentucky	Grayson, Union, West Paducah
Massachusetts	Great Barrington
Mississippi	Pearl
Missouri	DeKalb, Patterson
Montana	Lewistown
New Mexico	Deming
New York	Olean
North Carolina	Greensboro
Oklahoma	Fort Gibson
Oregon	Springfield
Pennsylvania	Edinboro
South Carolina	Blacksville
Tennessee	Fayetteville, Lynville
Texas	Austin
Virginia	Virginia Beach
Washington	Moses Lake
Wisconsin	Wauwatosa

INCIDENTS OF TARGETED SCHOOL VIOLENCE, BY YEAR

YEAR	MONTH AND DAY
1974	December 30
1978	May 18, October 15
1985	January 21
1986	December 4
1987	March 2
1988	December 14
1989	October 5
1992	May 1, May 14, December 14
1993	January 18, December 1
1994	May 26, October 12, November 8
1995	January 23, October 12, November 15
1996	February 2, February 8, March 25, September 25
1997	February 19, October 1, December 1, December 15
1998	March 24, April 24, May 19, May 24
1999	April 16, April 20, May 20, November 19, December 6
2000	May 26

RESOURCES

Boys and Violence

- Pollack, W. (1998). *Real boys: Rescuing our sons from the myths of boyhood*. New York: Henry Holt, Inc.
- Pollack, W., & Cushman, K. (2001). *Real boys workbook*. New York: Villard.
- Pollack, W., & Shuster, T. (2000). *Real boys' voices*. New York: Random House.

Legal Issues

- Medaris, M.L., Campbell, E., & James, B. (1997, June). *Sharing information: A guide to the Family Educational Rights and Privacy Act and participation in juvenile justice programs*. Washington, D.C.: U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention and U.S. Department of Education, Family Policy Compliance Office.
- Slayton, J. (2000, March). Establishing and maintaining interagency information sharing. *JAIBG Bulletin*. Washington, D.C.: U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention.
- Thomerson, J. (2001, May). *School violence: Sharing student information*. Denver, Colo.: National Conference of State Legislatures.

Related Research

- Borum, R. (2000). Assessing violence risk among youth. *Journal of Clinical Psychology*, 56, 1263-1288.
- Dwyer, K., Osher, D., & Wagner, C. (1998). *Early warning, timely response: A guide to safe schools*. Washington, D.C.: U.S. Department of Education.
- Fein, R.A., & Vossekuil, B.V. (1999). Assassination in the United States: An operational study of recent assassins, attackers, and near-lethal approachers. *Journal of Forensic Sciences*, 44, 321-333. Available at <http://www.secretservice.gov/ntac.htm>

Threat Assessment

- Borum, R., Fein, R., Vossekuil, B., & Berglund, J. (1999). Threat assessment: Defining an approach for evaluating risk of targeted violence. *Behavioral Sciences & the Law*, 17, 323-337. Available at <http://www.secretservice.gov/ntac.htm>
- Fein, R.A., & Vossekuil, B. (1998). *Protective intelligence & threat assessment investigations: A guide for state and local law enforcement officials* (NIJ/OJP/DOJ Publication No. 170612). Washington, D.C.: U.S. Department of Justice. Available at <http://www.secretservice.gov/ntac.htm>
- Fein, R.A., Vossekuil, B., & Holden, G.A. (1995, September). Threat assessment: An approach to prevent targeted violence. *National Institute of Justice: Research in Action*, 1-7. Available at <http://www.secretservice.gov/ntac.htm>
- Reddy, M., Borum, R., Berglund, J., Vossekuil, B., Fein, R., & Modzeleski, W. (2001). Evaluating risk for targeted violence in schools: Comparing risk assessment, threat assessment, and other approaches. *Psychology in the Schools*, 38, 157-172. Available at <http://www.secretservice.gov/ntac.htm>

Web Sites

United States Department of Educationwww.ed.gov
United States Secret Servicewww.secretservice.gov

CONTACT INFORMATION

United States Secret Service
National Threat Assessment Center
950 H Street NW, Suite 9100
Washington, DC 20223
Phone: 202-406-5470
Fax: 202-406-6180
Web site: www.secretservice.gov/ntac

United States Department of Education
Safe and Drug-Free Schools Program
400 Maryland Avenue, SW
Washington, DC 20202-6123
Phone: 202-260-3954
Fax: 202-260-7767
Web site: www.ed.gov/offices/OESE/SDFS

U.S. Department of Education

Rod Paige
Secretary

Office of Safe And Drug-Free Schools

Deborah Price
Deputy Under Secretary

William Modzeleski
Associate Deputy

U.S. Secret Service

W. Ralph Basham
Director

Office of Protective Research

Michael Stenger
Assistant Director

National Threat Assessment Center

Matthew Doherty
Special Agent in Charge

First printed in May 2002. Revised in May 2004.

This report is in the public domain. Authorization to reproduce it in whole or in part is granted. While permission to reprint this publication is not necessary, the citation should be: Vossekuil, B., Fein, R., Reddy, M., Borum, R., & Modzeleski, W., *The Final Report and Findings of the Safe School Initiative: Implications for the Prevention of School Attacks in the United States*. U.S. Department of Education, Office of Elementary and Secondary Education, Safe and Drug-Free Schools Program and U.S. Secret Service, National Threat Assessment Center, Washington, D.C., 2002.

To order copies of this report,

write to: ED Pubs, Education Publications Center, U.S. Department of Education, P.O. Box 1398, Jessup, MD 20794-1398;

or **fax** your request to: (301) 470-1244;

or **email** your request to: edpubs@inet.ed.gov or ntac@secretsservice.gov.

or **call** in your request toll-free: 1-877-433-7827 (1-800-4-ED-Pubs). If 877 service is

SAFE SCHOOL INITIATIVE FINAL REPORT

not yet available in your area, call 1-800-872-5327 (1-800-USA-LEARN). Those who use a telecommunications device for the deaf (TDD) or a teletypewriter (TTY), should call 1-800-437-0833.

or **order online** at: www.ed.gov/pubs/edpubs.html.

This report is also available on the Department of Education's Web site at: www.ed.gov/offices/OESE/SDFS and the U.S. Secret Service Web site at: www.secretservice.gov/ntac.

On request, this publication is available in alternate formats, such as Braille, large print, audiotape, or computer diskette. For more information, please contact the Department of Education's Alternate Format Center (202) 260-9895 or (202) 205-8113.

"

"

"

"

EXHIBIT 14

"

The terrible numbers that grow with each mass shooting

NOV. 17, 2019



Four people killed at a back yard party in Fresno, Calif.

By **Bonnie Berkowitz, Chris Alcantara and Denise Lu**
Updated Nov. 18, 2019

The Orinda, Calif., and Fresno, Calif., shootings are developing stories, and details will be updated..

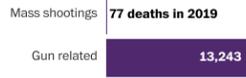
The places change, the numbers change, but the choice of weapon remains the same. In the United States, people who want to kill a lot of other people most often do it with guns.

Public mass shootings account for a tiny fraction of the country's gun deaths, but they are uniquely terrifying because they occur without warning in the most mundane places. Most of the victims are chosen not for what they have done but simply for where they happen to be.

There is no universally accepted definition of a public mass shooting, and this piece defines it narrowly. It looks at the **170 shootings** in which four or more people were killed by a lone shooter (two shooters in a few cases). It does not include shootings tied to robberies that went awry, and it does not include domestic shootings that took place exclusively in private homes. A broader definition would yield much higher numbers.

This tally begins Aug. 1, 1966, when a student sniper fired down on passersby from the observation deck of a clock tower at the University of Texas. By the time police killed him, 17 other people were dead or dying. As Texas Monthly's Pamela Colloff [wrote](#), the shooting "ushered in the notion that any group of people, anywhere — even walking around a university campus on a summer day — could be killed at random by a stranger."

Public mass shootings are a small slice of gun deaths



Source: Gun Violence Archive. Excludes the roughly 22,000 annual gun suicides, which are not publicly reported in real time.

Search for details of a particular shooting. The most recent is selected.

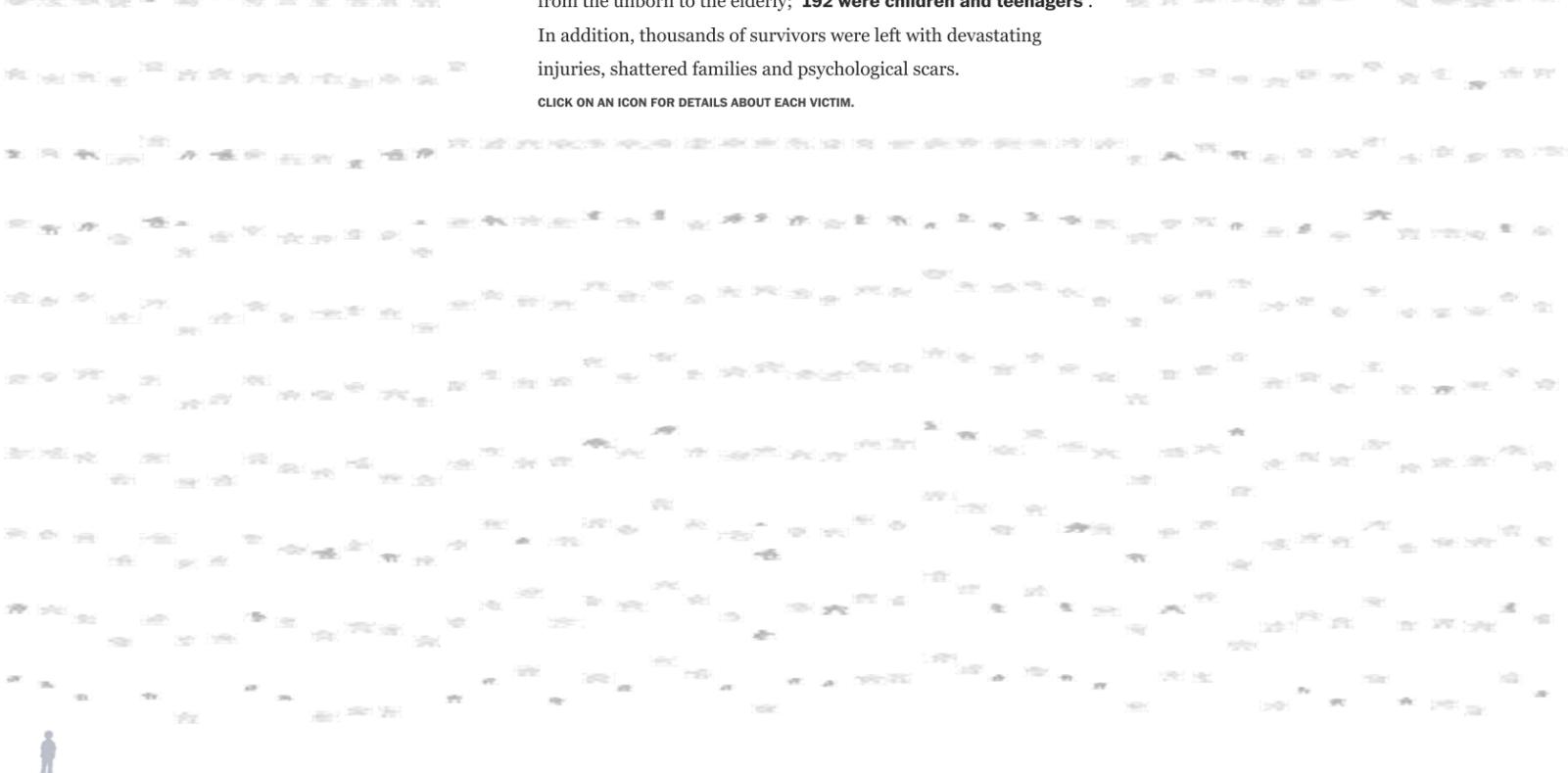
FRESNO, CALIF. — NOV. 17, 2019
Football-watching party shooting

Victims: **4** killed and **6** injured Guns: **2** Shooters: **2** [Read details](#)

1,220 killed

The people who were killed came from nearly every imaginable race, religion and socioeconomic background. Their ages range from the unborn to the elderly; **192 were children and teenagers**. In addition, thousands of survivors were left with devastating injuries, shattered families and psychological scars.

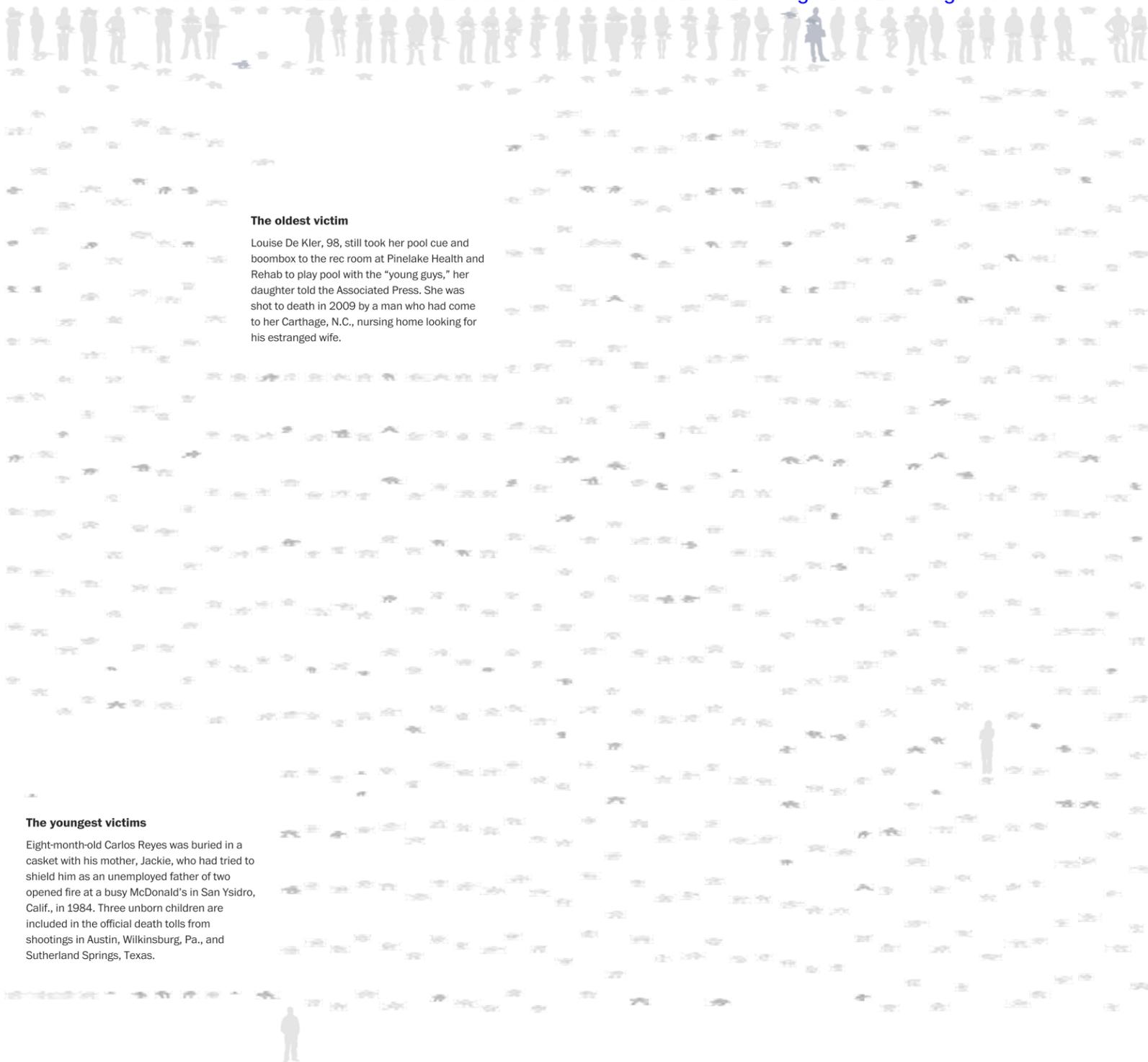
CLICK ON AN ICON FOR DETAILS ABOUT EACH VICTIM.



RELATED



The number of U.S. mass shootings depends on how you count →



The oldest victim

Louise De Kler, 98, still took her pool cue and boombox to the rec room at Pinelake Health and Rehab to play pool with the "young guys," her daughter told the Associated Press. She was shot to death in 2009 by a man who had come to her Carthage, N.C., nursing home looking for his estranged wife.

The youngest victims

Eight-month-old Carlos Reyes was buried in a casket with his mother, Jackie, who had tried to shield him as an unemployed father of two opened fire at a busy McDonald's in San Ysidro, Calif., in 1984. Three unborn children are included in the official death tolls from shootings in Austin, Wilksburg, Pa., and Sutherland Springs, Texas.

324 guns



Shooters often carried more than one weapon; one was found with 24. At least **179 of mass shooters' weapons were obtained legally** and **61 were obtained illegally**. It's unclear how **84 weapons** were acquired.

SILHOUETTES REPRESENT A BASIC TYPE OF GUN RATHER THAN EXACT MAKES OR MODELS. CLICK ON AN ICON FOR DETAILS ABOUT EACH GUN.

Semiautomatic rifles

Semiautomatic rifles have been used in some of the country's deadliest shootings, such as those in Newtown, Orlando, San Bernardino and Las Vegas. The AR-15, a lightweight, customizable version of the military's M16, soared in popularity after a 10-year federal ban on assault weapons expired in 2004. Some of the Las Vegas shooter's guns had been fitted with legal devices called "bump-fire stocks," which allow semiautomatic rifles to fire as quickly as automatic ones.

Semiautomatic pistols

The country's most popular type of firearm, 9mm semiautomatic handguns, are used by many law enforcement officers. They are generally light and inexpensive, easy to conceal and control, and they fire as quickly as a person can pull the trigger. The gunman who killed 32 students and teachers at Virginia Tech in 2007 used a 9mm semiautomatic Glock 19 (and a .22-caliber Walther P22, another popular caliber). In this data, 9mm semiautomatic handguns show up more than any other weapon.

42 states and the District

Shootings in schools and houses of worship tend to stand out in our minds, but they make up a relatively small portion of public mass shootings. More common are those in offices and retail establishments such as restaurants and stores. California has had more of these public mass shootings than any other state, with 28.

HOVER FOR INFO ABOUT EACH SHOOTING.



Some locations have simply become shorthand for the horrors that occurred there — Columbine, Aurora, Sandy Hook. And some have added other tragic phrases to the national vocabulary.:end

“Going postal”

One of the most notorious workplace shootings was carried out by an ex-Marine in an Edmond, Okla., post office in 1986. He killed 14 and wounded six before killing himself. It was the deadliest in a string of rage-fueled killings by current and former postal employees that gave rise to the phrase “going postal.”

“Active shooter”

The 1999 siege by two seniors at Columbine High School in Colorado became a turning point after which school shootings could no longer be considered unthinkable aberrations. After a confused response that played out over several hours while a wounded teacher bled to death, U.S. law enforcement agencies overhauled procedures and officer training to create protocols for stopping an “active shooter.”

“Lockdown drill”

After Columbine, many schools created safety plans so that children and educators would know what to do during an attack. After Sandy Hook, “lockdown drills” became as common as fire drills. No children were killed at the Rancho Tehama Elementary School shooting in California in 2017, when fast-acting educators and students executed lockdown procedures that kept the gunman out of the school.

Additional contributions by [Alex Horton](#), [Lazaro Gamio](#), [Kevin Uhrmacher](#), [Richard Johnson](#) and [Ted Mellnik](#).

About this story

This data is compiled from Grant Duwe, author of “Mass Murder in the United States: A History,” [Mother Jones](#) and Washington Post research.

Death tolls include victims killed by shooters within a day of the main shooting, including any who were killed in another way. Totals also include people who later died from injuries received during the shootings. Injuries include everyone reportedly hurt in the event, not just gunshot injuries. A gun purchase that should have been rejected but was allowed because of a bureaucratic or reporting glitch is considered illegal. Reports disagree on some ages in this dataset.

Additional sources: Violence Policy Center, [Gun Violence Archive](#); [FBI 2014 Study of Active Shooter Incidents](#); published reports.

This is an updated version of a piece originally published in December 2015. Originally published Feb. 14, 2018.

Share Comments

More stories

A gunman opens fire in your building. What do you do?

What would you do if someone walked into the building you are in right now and started shooting?



Most Read

Follow Post Graphics

Twitter Facebook Tumblr

Mass shootings: How U.S. gun culture compares with the rest of the world

After mass shooting events, much debate centers around Americans' relatively easy access to guns.



GZJ ~~DK~~'37"

Mother Jones

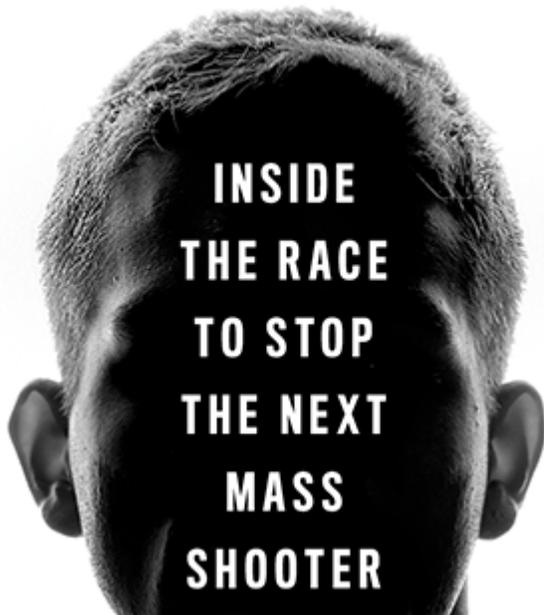
A Guide to Mass Shootings in America

There have been at least 115 in the past four decades—and most of the killers got their guns legally.

MARK FOLLMAN, GAVIN ARONSEN, AND DEANNA PAN UPDATED: NOV. 18, 2019, 8:30

A.M. PT

In July 2012, in the aftermath of the movie theater massacre in Aurora, Colorado, *Mother Jones* created a first-of-its-kind **open-source database documenting mass shootings** in the United States. Our research focused on indiscriminate rampages in public places resulting in four or more victims killed by the attacker. We exclude shootings stemming from more conventionally motivated crimes such as armed robbery or gang violence. (Or in which the perpetrators have not been identified.) Other news outlets and researchers have since published larger tallies that include a wide range of gun crimes in which four or more people have been either wounded or killed. While those larger datasets of multiple-victim shootings are useful for studying the broader problem of gun violence, our investigation provides an in-depth look at a distinct phenomenon—from the firearms used and mental health factors to the growing copycat problem. Tracking mass shootings is complex; we believe ours is the most useful approach for studying this specific phenomenon.



Can the next attack be prevented?

Since we began, our interactive map below and the downloadable database behind it have been expanded with 53 additional cases from 2013-2019. Dating back to at least 2005, the FBI and leading criminologists essentially defined a mass shooting as a single attack in a public place in which four or more victims were killed. We adopted

that baseline for fatalities when we gathered data in 2012 on three decades worth of cases. (It is important to note that there have been many similar indiscriminate gun rampages in public places—but resulting in fewer fatalities—that would otherwise be included in our dataset. In that regard, ours is a conservative measure of the problem.) In January 2013, a mandate for federal investigation of mass shootings authorized by President Barack Obama lowered that baseline to three or more victims killed. Accordingly, we include attacks dating from January 2013 in which three or more victims were killed. (Any analysis of the frequency of mass shootings using our database should account for this.) Our original analysis, which covers cases from 1982-2012 with four or more victims killed, follows below. The cases we’ve documented since then using the revised federal baseline reaffirm our major analytical findings.



[Zoom in to view multiple cases located in close proximity. **View and download the full database behind the map here.**]

Additional reporting and production contributed by: AJ Vicens, Olivia Exstrum, Tasneem Raja, Jaeah Lee, and Maggie Caldwell.

It is perhaps too easy to forget how many times this has happened. The gun massacre at a movie theater in Aurora, Colorado, in July 2012, another at a Sikh temple in Wisconsin that August, another at a manufacturer in Minneapolis that September, and then another in a movie theater in Aurora, Colorado, in July 2013.

September—and then the unthinkable nightmare at a Connecticut elementary school that December—were some of the latest in an epidemic of such gun violence over the last three-plus decades. Since 1982, there have been at least 115 public mass shootings across the country, with the killings unfolding in 34 states, from Massachusetts to Hawaii. They are occurring more often: An analysis of this database by researchers at Harvard University, further corroborated by a different study from the FBI, determined that mass shootings have tripled in frequency in recent years.

We've gathered detailed data on nearly four decades worth of cases, including information on the attackers' profiles, the types of weapons they used, and the number of victims they injured and killed. [*Editor's note:* The following analysis covers our original dataset comprised of 62 cases from 1982-2012.]

Weapons: Of the 143 guns possessed by the killers, more than three quarters were obtained legally. They included dozens of assault weapons and semi-automatic handguns with high-capacity magazines. (See charts below.) Just as a perpetrator used a .40-caliber Glock to slaughter students in Red Lake, Minnesota, in 2005, so too did the one in Aurora, along with an AR-15 assault rifle, when blasting away at his victims in a darkened movie theater. In Newtown, Connecticut, the attacker wielded a .223 Bushmaster semi-automatic assault rifle as he massacred 20 school children and six adults.

The perpetrators: More than half of the cases involved school or workplace shootings (12 and 20, respectively); the other 30 cases took place in locations including shopping malls, restaurants, and religious and government buildings. Forty-four of the killers were white males. Only one was a woman. (See Goleta, Calif., in 2006.) The average age of the killers was 35, though the youngest among them was a mere 11 years old. (See Jonesboro, Ark., in 1998.) A majority were mentally troubled—and many displayed signs of mental health problems before setting out to kill. Explore the above map and database for further details—we do not consider it to be all-inclusive, but based on the criteria we used, we believe that we have produced the most comprehensive rundown available on this particular type of violence. (Mass shootings represent a small fraction of America's overall gun violence.) For the stories of the 151 shooting rampage victims of 2012, [click here](#), and for our groundbreaking investigation into the economic costs of the nation's gun violence, including mass shootings, [click here](#).

Here is a description of the criteria we use:

- **The perpetrator took the lives of at least four people.** A 2008 FBI report identifies an individual as a mass murderer—versus a spree killer or a serial killer—if he kills four or more people in a single incident (not including himself), typically in a single location. (*In 2013, the US government's fatality baseline was revised down to three; our database reflects this change beginning from Jan. 2013, as detailed above.)

- **The killings were carried out by a lone shooter.** (Except in the case of the Columbine massacre and the Westside Middle School killings, which involved two shooters.)
- **The shootings occurred in a public place.** (Except in the case of a party on private property in Crandon, Wisconsin, and another in Seattle, where crowds of strangers had gathered, essentially constituting a public crowd.) Crimes primarily related to gang activity or armed robbery are not included, nor are mass killings that took place in private homes (often stemming from domestic violence).
- **Perpetrators who died or were wounded** during the attack are not included in the victim tallies.
- **We included a handful of cases also known as “spree killings”**—cases in which the killings occurred in more than one location, but still over a short period of time, that otherwise fit the above criteria.

For more on the thinking behind our criteria, see these two explanatory pieces. Plus: more on the mental health factor and on state laws rolling back gun restrictions across the US. And: Explore the full data set behind our investigation.

Here are two charts detailing the killers' weapons:

This guide was first published on July 20, 2012. Since then, we've updated and expanded it numerous times with additional research and reporting. The analysis and charts above cover the data through 2012 (comprising 62 cases); additional data and analysis on the shooters' weapons are in this story. Information on 53 additional mass shootings from 2013-2019 is included in our full data set here. For much more of our reporting on mass shootings, gun violence, and gun laws, see our special investigations: *America Under the Gun* and *The True Cost of Gun Violence*.

Copyright © 2019 Mother Jones and the Foundation for National Progress. All Rights Reserved.

EXHIBIT 16



K-12 School Shooting Database

SHOOTING INCIDENTS GRAPHS 2010-PRESENT

INCIDENTS BY CALIBER OF FIREARM

Based on publicly available data from 2010-present

Date
Last 10 years

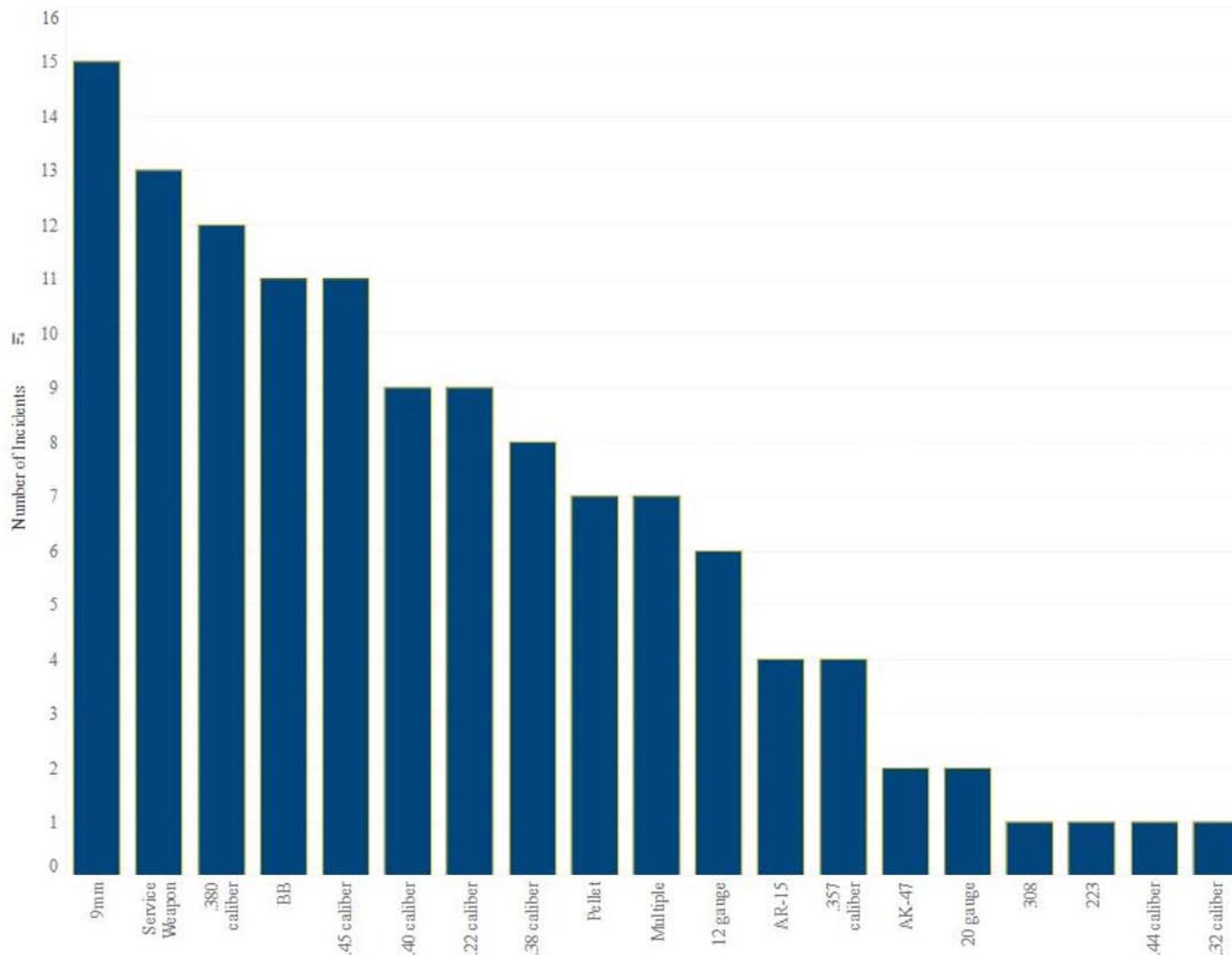


EXHIBIT 17



Center for American Progress



GUN VIOLENCE PREVENTION

America's Youth Under Fire

The Devastating Impact of Gun Violence on Young People

By Chelsea Parsons, Maggie Thompson, Eugenio Weigend Vargas, and Giovanni Rocco Posted on May 4, 2018, 9:02 am



Getty/Melina Mara

Students from across the Washington, D.C., area filled the west lawn of the U.S. Capitol demanding congressional action concerning gun violence, March 2018.

OVERVIEW

Young people in the United States bear the brunt of the nation's gun violence and are leading efforts to stop it.

PRESS CONTACT



Introduction and summary

On February 14, 2018, 14 students and three staff members were murdered at Marjory Stoneman Douglas High School in Parkland, Florida, by a single shooter armed with an assault rifle. This horrific massacre galvanized the nation's attention to the issue of gun violence, particularly as it affects young people in this country. However, the scope of gun violence as it affects America's youth is much vaster than this most recent mass shooting. Gunfire has officially overtaken car accidents as one of the leading killers of young people in the United States.¹ As of publication time, since the beginning of 2018, 820 teens ages 12 to 17 have been killed or injured with a gun.² As mass shootings become more common and more deadly, a staggering 57 percent of teenagers now fear a school shooting.³

The epidemic of gun violence against America's youth is more than just a disturbing data point. For each bullet fired, there are multiple stories of lives changed forever. When he was just 6 years old, Missouri State Rep. Bruce Franks Jr. saw his brother shot in front of their neighbor's home.⁴ Nevada activist Mariam El-Haj witnessed the shooting of her mother by her estranged father, who then turned the gun on Mariam.⁵ Oregon youth mentor Jes Phillip's siblings have all had close calls—she has three younger sisters who were present at the Reynolds High School shooting in Troutdale, Oregon, and two bullets landed next to her brother's bed when they came through her family's apartment wall during a neighborhood shooting.⁶ Nineteen-year-old student Eli Saldana, a member of the Native American community living in Chicago, was shot on his walk home from work.

SUBSCRIBE TO *INPROGRESS*

Email

SUBSCRIBE

These stories of gun violence are all too common among young Americans. The United States' gun violence epidemic disproportionately ravages young people, particularly young people of color. In short, gun violence is shattering a generation.

Young people are not simply victims of gun violence in this country, they are among the leading voices calling for change to the nation's weak gun laws and deadly gun culture. Organizers of the Black Lives Matter movement; survivors of the Parkland shooting; youth organizers working in cities hardest hit by gun violence, such as Chicago, Baltimore, and St. Louis, have all lent their voices to an increasingly loud call to action.

These young people do not just want to reform gun laws—they are also demanding that the issue of gun violence be examined as part of a complex and intersectional web of issues that also include community disinvestment, criminal justice reform, and policing. They are advocating not only for solutions to make

Introduction and summary

CONTENTS

- 1 This report breaks down how gun violence is affecting young people, and how young activists are rising to build an intersectional movement working for solutions. It examines the specific impact of gun violence on young people and considers both how young people as a collective are disproportionately affected and how different communities of young people share different aspects of the burden of this violence. This report also highlights examples of young people leading the advocacy efforts around this issue and discusses a number of policy solutions that are crucial to reducing gun violence, reforming the criminal justice system, improving police-community relations, and encouraging reinvestment in impacted communities.

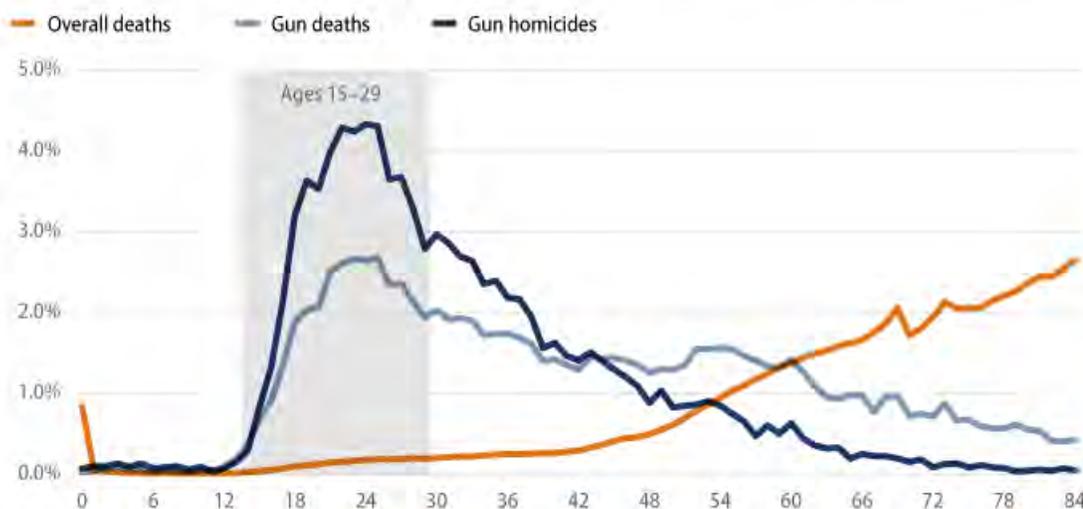
Impact of gun violence on young people: A national overview

- 1 Young people make up a very small percentage of all deaths in the United States each year. Consider 2016: That year, more than 2.7 million people in the United States died, with the top-three leading causes of death being heart disease, cancer, and unintentional injuries.⁷ Of these 2.7 million deaths, only 2.2 percent were individuals between the ages of 15 and 29.⁸ However, looking only at deaths caused by gunfire, the picture changes dramatically. Young people in this age range accounted for 31 percent of all gun deaths in 2016 and nearly 50 percent of all gun-related homicides.⁹

FIGURE 1

Young people ages 15 to 29 made up a large share of gun-related deaths in 2016

Percentage of deaths in 2016, by age and cause



Source: CAP analysis of Centers for Disease Control and Prevention, "About Underlying Cause of Death, 1999-2016," available at <https://wonder.cdc.gov/ucd-icd10.html> (last accessed April 2018).



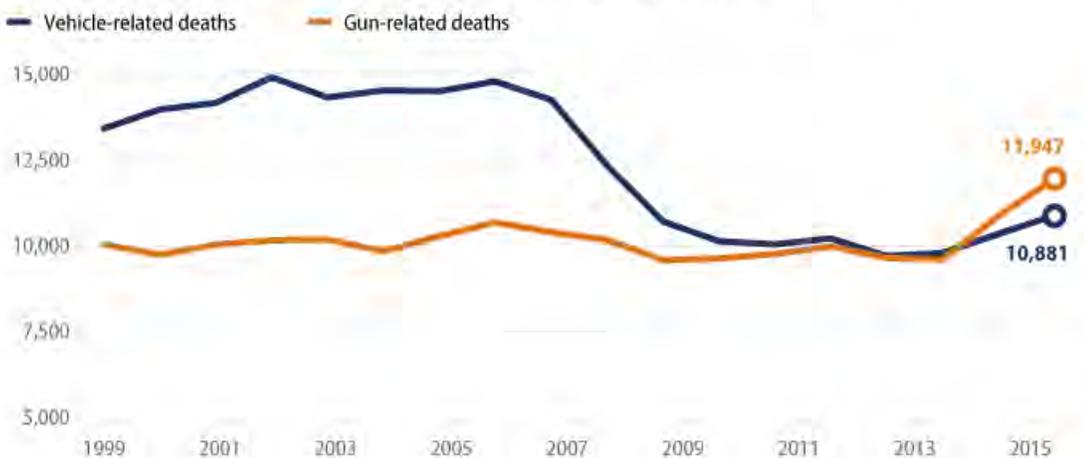
Introduction and summary

States and was second only to drug overdose. Following decades of advocacy and policymaking to make automobiles and driving safer, the number of young people killed in car accidents has steadily declined. In contrast, years of relative inaction to reduce U.S. gun violence has led to the number of gun deaths among young people between the ages of 15 to 29 to rise, with 11,947 individuals in this age group dying as the result of gun violence in 2016.¹⁰

FIGURE 2

Gun violence recently surpassed vehicle accidents as a leading cause of death for young Americans ages 15 to 29

Total gun-related deaths versus vehicle-related deaths of young Americans, 1999–2016



Source: Centers for Disease Control and Prevention. "Fatal Injury Reports, National, Regional and State (RESTRICTED), 1999–2016," available at <https://webappa.cdc.gov/cgi-bin/broker.exe> (last accessed April 2018).



DeJuan's story

The summer before he started his senior year of high school in 2005, DeJuan Patterson, now 29, was walking home from work when he was approached by a man who robbed him of his belongings and then shot him in the head. His body went into shock, but when he gathered the strength to open one of his eyes, he stared into the barrel of another gun, this time from the Baltimore police.

Patterson has relived that harrowing incident in his mind countless times and wondered what would prompt a police officer to revictimize a man sprawled on the ground bleeding from a gunshot wound to the head instead of offering help. Patterson understands that what he went through is something all too familiar to many black men, many of whom are victims of gun violence in their neighborhoods and at the hands of police. And while Patterson can make no sense of the police officer's actions that night, he has focused his energy on speaking up against gun violence, for the need for policing reform, and for investment in youth outreach and community engagement.

Introduction and summary

Leadership Council and is a leader in his Baltimore community. ¹¹

- Young people are also overrepresented in another category of gun deaths: fatal shootings by police. The use of lethal force by police has been a top concern in many communities for decades and gained increased attention nationwide in the wake of a spate of fatal shootings of unarmed black men in recent years. The criminal justice system deems most fatal shootings by police officers justified as a lawful use of force. Each of these deaths, however, has a significant impact on the community and its relationship with law enforcement—particularly in communities of color that have a deep and complicated history with their local police department. These police shootings are a core part of what gun violence looks like in many communities across the country.¹² According to data collected by *The Washington Post*, in the nearly 3,300 fatal shootings by police from January 2015 through April 2018, approximately 31 percent of the victims were between the ages of 18 and 29. This means that a young person is shot and killed by a police officer in the United States almost every day.¹³ Out of the young people fatally shot by police officers, 34 percent were African American, among which at least 12 percent were unarmed.¹⁴
- In addition, young people are at a heightened risk for being victims of violent crime involving a gun. Data from the National Crime Victimization Survey suggests that close to 840,000 young people between the ages of 15 and 29 were victims of violent crimes involving a firearm from 2012 to 2016.¹⁵ When compared to other age groups, young people present the highest rate of victimization at a rate that is 69 percent higher than the national average.¹⁶
-

Jes' story

Jes Phillip, 28, moved with her family from Micronesia to Portland, Oregon in 2008. As a teenager at the time, she left behind a country that experiences little to no gun violence to live a city neighborhood where gun violence was—and still is—part of daily life. Phillip made it to college without directly experiencing a shooting herself. However, all of her siblings were directly affected by gun violence in their school. On June 10, 2014, a student walked into Reynolds High School where Phillip's three younger sisters were present, armed with two guns, nine ammunition magazines, and a knife. A teacher was injured, and a student was shot and killed before the gunman committed suicide.¹⁷

Gun violence touched Phillip's life again just a year later when two stray bullets tore through the wall of her family's apartment, landing next to her brother's bed. That same day, several bullets peppered different apartments in her neighborhood, killing one of her neighbors.¹⁸

Introduction and summary

routine. She is afraid that this issue continues to threaten her child, her students at Parkrose High School, her family, and her community. Despite this, she has turned fear into action, by speaking out, sharing her story, and mobilizing her local community for gun reform.

Eli's story

On the evening of December 5, 2017, Eli Saldana, a 19-year-old Native American who lives in Chicago, was just walking home when he was shot. Right before he was attacked, he noticed a man walking behind him. When he turned around to look, Saldana was hit with the butt of the gun on the left side of his temple. As he tried to run away the man fired his gun. The bullet entered Saldana's right calf muscle but fortunately he escaped, making it home with his life.

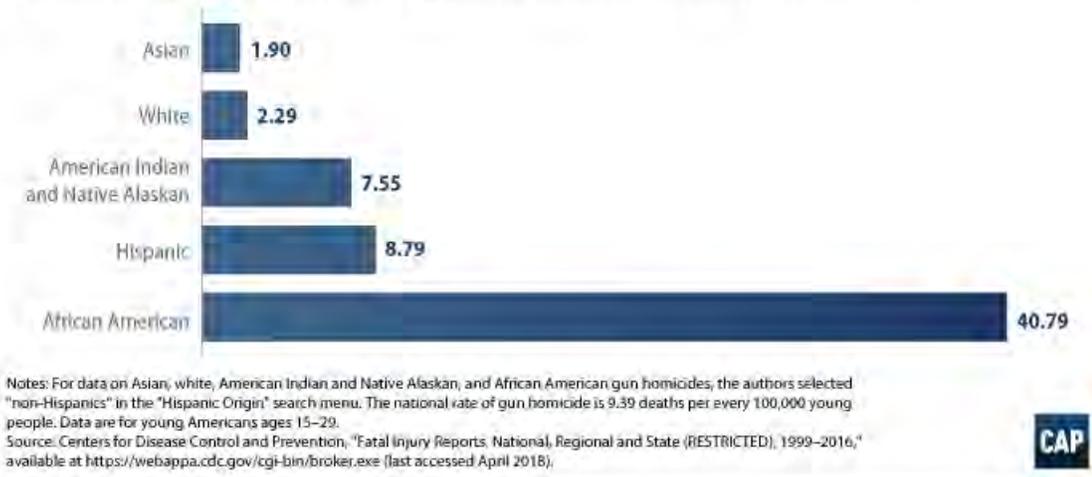
Like Saldana, 70 percent of American Indians and Alaska Natives live in urban areas¹⁹ and are thus exposed to the dangers of gun violence, like other racial minority groups. Saldana now lives with the physical scar of the bullet wound and the emotional scars of the event. However, he has used his traumatic experience to educate young people on gun violence and avoiding gang life. He's taken up music and uses that to connect with his nieces, nephews, and other Native American youth in hopes of being a positive role model.²⁰

Different communities, different impacts

¹ Generation Z and Millennials are the largest and most diverse generations in American history, and the burden of gun violence does not fall equally across their communities. Young African Americans, for example, face an exponentially higher risk of being the victim of a gun murder compared to young people of other races in the United States. African Americans between the ages of 15 and 29 are 18 times more likely than their white peers to be the victim of a gun homicide.²¹ While African Americans accounted for 15 percent of the population of young people in this age range, they comprise 64 percent of gun homicide victims.²² This dynamic is present among both men and women—young African American women, although they represent a small portion of gun-related homicides overall, are six times more likely than young white women to be the victim of a gun homicide.²³ Young Hispanics also face higher rates of gun homicides, with rates that are four times higher than their white peers.²⁴

of gun homicide than young people of other races

Gun homicides per every 100,000 young people, by race and ethnicity, 2007–2016

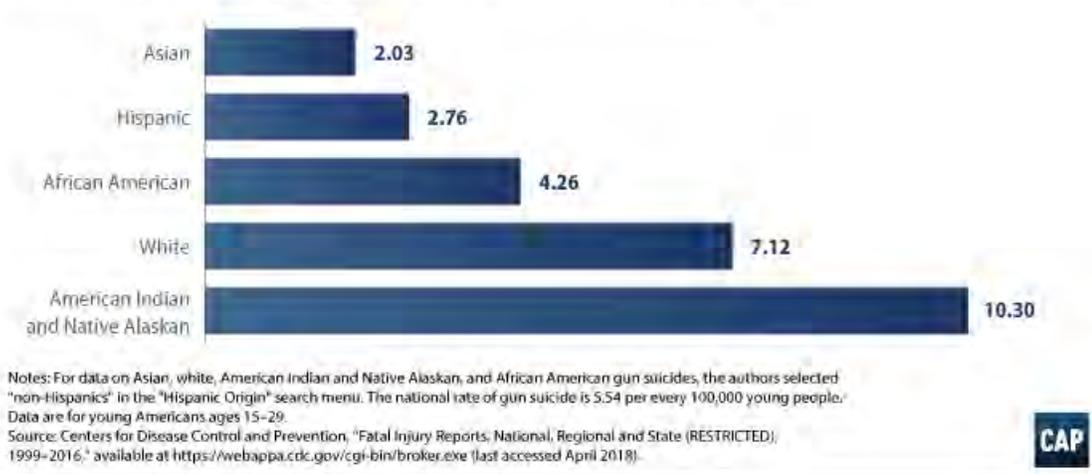


2 In contrast, gun suicides disproportionately impact white and Native American youth in the United States. From 2007 to 2016, the gun suicide rate among young white Americans was 2.6 times higher than Hispanics, 1.7 times higher than African Americans, and 3.5 times higher than Asian Americans.²⁵ Similarly, young American Indian and Native Alaskans presented a rate that was 3.7, 2.4, and 5.1 times higher than the rates among Hispanics, African Americans, and Asians, respectively.²⁶ A young Native American commits suicide with a gun every six days in the United States.²⁷ These numbers likely do not tell the whole story, as studies have found that overall deaths for American Indian or Alaska Native populations are underreported by 30 percent.²⁸ The elevated rate of suicide among young Native Americans presents a serious concern for tribal leaders, and as the National Congress of American Indians explained in 2015, "The higher incidence of suicide in Native peoples is informed by a long history of systemic discrimination and abuse."²⁹

FIGURE 4

There is an elevated rate of gun suicide among American Indian and Native Alaskan young people

Gun suicides per every 100,000 young people, by race and ethnicity, 2007–2016



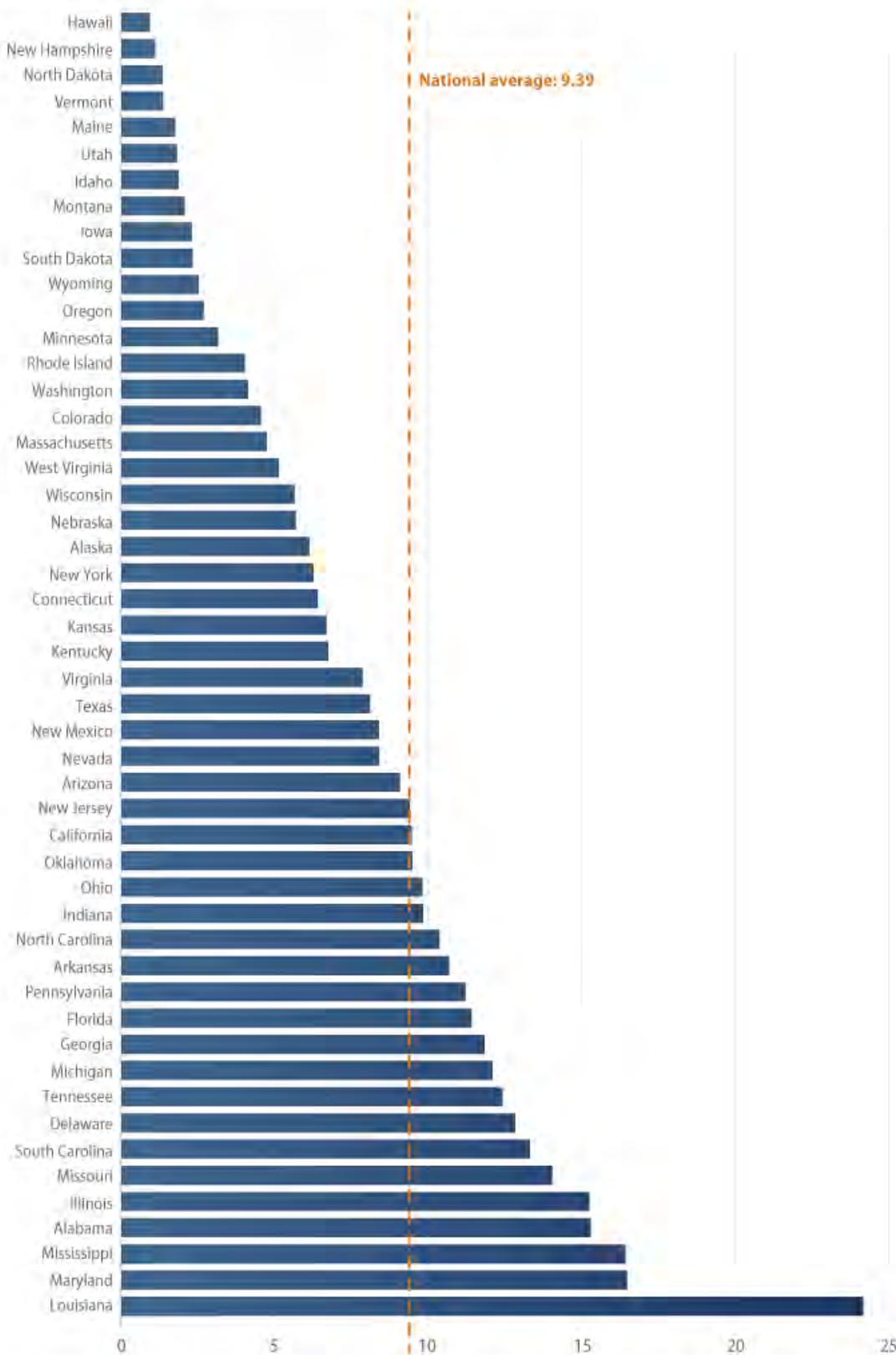
Introduction and summary

-
- 3 The experience of gun violence among young people varies widely depending on location. While the national numbers tell a disturbing story about the extent to which young lives in the United States are taken by gunfire, the reality is that a young person's risk of becoming a victim of gun violence depends, largely, on where they live.

 - 4 While approximately 17 young people are murdered with a gun every day in the United States, this risk is not borne equally by young people across the country.³⁰ The gun homicide rate of young people ages 15 to 29 varies dramatically from state to state. Louisiana has the highest rate of gun homicides of young people in the country, followed by Maryland, Mississippi, Alabama, and Illinois.³¹ The average gun homicide rate of young people in these five states is 14 times higher than the average of the five states with the lowest rates: Hawaii, New Hampshire, North Dakota, Vermont, and Maine.³² Louisiana's rate alone is more than 2.6 times higher than the national rate and 47 percent higher than Maryland's rate, the second-ranking state.³³

Introduction and summary

Gun homicides per every 100,000 young people, by state, 2007–2016



Note: The national rate of gun homicide is 9.39 per every 100,000 young people. Data are for young Americans ages 15–29. Source: Centers for Disease Control and Prevention, "Fatal Injury Reports, National, Regional and State (RESTRICTED), 1999–2016," available at <https://webappa.cdc.gov/cgi-bin/broker.exe> (last accessed April 2018).

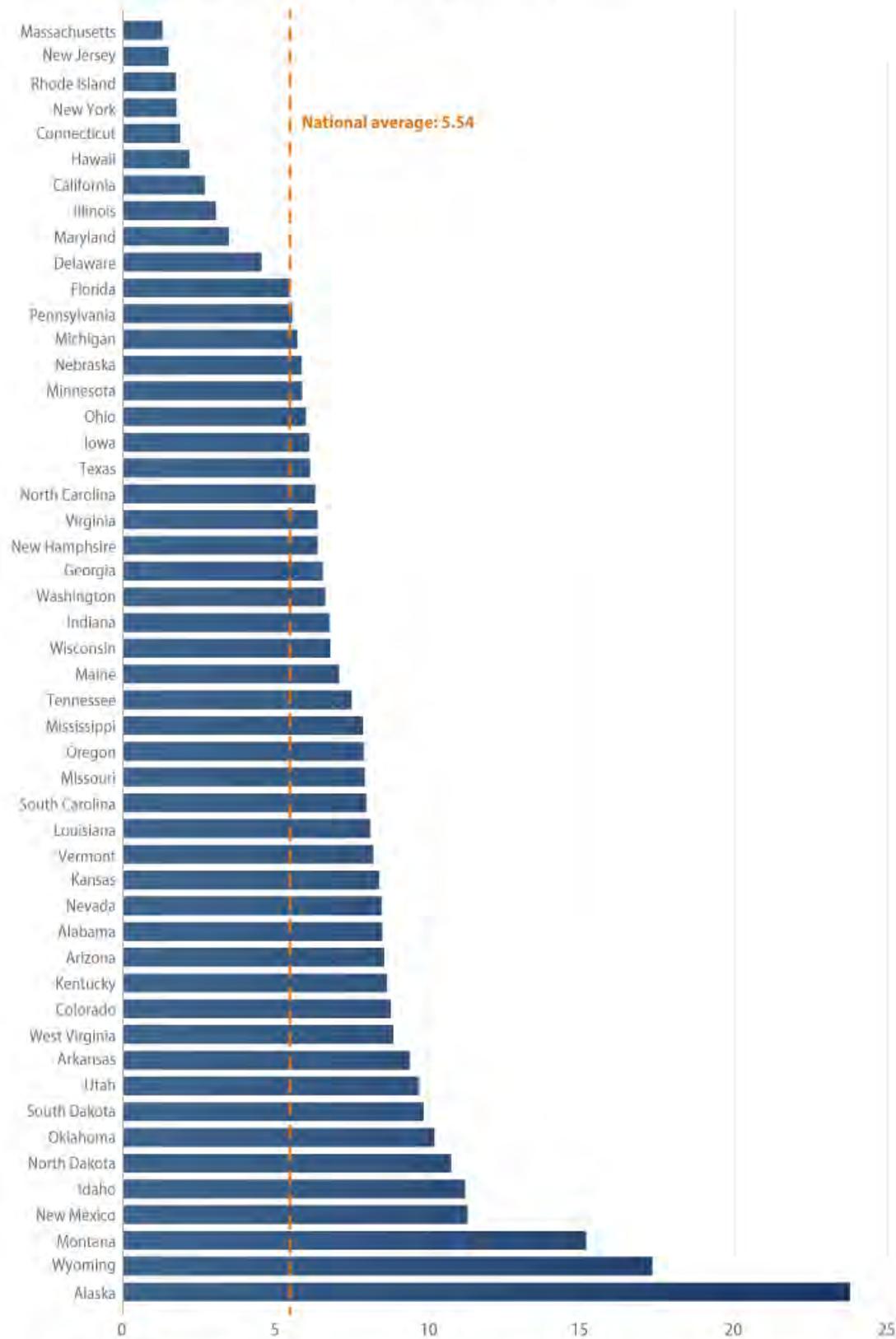


Introduction and summary

although with a different distribution among the states. Alaska has the highest rate of gun suicide among people ages 15 to 29, followed by Wyoming, Montana, New Mexico, and Idaho. Massachusetts, New Jersey, Rhode Island, New York, and Connecticut have the lowest rates.³⁴ Young people in the five highest ranking states are 10 times more likely to die by gun suicide than young people in the five lowest ranking states.³⁵

Introduction and summary

Gun suicides per every 100,000 young people, by state, 2007–2016



Note: The national rate of gun suicide is 5.54 per every 100,000 young people. Data are for young Americans ages 15–29.
 Source: Centers for Disease Control and Prevention, "Fatal Injury Reports, National, Regional and State (RESTRICTED), 1999–2016," available at <https://webappa.cdc.gov/cgi-bin/broker.exe> (last accessed April 2018).



Introduction and summary

on geography is gun homicides of women by intimate partners or family members. The risk posed by the presence of a gun in domestic violence situations is well established, particularly with respect to women of all ages.

7 Research has shown that the presence of a gun in a domestic violence situation increases the risk of homicides against women by 500 percent.³⁶ Young women in abusive relationships face a substantial risk by partners or family members with access to guns. From 2006 to 2015, 36 percent of murders of young women between the ages of 15 and 29 were committed by an intimate partner or family member, and 54 percent of those murders were committed with a gun.³⁷ Indeed, young women are more vulnerable to domestic violence gun homicides when compared to other women. From 2006 to 2015, the rate of domestic violence gun homicides of young women was 30 percent higher than for women of all ages.³⁸ This statistic is mainly driven by violence in dating-partner relationships. From 2006 to 2015, out of the more than 1,550 young women killed with a gun in domestic violence situations, 65 percent were murdered by a dating partner.³⁹

Mariam's story

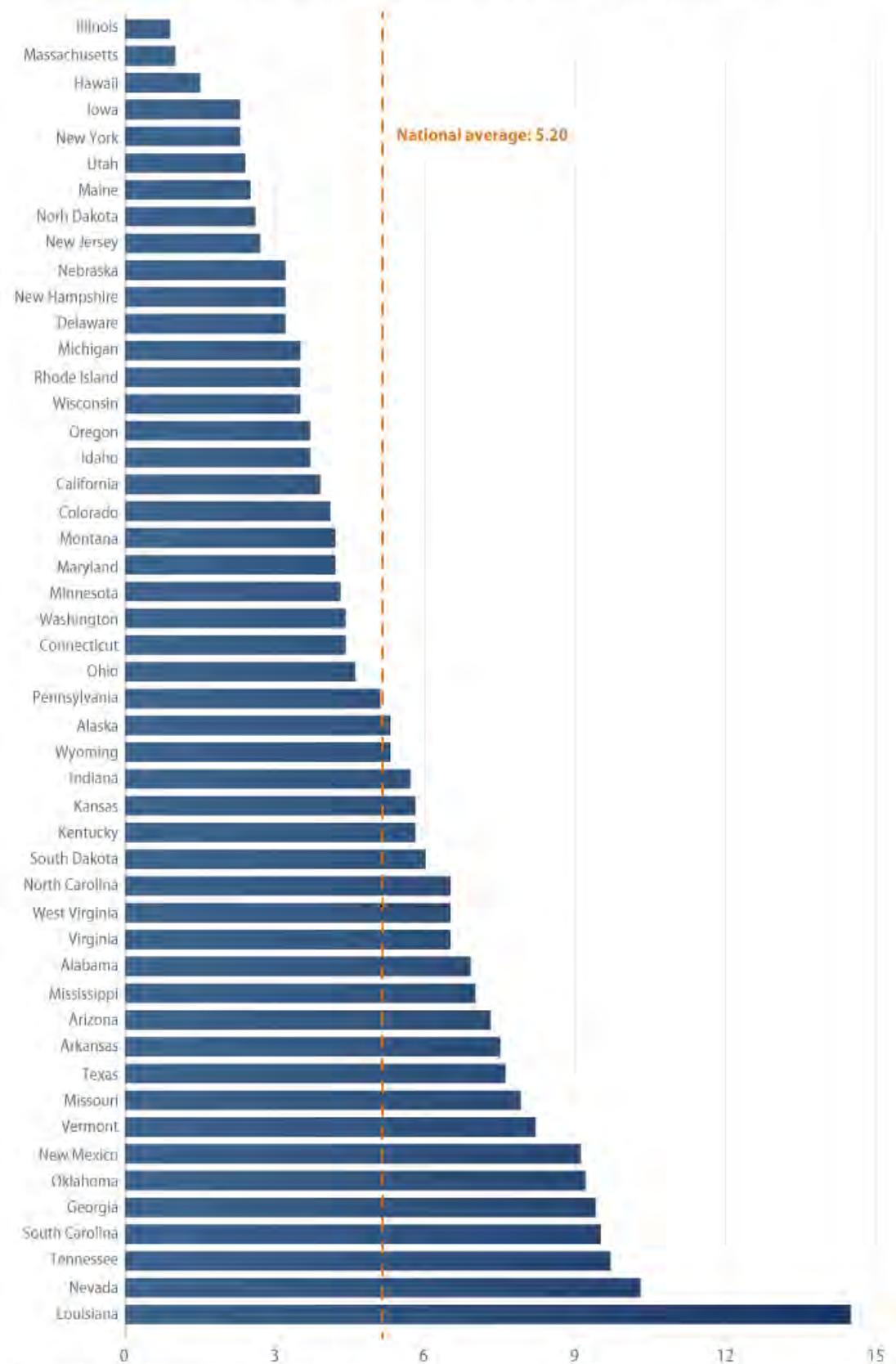
Mariam El-Haj, 26, grew up in south Texas in a strict, multicultural family. While she had a tense relationship with her father, nothing prepared her for what happened on June 15, 2012. Mariam was at home with her boyfriend, mother, and two sisters, when her estranged father broke into the house wielding a handgun. Angered by an ongoing divorce from his wife and enraged by his daughter having a boyfriend, El-Haj's father unleashed a volley of bullets. El-Haj was shot two times, her mother was shot twice, and Mariam's boyfriend was shot once. After six shots were fired, one of Mariam's sisters was able to take the gun from her father.

Miraculously, everyone survived, but the memory lives in the family's mind, continuing to torment them years after the incident. After her traumatic event, El-Haj decided that she wanted to use her voice so no one else would have to share her experience. She is an outspoken advocate for gun violence prevention; joined Generation Progress' Fight4AFuture National Leadership Council; and regularly shares her powerful story in order to push for tougher restrictions on the ability of domestic abusers to acquire guns.⁴⁰

8 Again, the risk varies widely from state to state. Louisiana, Nevada, and Tennessee have the highest rates of gun homicides of young women by intimate partners or family members, while Illinois, Massachusetts, Hawaii, and Iowa have the lowest.⁴¹

Introduction and summary

Domestic violence gun homicides per every one million young women, by state, 2007–2016



Note: Data are for young American women ages 15–29. The national average is estimated with information from 49 states. Data from the state of Florida is not included.
 Source: Federal Bureau of Investigation, *Supplemental Homicide Data* (U.S. Department of Justice, 2006–2015).



Introduction and summary

three categories for people ages 15 to 29: gun homicides, suicides, and domestic violence gun homicides of women. In contrast, 11 states are not among the 25 worst in any of these categories.

- 10 There are many factors that influence the rate of gun violence in a particular state, and attempting to parse out the precise reasons behind these rates has been a frequent subject of academic research. One factor that appears to have a significant effect is the relative strength of a state's gun laws. A 2016 CAP study found that the 10 states with the weakest gun laws collectively had rates of gun violence that were 3.2 times higher than the 10 states with the strongest gun laws.⁴² Similarly, relative strength of gun laws seems to be a factor in the state-to-state variations in gun death rates among young people. Out of the 11 states that ranked among the 25 worst in all three categories, nine received an "F" by the Giffords Law Center to Prevent Gun Violence for the strength of their gun laws, the lowest possible score.⁴³

Young people are at the center gun violence solutions

- 11 Long before the student survivors at Marjory Stoneman Douglas High School turned their grief into action,⁴⁴ young people, especially young African Americans and Latinos, have been working to curb gun violence in their communities. Being the communities that gun violence affects the most, young people have been at the forefront in the fight to end cyclical violence, mass shootings, and suicide. Survivors and students from Virginia Tech mobilized to push for tougher gun safety measures across the United States.⁴⁵ After the June 2016 massacre at the Pulse nightclub in Orlando, Florida, young LGBTQ leaders stepped up to demand immediate action on gun laws.⁴⁶ The groundwork these and other young activists laid contributed to the recent enactment of a package of new gun laws in Florida in March 2018.⁴⁷
- 12 Young people's activism is not limited to responding to mass shootings nor is it limited to legislative solutions. The Parkland students had a blueprint for success modeled after the work of Black Lives Matter organizers who, for years, have organized in communities across the country to pressure elected officials to fix broken systems and laws that are not serving a majority of people.⁴⁸ Young black leaders in the United States have used the tools at their disposal, including personal narratives and social media, to light up a movement that, since its inception, has shifted the national conversation and resulted in positive and concrete changes to laws around the country.

Policy options to reduce gun violence

- 13 A Harvard University poll showed that almost two-thirds of Americans under 30 support stronger gun laws.⁴⁹ Young people understand that legislative action is key to ending the gun violence epidemic, but they also understand that further steps must be taken. In addition to stronger gun laws, youth leaders have demanded support for community-based violence intervention programs and ensuring sufficient data and research to

Introduction and summary

demands immediate attention from lawmakers, and restoring our priority policies are among the most urgent and would have a significant impact on saving young lives.

- **Ban assault weapons and high capacity magazines.** Assault weapons and high-capacity magazines dramatically increase the lethality of shootings. For example, a review of mass shootings found that 155 percent more people were shot and 47 percent more people were killed when assault weapons or large-capacity magazines were used.⁵⁰ Assault weapons and guns equipped with high capacity magazines, together, account for up to 36 percent of guns used in crime.⁵¹
- **Enable the Centers for Disease Control to research gun violence as a public health issue.** In 1996, Congress imposed new restrictions on the ability of the Centers for Disease Control and Prevention (CDC) to study gun violence and drastically cut the funding available for this research. Since then, the CDC's annual funding for this research has fallen 96 percent, leaving many gaps in our knowledge regarding gun violence.⁵²
- **Require background checks for all gun sales.** Under current federal law, only gun sales conducted by a gun dealer require a background check. Sales by private sellers at gun shows, online, or anywhere else can be completed without a background check and with no questions asked.⁵³
- **Support local violence prevention and intervention programs.** Community-based programs that engage all local stakeholders to address gun violence are a crucial part of reducing gun deaths. These evidence-based programs can have a significant effect. For example, from 2011 to 2016, three cities in Connecticut experienced a 50 percent decline in gun homicides thanks to the Group Violence Intervention Program.⁵⁴ Similarly, between 2007 and 2016, Richmond, California, saw a 71 percent reduction in gun violence leading to injury or death due to a comprehensive strategy that addressed gun violence in the city.⁵⁵
- **Disarm all domestic abusers.** Current federal law only prohibits some domestic abusers from buying and possessing guns, but abusers in dating relationships, those convicted of stalking, and those subject to temporary restraining orders are free to buy guns under federal law. These gaps in the law put many young women at risk.⁵⁶
- **Make extreme risk protection orders available in every state.** This is a tool that allows family members or law enforcement officers to request that a court temporarily remove firearms from a person who has shown signs of being a risk of harm to themselves or to others. This type of law has already shown promising results in states where it has been enacted. Researchers found that for every 10 to 20 such orders issued in Connecticut, one life was saved.⁵⁷

⁵⁴ Along with these proposals, young people understand that curbing the epidemic of gun violence requires a comprehensive gun violence reduction strategy that places the problem in context with the criminal justice

Introduction and summary

Reinvestment in areas hardest hit by gun violence is just as essential to reducing gun violence as solutions that regulate firearms. Examples of these policies include:

- **Youth jobs programs.** Economic opportunities for young people are key to violence reduction. Programs such as the summer jobs programs in Chicago⁵⁸ and Boston⁵⁹ have demonstrated significant reductions in violent crime among youth from neighborhoods hard hit by gun violence.
- **Reinvestment in high-quality education programs in areas suffering from gun violence.** For students in areas most affected by gun violence, investing in education programs are key to achieving violence reduction. Similar to how jobs programs offer economic opportunity, high-quality educational opportunities—through funding to ensure high-quality schooling, including after-school programming,⁶⁰ and education for youth in prison⁶¹—are important to curbing cyclical gun violence among young people.
- **Implement trauma-informed education programs.** Young people dealing with trauma, given their generation’s high-level of exposure to gun violence in the United States, must be provided support. Investing in trauma-informed education programs in schools has proved effective at increasing resiliency among children suffering from trauma⁶² and reducing recurring violence in communities.⁶³
- **Smart on crime approaches to criminal justice.** Cities that implement local efforts to reduce unnecessary arrests and incarceration as well as promote re-entry success by removing significant barriers to opportunity for the formerly incarcerated help to make communities safer. These programs have been implemented in cities such as Philadelphia, New York, Washington, D.C., and Los Angeles. These “second chance” cities offer an alternate path for system-involved individuals that reduces recidivism and can serve as a key part of reducing violence.⁶⁴

Bruce’s story

Bruce Franks Jr., 33, a leader in Generation Progress’ Fight4AFuture gun violence prevention network, is no stranger to gun violence. Growing up in St. Louis, Missouri, he’s been exposed to gun violence from an early age. When he was just 6 years old, he saw his 9-year-old brother shot and killed in front of a neighbor’s house. In 2004, as a young man, a stray bullet struck him in the knee, ending his track career. Gun violence, however, was not the only barrier Franks faced growing up. He quickly realized how systematic racism and an unjust criminal justice system impacted his life and his community as well.

Following the fatal shooting of Michael Brown in Ferguson, Missouri, Franks became a leader in the Black Lives Matter movement during the protests in the wake of the shooting. He went on to build civic power by becoming a liaison between the community and the St. Louis Police Department. Then, in 2016, he ran and won a seat in the Missouri state legislature. As a state representative, Franks has

Introduction and summary

his first legislative victory last year when he secured \$6 million for Missouri's youth summer jobs program in the state's budget. In announcing the summer jobs program Franks said, "[T]hat's 2,700 youths off the streets, doing something productive."⁶⁵

Conclusion

15 Young people should not have to live in fear of being gunned down. Not in their schools, not in their churches, not in their neighborhoods—nowhere. All forms of gun violence need to be eradicated wherever present and elected leaders must heed the calls of the young people leading the movement. The solutions exist, and young people have been loud and clear in their demands. It is now time for policymakers to act.

About the author

16 **Chelsea Parsons** is the vice president of Gun Violence Prevention at American Progress. Her work focuses on advocating for progressive laws and policies relating to gun violence prevention and the criminal justice system at the federal, state, and local levels. In this role, she has helped develop measures to strengthen gun laws and reduce gun violence that have been included in federal and state legislation and executive actions. Prior to joining the Center, Parsons was general counsel to the New York City criminal justice coordinator, a role in which she helped develop and implement criminal justice initiatives and legislation in areas including human trafficking, sexual assault, family violence, firearms, identity theft, indigent defense, and justice system improvements. She previously served as an assistant New York state attorney general and a staff attorney clerk for the 2nd U.S. Circuit Court of Appeals.

17 **Maggie Thompson** is the executive director of Generation Progress. Prior to joining Generation Progress, Thompson served in the Obama administration at the White House Council on Environmental Quality as well as in the Office of the Director at U.S. Citizenship and Immigration Services. She has bachelor's degrees in economics and classical archaeology from Macalester College.

18 **Eugenio Weigend** is the associate director for Gun Violence Prevention at American Progress. His work is focused on public security. He has conducted research on gun violence, arms trafficking, and firearm regulations in the United States. He has a Ph.D. from Tecnológico de Monterrey and a master's degree in public affairs from Brown University.

Introduction and summary

people in the media. Before joining Generation Progress, Rocco was a field organizer with the Florida Democratic Party in Broward County, where he mobilized hundreds of volunteers on behalf of progressive issues and candidates. He graduated from Florida State University in 2016 with a B.S. in political science and a B.A. in media studies.

Endnotes

1. Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data," available at http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html (last accessed April 2018). 
2. Gun Violence Archive "Gun Violence Archive 2018," available at <http://www.gunviolencearchive.org/> (last accessed May 2018). Data form January 1, 2018 to April 30, 2018. 
3. Nikki Graf, "A majority of U.S. teens fear a shooting could happen at their school, and most parents share their concern," Pew Research Center, April 18, 2018, available at http://www.pewresearch.org/fact-tank/2018/04/18/a-majority-of-u-s-teens-fear-a-shooting-could-happen-at-their-school-and-most-parents-share-their-concern/?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiospm&stream=top-stories. 
4. Doug Moore, "From Ferguson protestor to state legislator, Bruce Franks Jr. says he will never stop fighting." *St. Louis Post Dispatch*, November 12 2017, available at http://www.stltoday.com/news/local/govt-and-politics/from-ferguson-protester-to-state-legislator-bruce-franks-jr-says/article_e2fc824e-3cdf-5d4b-8b32-91e5fa72549c.html. 
5. Ildfonso Ortiz, "Mission man to serve 30 years in prison for shooting family," *The Monitor*, May 16 2013, available at http://www.themonitor.com/news/local/article_bfe79f20-bdbf-11e2-9bfc-001a4bcf6878.html. 
6. Maxine Bernstein, "Oregon school shooting: Reynolds High gunman Jared Padgett wrote about killing classmates in journal," *The Oregonian*, June 13 2014, available at http://www.oregonlive.com/gresham/index.ssf/2014/06/oregon_school_shooting_gunman_1.html; .Natalie Diblasio, John Bacon, and Michael Winter, "'A very tragic day': Student, teen gunman dead at Ore. High School," *USA Today*, available at <https://www.usatoday.com/story/news/nation/2014/06/10/reynolds-high-school-shooting-portland/10279083/>. 
7. Center for Disease Control and Prevention, "About Underlying Cause of Death, 1999-2016," available at <https://wonder.cdc.gov/ucd-icd10.html> (last accessed April 2018). 

Introduction and summary

9. Ibid.; Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data." The population over 84 years of age accounted for 2.4 percent of gun deaths and 0.2 percent of gun homicides. [↗](#)
10. Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data." [↗](#)
11. Generation Progress, "Meet The New Fight4afuture National Leadership Council," available at <http://genprogress.org/voices/2016/05/02/43258/meet-2016-2017-fight4afuture-national-leadership-council/> (last accessed May 2018). [↗](#)
12. For a discussion of the intersection of policing and race, see Danyelle Solomon, "The Intersection of Policing and Race" (Washington: Center for American Progress, 2016), available at <https://www.americanprogress.org/issues/race/reports/2016/09/01/143357/the-intersection-of-policing-and-race/>. [↗](#)
13. Center for American Progress analysis of The Washington Post, "Fatal Force," available at https://www.washingtonpost.com/graphics/2018/national/police-shootings-2018/?utm_term=.1c311dbbfb39 (last accessed April 2018). Data updated until April 5, 2018. [↗](#)
14. Ibid. [↗](#)
15. Center for American Progress analysis of Bureau of Justice Statistics, "National Crime Victimization Survey 2012-2016," available at <http://www.bjs.gov/index.cfm?ty=dcdetail&iid=245> (last accessed March 2018). The authors obtained the annual number of violent crimes and summed them up to obtain the 2012-2016 total. Violent Crimes include rapes, assaults, threats, and robberies. Homicides are not included. [↗](#)
16. Ibid. To estimate the rates, the authors used population reported in Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data." For the overall population the authors include ages 12 and older. [↗](#)
17. Bernstein, "Oregon school shooting: Reynolds High gunman Jared Padgett wrote about killing classmates in journal." [↗](#)
18. Personal communication with Jes Phillip on April 15, 2018. [↗](#)
19. Indian Health Service, "Urban Indian Health Program," available at <https://www.ihs.gov/newsroom/factsheets/uihp/> (last accessed April 2018). [↗](#)
20. Personal communication with Eli Saldana on April 23, 2018. [↗](#)
21. Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data." The rate of gun homicides from 2007 to 2016 for

Introduction and summary

-
22. Ibid. [↗](#)
 23. Ibid. The rate gun homicides for young African American women from 2007 to 2016 was 6.71 per every 100,000 while the rate for young white women was 1.12 per every 100,000. [↗](#)
 24. Ibid. The rate of gun homicides for young Hispanics from 2007 to 2016 was 8.79 per every 100,000 people while the rate for young white individuals was 2.29 per every 100,000. [↗](#)
 25. Ibid. [↗](#)
 26. Ibid. [↗](#)
 27. Ibid. [↗](#)
 28. Centers for Disease Control and Prevention, *Racial and Gender Disparities in Suicide Among Young Adults Aged 18-24: United States, 2009-2013* (U.S. Department of Health and Human Services, 2015), available at https://www.cdc.gov/nchs/data/hestat/suicide/racial_and_gender_2009_2013.pdf. [↗](#)
 29. Alexandra Sifferlin, "Suicide Rates High Among Young American Indians," *Time*, September 30, 2015, available at <http://time.com/4054087/suicide-rate-american-indians/>. [↗](#)
 30. Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data." [↗](#)
 31. Ibid. [↗](#)
 32. Ibid. [↗](#)
 33. Ibid. [↗](#)
 34. Ibid. [↗](#)
 35. Ibid. [↗](#)
 36. J.C. Campbell and others, "Risk factors for femicide within physically abusive intimate relationships: results from a multi-site case control study," *American Journal of Public Health* 93 (2003): 1089–1097. [↗](#)
 37. Center of American Progress analysis of Federal Bureau of Investigation, "Supplemental Homicide Data" (U.S. Department of Justice, 2006–2015). "Intimate partner" includes boyfriends, girlfriends, husbands, wives, ex-wives, ex-husbands, common-law wives, and common-law husbands. The state of Florida does not report information to the FBI and therefore is not included in this analysis. [↗](#)
 38. Ibid. To estimate rates, we used population data provided by the CDC. [↗](#)

Introduction and summary

40. Generation Progress, "Meet The New Fight4afuture National Leadership Council." [↗](#)
41. Center of American Progress analysis of Federal Bureau of Investigation, "Supplemental Homicide Data" (U.S. Department of Justice, 2006–2015). [↗](#)
42. Chelsea Parsons and Eugenio Weigend, "America Under Fire" (Washington: Center for American Progress, 2016), available at <https://cdn.americanprogress.org/wp-content/uploads/2016/10/11100940/AmericaUnderFire-report.pdf>. [↗](#)
43. Center for American Progress analysis of Giffords Law Center to Prevent Gun Violence, "Annual Gun Law Scorecard," available at <http://lawcenter.giffords.org/scorecard/> (last accessed April 2018). [↗](#)
44. Julie Tukewitz and Anemona Hartocollis, "Highlights: Students Call for Action Across Nation; Florida Lawmakers Fail to Take Up Assault Rifle Bill," *The New York Times*, available at <https://www.nytimes.com/2018/02/20/us/gun-control-florida-shooting.html>. [↗](#)
45. Everytown for Gun Safety, "Virginia Tech Survivor, Maryland Resident and Everytown Survivor Network Member Colin Goddard Urges Maryland Legislators to Act on Domestic Violence Legislation," Press release, March 22, 2017, available at <https://everytown.org/press/virginia-tech-survivor-maryland-resident-and-everytown-survivor-network-member-colin-goddard-urges-maryland-legislators-to-act-on-domestic-violence-legislation/>. [↗](#)
46. Susan Lundine, "LGBTQ PAC to end gun violence launches in Orlando," Orlando Business Journal, August 15, 2016, available at <https://www.bizjournals.com/orlando/news/2016/08/15/americas-first-lgbtq-pac-to-end-gun-violence.html>. [↗](#)
47. Dan Sweeney, "Gov. Rick Scott signs sweeping gun bill; NRA files suit," *Sun Sentinel*, March 9, 2018, available at <http://www.sun-sentinel.com/local/broward/parkland/florida-school-shooting/fl-florida-school-shooting-rick-scott-gun-bill-20180308-story.html>. [↗](#)
48. Touré, "How America's new generation of civil rights activists is mobilizing in the age of Trump," *Rolling Stone*, available at <https://www.rollingstone.com/politics/news/toure-inside-black-lives-matter-w513190>. [↗](#)
49. John Wagner, "Poll shows growing support for stricter gun control among younger Americans," *The Washington Post*, April 18, 2018, available at https://www.washingtonpost.com/news/post-politics/wp/2018/04/18/new-poll-shows-growing-support-for-stricter-gun-control-among-younger-americans/?noredirect=on&utm_term=.40cc6eae711c. [↗](#)
50. Everytown for Gun Safety, "Analysis of Recent Mass Shootings" (2015), available at <https://everytownresearch.org/documents/2015/04/analysis-of-recent-mass-shootings.pdf>. [↗](#)

Introduction and summary

in an earlier special examination of local and national sources, *Journal of Urban Health* (2017), p. 1, available at <https://link.springer.com/article/10.1007%2Fs11524-017-0205-7>. 

52. Everytown for Gun Safety, "Access Denied: How the Gun Lobby is Depriving Police, Policy Makers, and the Public of the Data we Need to Prevent Gun Violence" (2013), available at <https://everytownresearch.org/documents/2015/04/access-denied.pdf>. 
53. Matthew Miller, Lisa Hepburn, and Deborah Azrael, "Firearm Acquisition Without Background Checks: Results of a National Survey," *Annals of Internal Medicine* 166 (4) (2017): 233–239, available at <http://annals.org/aim/fullarticle/2595892/firearm-acquisition-without-background-checks-results-national-survey>. 
54. PICO National Network, Community Justice Reform Coalition, and Giffords Law Center to Prevent Gun Violence, "Investing in Intervention: The Critical Role of State-Level Support in Breaking the Cycle of Urban Gun Violence" (2017), available at <http://lawcenter.giffords.org/wp-content/uploads/2017/12/Investing-in-Intervention-12.18.17.pdf>. 
55. City of Richmond Office of Neighborhood Safety, "2016 Highlights" (2016), available at <https://www.ci.richmond.ca.us/DocumentCenter/View/41749>. 
56. Giffords, "Guns and Domestic Violence," available at <https://giffords.org/issue/guns-domestic-violence/> (last accessed May 2018). 
57. Educational Fund to Stop Gun Violence, "Data behind Extreme Risk Protective Order Policies" (2017), available at <http://efsgv.org/wp-content/uploads/2017/09/CT-Risk-Warrant-Data-One-pager-ERPO-9-15-17-FINAL.pdf>. 
58. UChicago News, "Chicago jobs program reduces youth violence, Urban Labs study shows," June 29, 2017, available at <https://news.uchicago.edu/article/2017/06/29/chicago-jobs-program-reduces-youth-violence-urban-labs-study-shows>. 
59. Betsy Pearl and Ed Chung, "Resisting 'Tough on Crime': Smarter Ways to Keep American Cities Safe," Center for American Progress, February 1, 2018, available at <https://www.americanprogress.org/issues/criminal-justice/news/2018/02/01/445678/resisting-tough-crime-smarter-ways-keep-american-cities-safe/>. 
60. Corey Matthews, "Targeting High Risk Offenders: A Violence Reduction Strategy" (Oakland, CA: City of Oakland Human Service Department, 2015), available at http://oaklandunite.org/wp-content/uploads/2011/05/Targeting-High-Risk-Offenders_Advanced-Policy-Analysis_Matthews_Corey-Spring-2015.pdf. 
61. Jasmine Hardy, Betsy Pearl, and Rebecca Vallas, "A Criminal Record Shouldn't Be a Life Sentence to Poverty," Center for American Progress, April 12, 2018, available at

GZJ DKV'3: "

The Science of Gun Policy

**A Critical Synthesis of Research Evidence
on the Effects of Gun Policies in the United States**

A PART OF THE RAND

**Gun Policy
in AMERICA**

INITIATIVE



For more information on this publication, visit www.rand.org/t/RR2088

Library of Congress Cataloging-in-Publication Data

Names: Rand Corporation, issuing body.
Title: The science of gun policy : a critical synthesis of research evidence on the effects of gun policies in the United States / The RAND Corporation.
Description: Santa Monica, CA : RAND, [2018] | Includes bibliographical references.
Identifiers: LCCN 2017060115 | ISBN 9780833098412 (pbk. : alk. paper) | ISBN 9780833098436 (epub) | ISBN 9780833098443 (prc) | ISBN 9780833098429 (ebook pdf)
Subjects: LCSH: Gun control--United States.
Classification: LCC HV7436 .S387 2018 | DDC 363.330973--dc23
LC record available at <https://lcn.loc.gov/2017060115>

Published by the RAND Corporation, Santa Monica, Calif.

© Copyright 2018 RAND Corporation

RAND® is a registered trademark.

Updated Aug. 16, 2018, to correct minor errata on pp. 296–297.

Limited Print and Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law. This representation of RAND intellectual property is provided for noncommercial use only. Unauthorized posting of this publication online is prohibited. Permission is given to duplicate this document for personal use only, as long as it is unaltered and complete. Permission is required from RAND to reproduce, or reuse in another form, any of its research documents for commercial use. For information on reprint and linking permissions, please visit www.rand.org/pubs/permissions.

The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest.

RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

Support RAND

Make a tax-deductible charitable contribution at
www.rand.org/giving/contribute

www.rand.org

Gun Policy in America Research Synthesis Project Team

Project Director

Andrew R. Morral, Ph.D.

Research Synthesis Project Leadership

Rajeev Ramchand, Ph.D.

Rosanna Smart, Ph.D.

Literature Review Groups

Suicides

Rajeev Ramchand, Ph.D.

Homicides and Violent Crime

Carole Roan Gresenz, Ph.D.

John Speed Meyers, M.P.A.

Rouslan I. Karimov, M.P.A.

Lea Xenakis, M.P.A.

Accidents and Unintentional Injuries

Eric Apaydin, M.P.P.

Rajeev Ramchand, Ph.D.

Mass Shootings and Taxation

Rosanna Smart, Ph.D.

Officer-Involved Shootings

Carter C. Price, Ph.D.

Defensive Gun Use

Nancy Nicosia, Ph.D.

John Speed Meyers, M.P.A.

Hunting and Sport Shooting

Rosanna Smart, Ph.D.

Eric Apaydin, M.P.P.

Gun Industry

Carter C. Price, Ph.D.

Mental Health

Stephanie Brooks Holliday, Ph.D.

Public Information Campaigns

Elizabeth L. Petrun Sayers, Ph.D.

Policy Descriptions

Samantha Cherney, J.D.

Rosanna Smart, Ph.D.

Methodology Review

Carole Roan Gresenz, Ph.D.

Beth Ann Griffin, Ph.D.

Andrew R. Morral, Ph.D.

Nancy Nicosia, Ph.D.

Rajeev Ramchand, Ph.D.

Terry L. Schell, Ph.D.

Rosanna Smart, Ph.D.

Effect-Size Calculation

Brett Ewing, M.S.

Programming

Joshua Lawrence Traub, M.S.

Preface

Effective gun policies in the United States must balance the constitutional right to bear arms and public interest in gun ownership with concerns about public health and safety. However, current efforts to craft legislation related to guns are hampered by a paucity of reliable information about the effects of such policies. To help address this problem, the RAND Corporation launched the Gun Policy in America initiative. Throughout RAND's 70-year history, in multiple projects, in many policy arenas, and on topics that are sensitive and controversial, researchers have conducted analyses, built tools, and developed resources to help policymakers and the public make effective decisions. The primary goal of the Gun Policy in America project is to create resources where policymakers and the general public can access unbiased information that facilitates the development of fair and effective firearm policies.

This report is one of several research products stemming from the initiative. The research described here synthesizes the available scientific evidence on the effects of 13 types of firearm policies on a range of outcomes related to gun ownership. In addition, this report includes essays on several topics that frequently arise in discussions of gun policy.

Other project components include a survey of policy experts that identifies where access to reliable data would be most useful in resolving policy debates, plus an online tool allowing users to explore how different combinations of gun policies are likely to affect a range of outcomes. In another line of effort, RAND conducted simulation studies to evaluate the strengths and weaknesses of different approaches to modeling the effects of gun policies on outcomes, the results of which will be used to develop new estimates of the effects of state firearm policies. Finally, the project includes the development of a longitudinal database of state firearm laws as a resource for other researchers and the public.

The Gun Policy in America initiative did not attempt to evaluate the merits of different values or principles that sometimes drive policy disagreements. Rather, our focus is strictly on the empirical effects of policies on the eight outcomes specified in this report. All of our resources are publicly available on the project website at www.rand.org/gunpolicy.

The work should be of interest to policymakers and other stakeholders considering decisions related to firearm policy. Furthermore, this report may be of interest to the research community and to the general public.

RAND Ventures

The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest.

RAND Ventures is a vehicle for investing in such policy solutions. Philanthropic contributions support our ability to take the long view, tackle tough and often-controversial topics, and share our findings in innovative and compelling ways. RAND's research findings and recommendations are based on data and evidence and therefore do not necessarily reflect the policy preferences or interests of its clients, donors, or supporters.

Funding for this venture was provided by gifts from RAND supporters and income from operations.

Contents

Gun Policy in America Research Synthesis Project Team	iii
Preface	v
Figures	xiii
Tables	xv
Summary	xvii
Acknowledgments	xxix
Abbreviations	xxxix
 PART A	
Introduction and Methods	1
 CHAPTER ONE	
Introduction	3
Gun Policy in America	4
Research Focus	4
Organization of This Report.....	10
Chapter One References.....	11
 CHAPTER TWO	
Methods	15
Selecting Policies	15
Selecting and Reviewing Studies.....	17
Effects of the Inclusion and Exclusion Criteria on the Literature Reviewed	25
Effect Size Estimates.....	29
Chapter Two References.....	31
 PART B	
Evidence on the Effects of 13 Policies	37
 CHAPTER THREE	
Background Checks	39
State Implementation of Background Checks	41

Effects on Suicide 43
 Effects on Violent Crime..... 48
 Effects on Mass Shootings 54
 Outcomes Without Studies Examining the Effects of Background Checks 56
 Chapter Three References..... 57

CHAPTER FOUR

Bans on the Sale of Assault Weapons and High-Capacity Magazines..... 61
 State Implementation of Assault Weapon Bans 63
 Effects on Violent Crime..... 65
 Effects on Mass Shootings 67
 Effects on the Gun Industry..... 69
 Outcomes Without Studies Examining the Effects of Assault Weapon Bans 70
 Chapter Four References 71

CHAPTER FIVE

Stand-Your-Ground Laws 73
 State Implementation of Stand-Your-Ground Laws..... 74
 Effects on Suicide 77
 Effects on Violent Crime..... 78
 Effects on Defensive Gun Use..... 81
 Outcomes Without Studies Examining the Effects of Stand-Your-Ground Laws 82
 Chapter Five References..... 83

CHAPTER SIX

Prohibitions Associated with Mental Illness 85
 State Implementation of Prohibitions Associated with Mental Illness..... 87
 Effects on Suicide 89
 Effects on Violent Crime..... 91
 Outcomes Without Studies Examining the Effects of Prohibitions Associated with
 Mental Illness..... 94
 Chapter Six References 95

CHAPTER SEVEN

Lost or Stolen Firearm Reporting Requirements 97
 State Implementation of Lost or Stolen Firearm Reporting Requirements 98
 Outcomes Without Studies Examining the Effects of Lost or Stolen Firearm
 Reporting Requirements 99
 Chapter Seven References..... 100

CHAPTER EIGHT

Licensing and Permitting Requirements	101
State Implementation of Licensing and Permitting Requirements	103
Effects on Suicide	104
Effects on Violent Crime	107
Effects on Mass Shootings	109
Outcomes Without Studies Examining the Effects of Licensing and Permitting Requirements	110
Chapter Eight References	111

CHAPTER NINE

Firearm Sales Reporting and Recording Requirements	113
State Implementation of Firearm Sales Reporting and Recording Requirements	114
Outcomes Without Studies Examining the Effects of Firearm Sales Reporting and Recording Requirements	116
Chapter Nine References	117

CHAPTER TEN

Child-Access Prevention Laws	119
State Implementation of Child-Access Prevention Laws	121
Effects on Suicide	124
Effects on Violent Crime	128
Effects on Unintentional Injuries and Deaths	130
Effects on Mass Shootings	134
Outcomes Without Studies Examining the Effects of Child-Access Prevention Laws	135
Chapter Ten References	136

CHAPTER ELEVEN

Surrender of Firearms by Prohibited Possessors	139
State Implementation of Firearm-Surrender Laws	140
Effects on Violent Crime	141
Outcomes Without Studies Examining the Effects of Firearm-Surrender Laws	143
Chapter Eleven References	144

CHAPTER TWELVE

Minimum Age Requirements	145
State Implementation of Minimum Age Requirements	147
Effects on Suicide	148
Effects on Violent Crime	153
Effects on Unintentional Injuries and Deaths	155
Effects on Mass Shootings	156

Outcomes Without Studies Examining the Effects of Minimum Age Requirements 158
 Chapter Twelve References..... 159

CHAPTER THIRTEEN

Concealed-Carry Laws..... 161
 State Implementation of Concealed-Carry Laws..... 163
 Effects on Suicide 164
 Effects on Violent Crime..... 166
 Effects on Unintentional Injuries and Deaths..... 176
 Effects on Mass Shootings 179
 Effects on the Gun Industry..... 181
 Outcomes Without Studies Examining the Effects of Concealed-Carry Laws 182
 Chapter Thirteen References..... 183

CHAPTER FOURTEEN

Waiting Periods 187
 State Implementation of Waiting Periods 190
 Effects on Suicide 190
 Effects on Violent Crime..... 191
 Effects on Mass Shootings 194
 Outcomes Without Studies Examining the Effects of Waiting Periods 196
 Chapter Fourteen References 197

CHAPTER FIFTEEN

Gun-Free Zones 199
 State Implementation of Gun-Free Zones..... 200
 Outcomes Without Studies Examining the Effects of Gun-Free Zones 201
 Chapter Fifteen References 202

PART C

Supplementary Essays on Gun Policy Mechanisms and Context..... 203

CHAPTER SIXTEEN

The Relationship Between Firearm Availability and Suicide 205
 Methods..... 205
 Individual Access to Firearms 206
 Regional Availability of Firearms 215
 Conclusions 225
 Chapter Sixteen References 228

CHAPTER SEVENTEEN

The Relationship Between Firearm Prevalence and Violent Crime	233
Methods	233
Firearm Prevalence and Violent Crime	234
Conclusions	237
Chapter Seventeen References	239

CHAPTER EIGHTEEN

Firearm and Ammunition Taxes	241
Conclusions	243
Chapter Eighteen References	244

CHAPTER NINETEEN

Mental Health Care Access and Suicide	245
Availability of Health Care and Mental Health Services	245
Use of Health and Mental Health Services	247
Barriers to Mental Health Care	248
Policies That May Affect Access to Services	249
International and Cross-National Studies	249
Conclusions	251
Chapter Nineteen References	252

CHAPTER TWENTY

Education Campaigns and Clinical Interventions for Promoting Safe Storage	255
Evidence on Safe Storage	255
Education Campaigns	256
Clinical Interventions	257
Conclusions	257
Chapter Twenty References	259

CHAPTER TWENTY-ONE

Restricting Access to Firearms Among Individuals at Risk for or Convicted of Domestic Violence or Violent Crime	261
The Policy Defined	261
Research Synthesis Findings	262
Conclusions	263
Chapter Twenty-One References	264

CHAPTER TWENTY-TWO

Mass Shootings	265
What Is a Mass Shooting?	265

Are Mass Shootings on the Rise?..... 267
 Conclusions 270
 Chapter Twenty-Two References 271

CHAPTER TWENTY-THREE

Defensive Gun Use 273
 What Is Defensive Gun Use? 274
 What Are the Challenges in Measuring Defensive Gun Use? 275
 Does Defensive Gun Use Reduce Harm? 280
 Chapter Twenty-Three References 286

CHAPTER TWENTY-FOUR

**The Effects of the 1996 National Firearms Agreement in Australia on Suicide,
 Violent Crime, and Mass Shootings**..... 289
 Methods 290
 Research Synthesis Findings 291
 Conclusions 297
 Chapter Twenty-Four References 298

PART D

Summary of Findings and Recommendations 299

CHAPTER TWENTY-FIVE

Summary and Conclusions 301
 Summarizing the Strength of Evidence 302
 What Can We Conclude About the Effects of Gun Policies?..... 307
 Why Don't We Know More? 310
 Chapter Twenty-Five References 319

APPENDIXES

A. Methodological Challenges to Identifying the Effects of Gun Policies..... 323
B. Source Data Used to Produce the Forest Plot Figures..... 339

Figures

3.1.	Incidence Rate Ratios Associated with the Effect of Background Checks on Suicide.....	46
3.2.	Incidence Rate Ratios Associated with the Effect of Background Checks on Violent Crime	52
3.3.	Incidence Rate Ratios Associated with the Effect of Background Checks on Mass Shootings.....	55
4.1.	Incidence Rate Ratios Associated with the Effect of Assault Weapon Bans on Violent Crime.....	66
4.2.	Incidence Rate Ratios Associated with the Effect of Assault Weapon Bans on Mass Shootings	68
5.1.	Incidence Rate Ratios Associated with the Effect of Stand-Your-Ground Laws on Suicide.....	78
5.2.	Incidence Rate Ratios Associated with the Effect of Stand-Your-Ground Laws on Violent Crime.....	80
5.3.	Incidence Rate Ratios Associated with the Effect of Stand-Your-Ground Laws on Defensive Gun Use.....	82
6.1.	Incidence Rate Ratios Associated with the Effect of Mental Health–Related Prohibitions on Suicide.....	90
6.2.	Incidence Rate Ratios Associated with the Effect of Mental Health–Related Prohibitions on Violent Crime	92
8.1.	Incidence Rate Ratios Associated with the Effect of Licensing and Permitting Requirements on Suicide	106
8.2.	Incidence Rate Ratios Associated with the Effect of Licensing and Permitting Requirements on Violent Crime.....	108
8.3.	Incidence Rate Ratios Associated with the Effect of Licensing and Permitting Requirements on Mass Shootings	110
10.1.	Incidence Rate Ratios Associated with the Effect of Child-Access Prevention Laws on Suicide.....	127
10.2.	Incidence Rate Ratios Associated with the Effect of Child-Access Prevention Laws on Violent Crime	129
10.3.	Incidence Rate Ratios Associated with the Effect of Child-Access Prevention Laws on Unintentional Firearm Injuries and Deaths	133

10.4.	Incidence Rate Ratios Associated with the Effect of Child-Access Prevention Laws on Mass Shootings	135
11.1.	Incidence Rate Ratios Associated with the Effect of Firearm-Surrender Laws on Violent Crime.....	142
12.1.	Incidence Rate Ratios Associated with the Effect of Minimum Age Requirements on Suicide.....	151
12.2.	Incidence Rate Ratios Associated with the Effect of Minimum Age Requirements on Violent Crime	154
12.3.	Incidence Rate Ratios Associated with the Effect of Minimum Age Requirements on Unintentional Injuries and Deaths	156
12.4.	Incidence Rate Ratios Associated with the Effect of Minimum Age Requirements on Mass Shootings.....	157
13.1.	Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Suicide.....	165
13.2.	Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Violent Crime.....	174
13.3.	Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Unintentional Injuries and Deaths.....	178
13.4.	Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Mass Shootings.....	180
13.5.	Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Gun Ownership	182
14.1.	Incidence Rate Ratios Associated with the Effect of Waiting Periods on Violent Crime	193
14.2.	Incidence Rate Ratios Associated with the Effect of Waiting Periods on Mass Shootings	195
22.1.	Trends in Mass Shooting Incidents, by Type of Incident	269
22.2.	Trends in Mass Shooting Fatalities, by Type of Incident	269

Tables

S.1.	Strength of Evidence Across Gun Policies and Outcomes	xx
2.1.	Databases Searched for Studies Examining the Effects of Firearm Policies	18
2.2.	Number of Studies Selected for Review at Each Stage of the Review Process....	25
2.3.	Studies Meeting Inclusion Criteria	26
2.4.	Superseded Studies	27
2.5.	Included Studies, by Policy and Outcome.....	28
16.1.	Individual-Level Studies Published in or After 2003 That Examined the Relationship Between Firearm Access and Suicide	212
16.2.	Estimated Effects of a 1-Percent Increase in Firearm Prevalence on Firearm and Total Suicides	217
16.3.	Quasi-Experimental Studies Published in or After 2003 That Examined the Regional Relationship Between Firearm Prevalence and Suicide	219
16.4.	Cross-Sectional Studies Published in or After 2003 That Examined the Regional Relationship Between Firearm Availability and Suicide	221
17.1.	Studies Published in or After 2005 That Examined the Relationship Between Firearm Prevalence and Violent Crime	235
22.1.	Variation in How Mass Shootings Are Defined and Counted.....	266
24.1.	Summary of Studies Examining the Effects of the National Firearms Agreement on Suicide in Australia.....	292
25.1.	Strength of Evidence Across Gun Policies and Outcomes	304
A.1.	Illustrative Data, with Spline and Dummy-Coded Effect Variables.....	330
B.1.	Source Data Used to Estimate Study Effect Sizes in the Forest Plot Figures.....	340
B.2.	Methodological Concerns Identified for Analyses Included in the Report’s Forest Plot Figures.....	363

Summary

The RAND Corporation's Gun Policy in America initiative is a unique attempt to systematically and transparently assess available scientific evidence on the real effects of gun laws and policies. Our goal is to create resources where policymakers and the general public can access unbiased information that informs and enables the development of fair and effective policies. Good gun policies in the United States require consideration of many factors, including the law and constitutional rights, the interests of various stakeholder groups, and information about the likely effects of different policies on a range of outcomes. This report seeks to provide the third factor—objective information about what the scientific literature examining gun policies can tell us about the likely effects of those policies.

This report synthesizes the available scientific evidence on the effects of various gun policies on firearm deaths, violent crime, the gun industry, participation in hunting and sport shooting, and other outcomes.¹ It builds and expands on earlier comprehensive reviews of scientific evidence on gun policy conducted more than a decade ago by the National Research Council (NRC) (see NRC, 2004) and the Community Preventive Services Task Force (see Hahn et al., 2005).

Methodology

We used Royal Society of Medicine guidelines for conducting systematic reviews of a scientific literature (Khan et al., 2003). We focused on the empirical literature assessing the effects of 13 classes of firearm policies or of the prevalence of firearms on any of eight outcomes, which include both public health outcomes and outcomes of concern to many gun owners. We reviewed scientific reports that have been published since 2003, a date chosen to capture studies conducted since the last major systematic reviews of the science of gun policy were published by NRC (2004) and Hahn et al. (2005).

¹ Although not all guns are firearms, in this report, we follow conventional use in U.S. policy discussions and treat the terms *gun* and *firearm* as interchangeable.

The 13 classes of gun policies considered in this research are as follows:

1. background checks
2. bans on the sale of assault weapons and high-capacity magazines
3. stand-your-ground laws
4. prohibitions associated with mental illness
5. lost or stolen firearm reporting requirements
6. licensing and permitting requirements
7. firearm sales reporting and recording requirements
8. child-access prevention laws
9. surrender of firearms by prohibited possessors
10. minimum age requirements
11. concealed-carry laws
12. waiting periods
13. gun-free zones.

The eight outcomes considered in this research are

1. suicide
2. violent crime
3. unintentional injuries and deaths
4. mass shootings
5. officer-involved shootings
6. defensive gun use
7. hunting and recreation
8. gun industry.²

Policy Analyses, by Outcome

Building on the earlier reviews (NRC, 2004; Hahn et al., 2005) and using standardized and explicit criteria for determining the strength of evidence that individual studies provide for the effects of gun policies, we produced research syntheses that describe the quality and findings of the best available scientific evidence. Each synthesis defines the class of policies being considered; presents and rates the available evidence; and describes what conclusions, if any, can be drawn about the policy's effects on outcomes.

In many cases, we were unable to identify any research that met our criteria for considering a study as providing minimally persuasive evidence for a policy's effects. Studies were excluded from this review if they offered only correlational evidence for a

² The terms in these lists describe broad categories of policies and outcomes that are defined and described in detail in the full report.

possible causal effect of the law, such as showing that states with a specific law had lower firearm suicides at a single point in time than states without the law. Correlations like these can occur for many reasons other than the effects of a single law, so this kind of evidence provides little information about the effects attributable to specific laws. We did not exclude studies on the basis of their findings, only on the basis of their methods for isolating causal effects. For studies that met our inclusion criteria, we summarize key findings and methodological weaknesses, when present, and provide our consensus judgment on the overall strength of the available scientific evidence. We did this by establishing the following relativistic scale describing the strength of available evidence:

1. *No studies.* This designation was made when no studies meeting our inclusion criteria evaluated the policy's effect on the outcome.
2. *Inconclusive evidence.* This designation was made when studies with comparable methodological rigor identified inconsistent evidence for the policy's effect on an outcome or when a single study found only uncertain or suggestive effects.
3. *Limited evidence.* This designation was made when at least one study meeting our inclusion criteria and not otherwise compromised by serious methodological problems reported a significant effect of the policy on the outcome, even if other studies meeting our inclusion criteria identified only uncertain or suggestive evidence for the effect of the policy.
4. *Moderate evidence.* This designation was made when two or more studies found significant effects in the same direction and contradictory evidence was not found in other studies with equivalent or strong methods.
5. *Supportive evidence.* This designation was made when (1) at least three studies found suggestive or significant effects in the same direction using at least two independent data sets or (2) the effect was observed in a rigorous experimental study.

These ratings are meant to describe the relative strengths of evidence available across gun policy research domains, not any rating of our absolute confidence in the reported effects. For instance, when we find *supportive evidence* for the conclusion that child-access prevention laws reduce self-inflicted injuries and deaths, we do not mean to suggest that it is comparable to the evidence available in more-developed fields of social science. That is, in comparison to the evidence that smoking causes cancer, the evidence base in gun policy research is very limited. Nevertheless, we believe that it may be valuable to the public and to policymakers to understand which laws currently have more or less persuasive evidence concerning the effects the laws are likely to produce.

Table S.1 summarizes our judgments for all policy and outcome pairings. Several outcomes show multiple judgments, and these correspond to different characterizations of the specific policy-outcome association. For instance, we identified limited evidence that background checks reduce *total suicides* and moderate evidence that they reduce *firearm suicides*.

Table S.1—Continued

	Gun-Free Zones	Waiting Periods	Concealed-Carry Laws		Minimum Age Requirements	Surrender of Firearms by Prohibited Possessors	Child-Access Prevention Laws	Firearm Sales Reporting and Recording Requirements	Licensing and Permitting Requirements	Lost or Stolen Firearm Reporting Requirements	Prohibitions Associated with Mental Illness	Stand-Your-Ground Laws	Bans on the Sale of Assault Weapons and High-Capacity Magazines	Background Checks
			Permitless Carry	Shall Issue										
Gun industry														
Gun ownership				I										
Prices of banned firearms in the short term													↑ L	

NOTE: I = inconclusive; L = limited; M = moderate; S = supportive. When we identified no studies meeting eligibility criteria, cells are blank. ↑ = the policy increases the outcome; ↓ = the policy decreases the outcome.

^a We concluded that there is moderate evidence that dealer background checks decrease firearm homicides, and there is inconclusive evidence for the effect of private-seller background checks on firearm homicides.

Rather than concerning how strong a policy's effects are, our findings concern the strength of the available scientific evidence examining those effects. Thus, even when the available evidence is limited, the actual effect of the policy may be strong. Presumably, every policy has some effect on a range of outcomes, however small or unintended. Until researchers design studies that can detect these effects, available evidence is likely to remain inconclusive or limited. But this fact should not be confused with the conclusion that the policies themselves have limited effects. They may or may not have the effects they were designed to produce; available scientific research cannot yet answer that question. Moreover, even a policy with a small effect may nevertheless be beneficial to society or worth its costs. For instance, a policy that reduces firearm deaths by just a few percentage points could save more than 1,000 lives per year. This kind of "small" effect might be very difficult to detect with existing study methods but could represent an important contribution to public health and safety.

Supplementary Essays

The 13 types of policies reviewed in this report and the scope of the systematic review for the research synthesis were selected a priori and represent the central focus of our research synthesis efforts. Nevertheless, in reviewing evidence on these policies, other important themes emerged that the research team believed provided useful context for the policies or that were frequently cited in gun policy debates. Thus, we also researched what rigorous studies reveal about

- the possible mechanisms by which laws may affect outcomes
- how taxes, access to health care, and media campaigns might affect gun violence
- the effectiveness of laws used to target domestic violence
- methodological challenges in defining and estimating the prevalence of mass shootings and defensive gun use
- how suicide, violence, and mass shootings were affected by Australia's implementation of the National Firearms Agreement.

Conclusions and Recommendations

Of more than 100 combinations of policies and outcomes, we found that surprisingly few were the subject of methodologically rigorous investigation. Notably, research into four of our outcomes was essentially unavailable, with three of these four outcomes—defensive gun use, hunting and recreation, and the gun industry—representing issues of particular concern to gun owners or gun industry stakeholders. Here, we summarize the key conclusions and recommendations that can be drawn from the policy-outcome

combinations with the strongest available evidence (conclusions 1 through 8). Thereafter, we draw conclusions and recommendations concerning how to improve evidence on the effects of gun policies (conclusions 9 through 13).

Conclusions and Recommendations Based on the Existing Evidence Base

Our first set of conclusions and recommendations describes the policy-outcome combinations with the strongest available evidence as identified through our review of the existing literature, as well as recommendations for policy based on this evidence.

Conclusion 1. Available evidence supports the conclusion that child-access prevention laws, or safe storage laws, reduce self-inflicted fatal or nonfatal firearm injuries among youth. There is moderate evidence that these laws reduce firearm suicides among youth and limited evidence that the laws reduce total (i.e., firearm and non-firearm) suicides among youth.

Conclusion 2. Available evidence supports the conclusion that child-access prevention laws, or safe storage laws, reduce unintentional firearm injuries or unintentional firearm deaths among children. In addition, there is limited evidence that these laws may reduce unintentional firearm injuries among adults.

Recommendation 1. States without child-access prevention laws should consider adopting them as a strategy to reduce firearm suicides and unintentional firearm injuries and deaths. We note, however, that scientific research cannot, at present, address whether these laws might increase or decrease crime or rates of legal defensive gun use.

Recommendation 2. When considering adopting or refining child-access prevention laws, states should consider making child access to firearms a felony; there is some evidence that felony laws may have the greatest effects on unintentional firearm deaths.

Conclusion 3. There is moderate evidence that background checks reduce firearm suicides and firearm homicides, as well as limited evidence that these policies can reduce overall suicide and violent crime rates.

Conclusion 4. There is moderate evidence that stand-your-ground laws may increase state homicide rates and limited evidence that the laws increase firearm homicides in particular.

Conclusion 5. There is moderate evidence that laws prohibiting the purchase or possession of guns by individuals with some forms of mental illness reduce violent crime, and there is limited evidence that such laws reduce homicides in particular. There is also limited evidence these laws may reduce total suicides and firearm suicides.

Recommendation 3. States that currently do not require a background check investigating all types of mental health histories that lead to federal prohibi-

tions on firearm purchase or possession should consider implementing robust mental illness checks, which appear to reduce rates of gun violence. The most robust procedures involve sharing data on all prohibited possessors with the National Instant Criminal Background Check System.

Conclusion 6. There is limited evidence that before implementation of a ban on the sale of assault weapons and high-capacity magazines, there is an increase in the sales and prices of the products that the ban will prohibit.

Conclusion 7. There is limited evidence that a minimum age of 21 for purchasing firearms may reduce firearm suicides among youth.

Conclusion 8. No studies meeting our inclusion criteria have examined required reporting of lost or stolen firearms, required reporting and recording of firearm sales, or gun-free zones.

Conclusions and Recommendations for Improving Gun Policy Research

Based on our review of the existing literature on the effects of firearm policy changes, we offer the following conclusions and recommendations for improving the evidence base on the effects of gun laws.

Conclusion 9. The modest growth in knowledge about the effects of gun policy over the past dozen years reflects, in part, the reluctance of the U.S. government to sponsor work in this area at levels comparable to its investment in other areas of public safety and health, such as transportation safety.

Recommendation 4. To improve understanding of the real effects of gun policies, Congress should consider whether to lift current restrictions in appropriations legislation, and the administration should invest in firearm research portfolios at the Centers for Disease Control and Prevention, the National Institutes of Health, and the National Institute of Justice at levels comparable to its current investment in other threats to public safety and health.

Recommendation 5. Given current limitations in the availability of federal support for gun policy research, private foundations should take further steps to help fill this funding gap by supporting efforts to improve and expand data collection and research on gun policies.

Conclusion 10. Research examining the effects of gun policies on officer-involved shootings, defensive gun use, hunting and recreation, and the gun industry is virtually nonexistent.

Recommendation 6. To improve understanding of outcomes of critical concern to many in gun policy debates, the U.S. government and private research sponsors should support research examining the effects of gun laws on a wider

set of outcomes, including crime, defensive gun use, hunting and sport shooting, officer-involved shootings, and the gun industry.

Conclusion 11. The lack of data on gun ownership and availability and on guns in legal and illegal markets severely limits the quality of existing research.

Recommendation 7. To make important advances in understanding the effects of gun laws, the Centers for Disease Control and Prevention or another federal agency should resume collecting voluntarily provided survey data on gun ownership and use.

Recommendation 8. To foster a more robust research program on gun policy, Congress should consider whether to eliminate the restrictions it has imposed on the use of gun trace data for research purposes.

Conclusion 12. Crime and victimization monitoring systems are incomplete and not yet fulfilling their promise of supporting high-quality gun policy research in the areas we investigated.

Recommendation 9. To improve the quality of evidence used to evaluate gun policies, the National Violent Death Reporting System should be expanded to include all states with rigorous quality control standards.

Recommendation 10. The Bureau of Justice Statistics should examine the cost and feasibility of expanding its existing programs to generate state-level crime data.

Recommendation 11. The Bureau of Justice Statistics should continue to pursue its efforts to generate state-level victimization estimates. The current goal of generating such estimates for 22 states is a reasonable compromise between cost and the public's need for more-detailed information. However, the bureau should continue to expand its development of model-based victimization rates for all states and for a wider set of victimization experiences (including, for instance, crimes involving firearm use by an assailant or victim).

Conclusion 13. The methodological quality of research on firearms can be significantly improved.

Recommendation 12. As part of the Gun Policy in America initiative, we have published a database containing a subset of state gun laws from 1979 to 2016 (Cherney, Morral, and Schell, 2018). We ask that others with expertise on

state gun laws help us improve the database by notifying us of its errors, proposing more-useful categorizations of laws, or submitting information on laws not yet incorporated into the database. With such help, we hope to make the database a resource beneficial to all analysts.

Recommendation 13. Researchers, reviewers, academics, and science reporters should expect new analyses of the effects of gun policies to improve on earlier studies by persuasively addressing the methodological limitations of earlier studies, including problems with statistical power, model overfitting, covariate selection, poorly calibrated standard errors, multiple testing, undisclosed state variation in law implementation, unjustified assumptions about the time course of each policy's effects, the use of spline and hybrid effect codings that do not reveal coherent causal effect estimates, and inadequate attention to threats of reciprocal causation and simultaneity bias.

In conclusion, with a few exceptions, there is a surprisingly limited base of rigorous scientific evidence concerning the effects of many commonly discussed gun policies. This does not mean that these policies are ineffective; they might well be quite effective. Instead, it reflects shortcomings in the contributions that scientific study can currently offer to policy debates in these areas. It also reflects, in part, the policies we chose to investigate, all of which have been implemented in some U.S. states and, therefore, have proven to be politically and legally feasible, at least in some states. This decision meant that none of the policies we examined would dramatically increase or decrease the stock of guns or gun ownership rates in ways that would produce more readily detectable effects on public safety, health, and industry outcomes. The United States has a large stock of privately owned guns in circulation—estimated in 2014 to be somewhere between 200 million and 300 million firearms (Cook and Goss, 2014). Laws designed to change who may buy new weapons, what weapons they may buy, or how gun sales occur will predictably have only a small effect on, for example, homicides or participation in sport shooting, which are affected much more by the existing stock of firearms. Although small effects are especially difficult to identify with the statistical methods common in this field, they may be important. Even a 1-percent reduction in homicides corresponds to more than 1,500 fewer deaths over a decade.

By highlighting where scientific evidence is accumulating, we hope to build consensus around a shared set of facts that have been established through a transparent, nonpartisan, and impartial review process. In so doing, we also mean to highlight areas where more and better information could make important contributions to establishing fair and effective gun policies.

Summary References

Cherney, Samantha, Andrew R. Morral, and Terry L. Schell, *RAND State Firearm Law Database*, Santa Monica, Calif.: RAND Corporation, TL-283-RC, 2018. As of March 2, 2018: <https://www.rand.org/pubs/tools/TL283.html>

Cook, Philip J., and Kristin A. Goss, *The Gun Debate: What Everyone Needs to Know*, New York: Oxford University Press, 2014.

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, “Firearms Laws and the Reduction of Violence: A Systematic Review,” *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Khan, Khalid S., Regina Kunz, Jos Kleijnen, and Gerd Antes, “Five Steps to Conducting a Systematic Review,” *Journal of the Royal Society of Medicine*, Vol. 96, No. 3, 2003, pp. 118–121.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Acknowledgments

We wish to thank many staff and researchers inside and outside RAND who helped us to collect, interpret, and present the research discussed in this report. In particular, we wish to thank our quality assurance reviewers who provided expert and valuable guidance on how to improve earlier versions of this report or sections of it. These reviewers included James Anderson, Deborah Azrael, John Donohue, Susan Gates, Andy Hoehn, and Priscillia Hunt, as well as Jack Riley, whom we wish to especially thank for his encouragement and support of the idea that RAND could make important contributions to the gun policy discourse in the United States. The report also benefited from candid written reviews provided by two reviewers who wished to remain anonymous, one affiliated with a gun rights advocacy organization and one affiliated with a gun violence prevention advocacy organization. Within RAND, we wish to acknowledge the exceptional support we received from our research librarians, Roberta Shanman and Sachi Yagyu; our publication editor, Allison Kerns; and members of RAND's Office of External Affairs, including Lee Floyd, Chandra Garber, Stephan Kistler, Heather McCracken, Lauren Skrabala, Mary Vaiana, and Chara Williams.

Abbreviations

aOR	adjusted odds ratio
ARIMA	autoregressive integrated moving average
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
BJS	Bureau of Justice Statistics
BRFSS	Behavioral Risk Factor Surveillance Survey
CAP	child-access prevention
CC	concealed carry
CDC	Centers for Disease Control and Prevention
CI	confidence interval
DGU	defensive gun use
FBI	Federal Bureau of Investigation
FS/S	proportion of suicides that are firearm suicides
GSS	General Social Survey
IPH	intimate partner homicide
IRR	incidence rate ratio
NCVS	National Crime Victimization Survey
NFA	(Australian) National Firearms Agreement
NIBRS	National Incident-Based Reporting System
NICS	National Instant Criminal Background Check System

NIS	Nationwide Inpatient Sample
NRC	National Research Council
NSDS	National Self Defense Survey
NSPOF	National Survey of Private Ownership of Firearms
NSSF	National Shooting Sports Foundation
NVDRS	National Violent Death Reporting System
OR	odds ratio
VA	U.S. Department of Veterans Affairs

PART A

Introduction and Methods

CHAPTER ONE

Introduction

Americans are deeply divided on gun policy (Parker et al., 2017). Many Americans cherish the traditions of hunting, sport shooting, and collecting guns and value the security and protection that guns can provide. Many regions rely on hunting as an important driver of the tourism economy (Nelson, 2001; BBC Research & Consulting, 2008; Hodur, Leistritz, and Wolfe, 2008), and the wider gun industry employs hundreds of thousands of Americans, including instructors; shooting range operators; hunting equipment suppliers; and manufacturers, distributors, and retailers of firearms and ammunition. At the same time, many Americans have suffered grievous injuries and lost friends and family members in incidents involving firearms.¹ More than 36,000 Americans die annually from deliberate and unintentional gun injuries, and two-thirds of these deaths are suicides (Centers for Disease Control and Prevention [CDC], 2017a). Another 90,000 Americans per year receive care in a hospital for a nonfatal gun injury (CDC, 2017c).

Few are satisfied with the levels of mortality and injury associated with firearms, but there is passionate disagreement about how policies could be shaped to create a better future. There is a quite limited base of science on which to build sound and effective gun policies. Instead, when the public or members of Congress consider proposals affecting gun policy, they encounter conflicting opinions and inconsistent evidence about the likely effects of new laws. Views on what is factual concerning gun policies, or what the facts imply for decisionmaking, frequently divide along political and partisan lines (Kahan, 2017).

Entrenched disagreements on gun policy are not surprising, given the number and variety of contested and contradictory studies, selective misuse of facts by some on all sides of the debate, and today's hyper-partisan political environment. Moving past such roadblocks will be impossible unless decisionmakers can draw on a common set of facts based on transparent, nonpartisan, and impartial research and analysis. Even when individuals disagree about the objectives of gun policies, empirical evidence can help determine the most likely benefits and harms associated with such policies.

¹ Although not all guns are firearms, in this report, we follow conventional use in U.S. policy discussions and treat the terms *gun* and *firearm* as interchangeable.

Gun Policy in America

To help fill the gap in impartial research and analysis, the RAND Corporation launched the Gun Policy in America initiative, which is premised on the idea that the real effects of policies can be objectively determined and that establishing these facts will help lead to sound policies. Our goal is to create a resource where policymakers and the general public can access unbiased information that informs and enables the development of fair and effective firearm policies.

This report synthesizes the available scientific data on the effects of various firearm policies on firearm deaths, violent crime, the gun industry, participation in hunting and sport shooting, and other outcomes. It builds and expands on earlier comprehensive reviews of scientific evidence on gun policy conducted more than a decade ago by the National Research Council (2004) and the Community Preventive Services Task Force (see Hahn et al., 2005). This report is one of several research products stemming from RAND's Gun Policy in America initiative (see www.rand.org/gunpolicy).

In the Gun Policy in America initiative, we have made no attempt to evaluate the merits of different values and principles that sometimes drive policy disagreements. We also have not evaluated the legality of any candidate laws or how they may infringe on Second Amendment rights. Instead, our focus is strictly on the empirical effects of policies on the eight outcomes specified in this report. However, all of the policies we investigate have been implemented in multiple states, and many have withstood Supreme Court review; therefore, we have selected policies that have previously been found not to violate the Constitution.

Laws are not the only interventions that have been used to shape how guns are used in the United States, and research is available on the effectiveness of other approaches, such as public information campaigns, safety and training programs, policing interventions, and school and community programs. In this report, however, our focus is on what scientific studies tell us about the probable effects of certain laws.

Research Focus

The primary focus of this report is our systematic review of 13 broad classes of gun policies that have been implemented in some states and the effects of those policies on eight outcomes. We selected the 13 classes from a larger set of more than 100 gun policies that have been advocated for; proposed; or passed into law by the federal government, states, or municipalities. Specifically, we restricted our attention to policies or laws that have already been implemented in some states so that researchers could examine the effects of each. In addition, we sought policies designed to have a direct effect on our selected outcomes. These policies, the presumed mechanisms whereby they produce intended (and possibly unintended) effects on our selected outcomes,

and the various ways that U.S. states have implemented them are discussed in detail in Chapters Three through Fifteen of this report. Although, in many cases, these policies have been implemented by local municipalities rather than states, we have not sought to review implementation at the local level.

The 13 classes of gun policies considered in this research are as follows:

1. background checks
2. bans on the sale of assault weapons and high-capacity magazines
3. stand-your-ground laws
4. prohibitions associated with mental illness
5. lost or stolen firearm reporting requirements
6. licensing and permitting requirements
7. firearm sales reporting and recording requirements
8. child-access prevention laws
9. surrender of firearms by prohibited possessors
10. minimum age requirements
11. concealed-carry laws
12. waiting periods
13. gun-free zones.

When deciding on the outcomes to examine in our research, we first included those related to public health and safety—suicide, violent crime, unintentional injuries and deaths, mass shootings, and officer-involved shootings. These are the outcomes most commonly examined in the research literature we were familiar with. However, we recognized that such outcomes omit many of the benefits of gun ownership that are attractive to gun owners and that may also be affected by laws designed to reduce the gun-related harms to public health and safety. Therefore, we also systematically searched the research literature for studies examining how gun laws affect defensive gun use, hunting and recreation, and the gun industry. Together, these eight outcomes cover many of the areas of concern frequently discussed in debates on gun policy. Here, we provide a short description of each outcome.

Suicide

Official statistics on suicide in the United States are compiled by the CDC. Recent data, from 2015, indicate that 44,193 suicides occurred that year, for a rate of 13.75 per 100,000 people. Of these, 22,018 (49.8 percent) were firearm suicides (CDC, 2017a). Researchers have often examined the effects of laws on total suicides (i.e., suicide deaths by any means, including those involving a firearm), firearm suicides, nonfirearm suicides, and suicide attempts. From a societal perspective, the most important of these outcomes is total suicide; that is, the goal is to reduce the total number of suicide deaths, regardless of how one goes about attempting to die. In many cases, however, we would expect the effects of gun laws to be more easily observed in rates of firearm

suicides, not total suicides. The consensus among public health experts is that reducing firearm suicides in contexts where more-lethal means of attempting suicide are unavailable will result in reductions in the total suicide rate (see, for example, Office of the Surgeon General and National Alliance for Suicide Prevention, 2012; World Health Organization, 2014; for review, see Azrael and Miller, 2016). Nevertheless, it is also clear that some people prevented from attempting suicide with a firearm will substitute another lethal means and successfully end their lives. The rate at which this substitution occurs is not known. Thus, for laws that increase or decrease firearm suicides, the effects on total suicides are likely smaller and harder to detect. For this reason, we examine the effects of policies on both total suicides and firearm suicides.

Suicide rates in the United States have increased 25 percent since 1999 (Curtin, Warner, and Hedegaard, 2016).² There is some degree of misclassification of suicide deaths, with some suicides likely classified as unintentional deaths (Kapusta et al., 2011) or overdose deaths (Bohnert et al., 2013). The CDC provides limited nationwide data on suicides for all states. More-expansive data are contained in the National Violent Death Reporting System, also maintained by the CDC, but because that system currently releases information on just a subset of U.S. states, we cannot use this data set to characterize suicides nationally.

Data on suicide attempts generally derive from two sources: hospital admission records and self-reports. In hospital data, suicides are generally categorized as “self-harm” with unspecified intent; although there is a field to code cause of injury, this field is completed inconsistently across states (Coben et al., 2001). In 2014, there were 469,096 self-harm, nonfatal hospital admissions to emergency departments in the United States, 3,320 (less than 1 percent) of which were caused by a firearm (CDC, 2017c). This may be because between 83 and 91 percent of those who attempt suicide with a firearm die, which is a higher rate than some other methods of suicide, such as drowning (66–84 percent) or hanging (61–83 percent) (Azrael and Miller, 2016).

Emergency room data contain only self-harm incidents that resulted in an emergency room visit; as a complementary data source, national data based on self-reports reveal that, in 2015, 1.4 million adults aged 18 or older (0.6 percent) attempted suicide in the past year (Piscopo et al., 2016).

Violent Crime

The Federal Bureau of Investigation (FBI) defines *violent crime* as including forcible rape, robbery, aggravated assault, and murder or nonnegligent manslaughter. The last category excludes deaths caused by suicide, negligence, or accident, as well as justifiable homicides (such as the killing of a felon by a peace officer in the line of duty) (FBI, 2016d).

² The 25-percent increase in suicides refers to the age-adjusted rate, although the crude rate and the absolute number of suicides have also increased.

One source of data on violent crime is the FBI's Uniform Crime Reporting program, which relies on voluntary reporting of crimes by city, university/college, county, state, tribal, and federal law enforcement agencies. Data from the program indicate that there were approximately 1.2 million violent crimes in the United States in 2015, including 764,449 aggravated assaults, 327,374 robberies, 124,047 rapes, and 15,696 instances of murder or nonnegligent manslaughter (FBI, 2016d). The overall violent crime rate was 372.6 per 100,000 people, with the highest rate for aggravated assault (237.8 per 100,000), followed by robbery (101.9 per 100,000), rape (38.6 per 100,000) and murder or nonnegligent manslaughter (4.9 per 100,000). Nationwide, firearms were used in 71.5 percent of all instances of murder or nonnegligent manslaughter, 40.8 percent of robberies, and 24.2 percent of aggravated assaults in 2015 (FBI, 2016d).

Death certificate data and emergency department admission data provide additional insights into the prevalence and consequences of violent crime. Based on mortality data, the CDC estimated that there were 17,793 homicides in the United States in 2015, for a rate of 5.54 per 100,000 people; of these, 12,979 (73 percent) were caused by a firearm (CDC, 2017a). Emergency department data show that in 2014 there were more than 1.5 million admissions to hospital emergency departments for assault; of these, 60,470 (3.8 percent) were firearm-related (CDC, 2017c).

Unintentional Injuries and Deaths

Like suicide, official statistics on unintentional injuries and deaths in the United States are compiled by the CDC. The most recent data, from 2015, indicate that 146,571 fatal unintentional injuries occurred that year, for a rate of 46.50 per 100,000 people (CDC, 2017a). Of these, 489 (less than 1 percent) were caused by a firearm. Some of these fatal unintentional injuries were likely misclassified and were actually suicides or homicides. Nevertheless, the true number of unintentional firearm deaths may be substantially greater than reported in the CDC's vital data. For example, inconsistent classification of child firearm deaths by local coroners may result in 35–45 percent of all unintentional firearm deaths being classified instead as suicides or homicides (Everytown for Gun Safety Support Fund, 2014; Hemenway and Solnick, 2015a). We also include research examining nonfatal unintentional injuries. There were close to 29 million unintentional injury discharges from emergency rooms in 2014, of which 15,928 (less than 1 percent) were caused by a firearm. These reports omit injuries that did not result in an emergency room visit.

Mass Shootings

Although only a small fraction of annual firearm deaths result from a mass shooting, these events attract enormous public, media, and social media attention in the country, and they frequently prompt discussions about legislative initiatives for how better to prevent gun violence. The U.S. government has never defined *mass shooting*, and there is no single universally accepted definition of the term. The FBI's definition of a *mass*

murderer requires at least four casualties, excluding the offender or offenders, in a single incident. Public law (the Investigative Assistance for Violent Crime Act of 2012; Pub. L. 112-265) defines a *mass killing* as a single incident in which three or more people were killed. Alternative definitions include two or more injured victims or four or more people injured or killed, including the shooter. Depending on which data source is referenced, and its definitions, there were seven, 65, 332, or 371 mass shootings in the United States in 2015 (see a discussion of these estimates in Chapter Twenty-Two).

Officer-Involved Shootings

Police shootings of civilians have triggered fierce debates locally and nationally about when use of lethal force is appropriate and whether it is being used disproportionately against minorities. Although the FBI has tried to collect information on police shootings from around 17,000 local law enforcement agencies, recent efforts by news organizations (such as the *Washington Post* and the *Guardian*) have demonstrated that the FBI's data collection misses many such cases. Whereas the FBI's count typically comes to around 400 killings by police per year, the *Washington Post* documented news stories on 963 individuals shot and killed by law enforcement in 2016, a number that could omit any individuals shot and killed by police about whom no news story was written. The FBI has announced plans to begin a new data collection effort that will reportedly track all incidents in which law enforcement seriously injure or kill citizens (Kindy, 2015).

Because reliable data on police shootings are often available only for individual police departments, prior studies using such data typically present information at the city level. For example, using police reports and other administrative data, Klinger et al. (2016) looked at 230 use-of-force shootings by police officers involving 373 suspects in St. Louis between 2003 and 2012. Similarly, medical records of shooting victims contain information on whether the shooter was a member of the law enforcement community. Using data from New York City's medical examiner, Gill and Pasquale-Styles (2009) looked at law enforcement shootings resulting in a fatality there between 2003 and 2006. The data included 42 cases for the four-year period. Like suicide attempts and unintentional injuries and deaths, this data source misses incidents in which the officer did not injure the suspect or the suspect did not seek medical attention.

Defensive Gun Use

Defensive gun use has typically been measured in the empirical literature using self-reports on surveys of gun owners, although some studies have used firearm deaths coded as justifiable homicides to investigate subsets of defensive gun use. Although there are some variations, *defensive gun use* has often been defined as incidents that involve (1) protection against humans (i.e., not animals); (2) gun use by civilians (not official use by military, police, or security personnel); (3) contact between persons (not, for instance, carrying a firearm to investigate a suspicious sound when no intruder is encountered); and (4) use of a gun, at least as a visual or verbal threat (not

incidents in which a gun may have simply been available for use). Definitions this broad would include defensive use of a gun by criminals during the commission of a crime, as well as use of a gun for personal defense by those who are prohibited by law from being in possession of a weapon (itself a crime). More-restrictive definitions specify that the defensive gun use be performed by the victim of certain crimes or by someone trying to protect the victim. These definitions may miss instances in which crimes were deterred or averted when a firearm was brandished.

Differences in the definitions of defensive gun use, and in the manner of collecting information about it, lead to wide differences in estimates of the annual incidence of defensive gun use. Low estimates (based on the experiences of crime victims) are a little more than 100,000 such incidents per year, and high estimates are 4.7 million per year (Cook and Ludwig, 1996, 1997, 1998; McDowall, Loftin, and Wiersema, 1998). This literature and the challenges of defining and measuring defensive gun use are reviewed in Chapter Twenty-Three.

Hunting and Recreation

Federal statistics on hunters largely come from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation Survey, which is conducted every five years as a coordinated effort by the U.S. Fish and Wildlife Service and the U.S. Census Bureau. According to the most recent data, from 2011, approximately 13 million people used firearms for hunting, more than 50 percent of all hunters participated in target shooting, and 22 percent of hunters visited shooting ranges (U.S. Fish and Wildlife Service, U.S. Department of the Interior, and U.S. Department of Commerce, 2012). Estimates from the National Shooting Sports Foundation (NSSF) suggest that approximately 20 million individuals participate in target shooting annually (Southwick Associates, 2013). Data from the General Social Survey suggest that hunting has decreased significantly since 1977, when 31.6 percent of adults lived in households where they, their spouse, or both hunted. In 2014, households with a hunter was down to 15.4 percent (Smith and Son, 2015).

Gun Industry

Estimates produced by the NSSF suggest that there are 141,000 jobs in the United States involving the manufacture, distribution, or retailing of ammunition, firearms, and hunting supplies and potentially another 150,000 jobs in supplier and ancillary industries connected with the firearm market (NSSF, 2017). According to the U.S. Census Bureau, in 2014, more than 90,000 people were employed in U.S. firms coded as being involved in just the manufacture of firearms, ammunition, or ordnance (North American Industry Classification System [NAICS] codes 332992, 332993, and 332994; U.S. Census Bureau, 2016). The manufacturing industry alone is estimated to generate \$16 billion in revenue annually (IBISWorld, 2016). In 2011, hunters spent \$3 billion on firearms and \$1.2 billion on ammunition (U.S. Fish and Wildlife Ser-

vice, U.S. Department of the Interior, and U.S. Department of Commerce, 2012). More than 9 million firearms were manufactured in the United States in 2014, nearly triple the number manufactured one decade prior. An additional 3.6 million firearms were imported in 2014, while just more than 420,900 firearms were exported from the United States (Bureau of Alcohol, Tobacco, Firearms and Explosives, 2016b).

As of the end of fiscal year 2015, 139,840 federal firearms licensees had active licenses to sell firearms in the United States. Just more than 46 percent of these licenses were held by dealers or pawnbrokers, 43 percent were held by collectors, about 9 percent were held by manufacturers of ammunition or firearms, and less than 1 percent were held by importers (Bureau of Alcohol, Tobacco, Firearms and Explosives, 2016b).

Organization of This Report

The report is organized into five parts. Part A introduces the project scope and objectives in Chapter One and the methods used to conduct systematic reviews and syntheses of the literature in Chapter Two. In Part B, we present a research synthesis on each of the 13 state policies selected for review (Chapters Three through Fifteen). Each of these chapters defines the class of policies under review; presents and rates the available evidence; and describes what conclusions, if any, can be drawn about how each policy affects each outcome. Part B includes all of the research syntheses we selected a priori; however, in the course of developing these, several related themes frequently came up in the literature and in policy debates, and we believed that these themes warranted further discussion or review. Therefore, to augment and provide context for Part B's syntheses, Part C presents supplementary essays on what rigorous studies reveal about

- the possible mechanisms by which laws may affect outcomes (Chapters Sixteen and Seventeen on the effects of firearm prevalence on suicide and violent crime)
- how taxes, access to health care, and media campaigns might affect gun violence (Chapters Eighteen through Twenty)
- the effectiveness of laws used to target domestic violence (Chapter Twenty-One)
- methodological challenges in defining and estimating the prevalence of mass shootings and defensive gun use (Chapters Twenty-Two and Twenty-Three)
- how suicide, violent crime, and mass shootings were affected by Australia's implementation of the National Firearms Agreement (Chapter Twenty-Four).

In Part D, we draw general conclusions from the main policy analyses and offer recommendations for how to improve the state of evidence for the effects of state laws. Finally, in an appendix section, Appendix A describes common methodological shortcomings found in the existing scientific literature examining gun policy, and Appendix B describes the source data used to display study effect sizes and rate study methodologies.

Chapter One References

Azrael, Deborah, and Matthew Miller, “Reducing Suicide Without Affecting Underlying Mental Health: Theoretical Underpinnings and a Review of the Evidence Base Lining the Availability of Lethal Means and Suicide,” in Rory C. O’Connor and Jane Pirkis, eds., *The International Handbook of Suicide Prevention*, 2nd ed., Hoboken, N.J.: John Wiley and Sons, 2016.

BBC Research & Consulting, *The Economic Impacts of Hunting, Fishing and Wildlife Watching in Colorado*, Denver, Colo., September 26, 2008. As of October 13, 2017:
<https://cpw.state.co.us/Documents/About/Reports/08DOWEconomicImpactReport.pdf>

Bohnert, A. S., J. F. McCarthy, R. V. Ignacio, M. A. Ilgen, A. Eisenberg, and F. C. Blow, “Misclassification of Suicide Deaths: Examining the Psychiatric History of Overdose Decedents,” *Injury Prevention*, Vol. 19, No. 6, 2013, pp. 326–330.

Bureau of Alcohol, Tobacco, Firearms and Explosives, *Firearms Commerce in the United States: Annual Statistical Update 2016*, Washington, D.C.: U.S. Department of Justice, 2016b.

CDC—See Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention, “Fatal Injury Reports, National, Regional, and State 1981–2015,” WISQARS database, Atlanta, Ga., 2017a. As of May 8, 2017:
<https://webappa.cdc.gov/sasweb/ncipc/mortrate.html>

———, “Nonfatal Injury Reports: 2001–2014,” WISQARS database, Atlanta, Ga., 2017c. As of January 15, 2017:
<https://webappa.cdc.gov/sasweb/ncipc/nfirates2001.html>

Coben, J. H., C. A. Steiner, M. Barrett, C. T. Merrill, and D. Adamson, “Completeness of Cause of Injury Coding in Healthcare Administrative Databases in the United States,” *Injury Prevention*, Vol. 12, No. 3, 2001, pp. 199–201.

Cook, Philip J., and Jens Ludwig, *Guns in America: Results of a Comprehensive National Survey on Firearms Ownership and Use*, Washington, D.C.: Police Foundation, 1996.

———, *Guns in America: National Survey on Private Ownership and Use of Firearms: Research in Brief*, Rockville, Md.: National Institute of Justice, 1997.

———, “Defensive Gun Uses: New Evidence from a National Survey,” *Journal of Quantitative Criminology*, Vol. 14, No. 2, 1998, pp. 111–131.

Curtin, Sally C., Margaret Warner, and Holly Hedegaard, *Suicide Rates for Females and Males by Race and Ethnicity: United States, 1999 and 2014*, Atlanta, Ga.: Centers for Disease Control and Prevention, 2016.

Everytown for Gun Safety Support Fund, *Innocents Lost: A Year of Unintentional Child Gun Deaths*, June 2014. As of May 12, 2017:
<https://everytownresearch.org/documents/2015/04/innocents-lost.pdf>

FBI—See Federal Bureau of Investigation.

Federal Bureau of Investigation, “Crime in the United States 2015: Violent Crime,” Washington, D.C.: U.S. Department of Justice, 2016d. As of May 8, 2017:
https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/offenses-known-to-law-enforcement/violent-crime/violentcrimemain_final.pdf

Gill, J. R., and M. Pasquale-Styles, “Firearm Deaths by Law Enforcement,” *Journal of Forensic Science*, Vol. 54, No. 1, 2009, pp. 185–188.

12 The Science of Gun Policy: A Critical Synthesis of Research Evidence on the Effects of U.S. Policies

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Hemenway, David, and Sara J. Solnick, "Children and Unintentional Firearm Death," *Injury Epidemiology*, Vol. 2, No. 26, 2015a.

Hodur, Nancy M., F. Larry Leistritz, and Kara L. Wolfe, "Developing the Nature-Based Tourism Sector in Southwestern North Dakota," *Great Plains Research: A Journal of Natural and Social Sciences*, Vol. 18, Spring 2008, pp. 81–92.

IBISWorld, *Guns and Ammunition Manufacturing in the U.S.: Market Research Report*, Los Angeles, Calif., August 2016.

Kahan, Dan M., "On the Sources of Ordinary Science Knowledge and Extraordinary Science Ignorance," in Kathleen Hall Jamieson, Dan Kahan, and Dietram A. Scheufele, eds., *Oxford Handbook of the Science of Science Communication*, Oxford, UK: Oxford University Press, 2017.

Kapusta, N. D., U. S. Tran, I. R. Rockett, D. DeLeo, C. P. Naylor, T. Niederkrotenthaler, M. Voracek, E. Etzersdorfer, and G. Sonneck, "Declining Autopsy Rates and Suicide Misclassification: A Cross-National Analysis of 35 Countries," *Archives of General Psychiatry*, Vol. 68, No. 10, 2011, pp. 1050–1057.

Kindy, Kimberly, "FBI to Sharply Expand System for Tracking Fatal Police Shootings," *Washington Post*, December 8, 2015.

Klinger, D., R. Rosenfeld, D. Isom, and M. Deckard, "Race, Crime, and the Micro-Ecology of Deadly Force," *Criminology and Public Policy*, Vol. 15, No. 1, February 2016, pp. 193–222.

McDowall, D., C. Loftin, and B. Wiersema, "Estimates of the Frequency of Firearm Self Defense from the National Crime Victimization Survey," Albany, N.Y.: State University of New York, School of Criminal Justice, Violence Research Group Discussion Paper 20, 1998 (unpublished).

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

National Shooting Sports Foundation, *Firearms and Ammunition Industry Economic Impact Report*, Newtown, Conn., 2017. As of October 18, 2017:
<https://d3aya7xwz8momx.cloudfront.net/wp-content/uploads/2017/07/EconomicImpactofIndustry2017.pdf>

Nelson, Charles M., *Economic Implications of Land Use Patterns for Natural Resource Recreation and Tourism*, Lansing, Mich.: Michigan Land Resource Project, Public Sector Consultants, 2001.

NSSF—See National Shooting Sports Foundation.

Office of the Surgeon General and National Action Alliance for Suicide Prevention, *National Strategy for Suicide Prevention: Goals and Objectives for Action: A Report of the U.S. Surgeon General and of the National Action Alliance for Suicide Prevention*, Washington, D.C.: U.S. Department of Health and Human Services, 2012.

Parker, Kim, Juliana Menasce Horowitz, Ruth Igielnik, Baxter Oliphant, and Anna Brown, *America's Complex Relationship with Guns*, Washington, D.C.: Pew Research Center, June 22, 2017. As of August 14, 2017:
<http://assets.pewresearch.org/wp-content/uploads/sites/3/2017/06/06151541/Guns-Report-FOR-WEBSITE-PDF-6-21.pdf>

Piscopo, Kathryn, Rachel N. Lipari, Jennifer Cooney, and Christie Galsheen, *Suicidal Thoughts and Behavior Among Adults: Results from the 2015 National Survey on Drug Use and Health*, NSDUH Data Review, September 2016. As of May 23, 2017:
<https://www.samhsa.gov/data/sites/default/files/NSDUH-DR-FFR3-2015/NSDUH-DR-FFR3-2015.pdf>

Public Law 112-265, Investigative Assistance for Violent Crimes Act of 2012, January 14, 2013.

Smith, T. W., and J. Son, *Trends in Gun Ownership in the United States, 1972–2014*, Chicago, Ill.: NORC at the University of Chicago, March 2015. As of March 9, 2017:
http://www.norc.org/PDFs/GSS%20Reports/GSS_Trends%20in%20Gun%20Ownership_US_1972-2014.pdf

Southwick Associates, *Target Shooting in America*, Newtown, Conn.: National Shooting Sports Foundation, 2013.

U.S. Census Bureau, *Number of Firms, Number of Establishments, Employment, and Annual Payroll by Enterprise Employment Size for the United States, All Industries: 2014*, Washington, D.C., December 2016. As of January 15, 2017:
<https://www.census.gov/data/tables/2014/econ/susb/2014-susb-annual.html>

U.S. Fish and Wildlife Service, U.S. Department of the Interior, and U.S. Department of Commerce, *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*, Washington, D.C., FH2/11-NAT, 2012.

World Health Organization, *Preventing Suicide: A Global Imperative*, Geneva, 2014. As of May 8, 2017:
http://apps.who.int/iris/bitstream/10665/131056/1/9789241564779_eng.pdf

CHAPTER TWO

Methods

Our review of evidence concerning the effects of 13 policies on eight outcomes used Royal Society of Medicine (Khan et al., 2003) guidelines for conducting systematic reviews of a scientific literature. Those guidelines consist of a five-step protocol: framing questions for review, identifying relevant literature, assessing the quality of the literature, summarizing the evidence, and interpreting the findings. Our objective was to identify and assess the quality of evidence provided in research that estimated the causal effect of one of the selected gun policies (or the prevalence of firearm ownership) on any of our eight key outcomes.

Before undertaking the review, we knew that we would need to draw on primarily observational studies across a range of disciplines, including economics, psychology, public health, sociology, and criminology. The Royal Society of Medicine approach is suitable in this context because of its flexibility and applicability to social and policy interventions. Other approaches for systematic reviews (e.g., Institute of Medicine, 2011; Higgins and Green, 2011) are designed primarily for reviews specific to health care. We consulted guidelines from the Campbell Collaboration to ensure that our review criteria were based on relevant factors prescribed for reviews of social and policy interventions (e.g., determination of independent findings, statistical procedures; Campbell Collaboration, 2001). However, to more efficiently examine the range of outcomes and interventions we set out to review, and because of the wide range of methods researchers have used to examine these effects, we do not follow the Campbell Collaboration guidelines exactly, as detailed next.

Selecting Policies

RAND assembled a list of close to 100 distinct gun policies advocated by diverse organizations, including the White House and other U.S. government organizations, advocacy organizations focused on gun policy (such as the National Rifle Association and the Brady Campaign to Prevent Gun Violence), academic organizations focused on gun policy or gun policy research, and professional organizations that had made public recommendations related to gun policy (e.g., the International Association of Chiefs of

Police and the American Bar Association). Our objective was to evaluate state firearm laws because there is considerable variation that could be examined to understand the causal effects of such laws. Moreover, because the laws are applied statewide, observed effects may generalize to new jurisdictions better than the effects of local gun policies or programs that may be more tailored to the unique circumstances giving rise to them. We therefore eliminated policies that chiefly concerned local programs or interventions that are not mandated by state laws (e.g., gun buy-back programs or policing strategies that have been recommended on the basis of favorable research findings). For the same reason, we eliminated policies that either have never been passed into state laws or that have not yet had their intended effects (e.g., laws requiring new handguns to incorporate smart-gun technologies). We excluded policies that we concluded were likely to have only an indirect effect on any of the eight outcomes we were examining (e.g., policies concerning mental health coverage in group health insurance plans; the public availability of Bureau of Alcohol, Tobacco, Firearms and Explosives data on gun traces). We clustered some policy proposals that we regarded as sufficiently similar in concept to be included in the same general class of policies (e.g., policies of repealing the Safe Schools Act and the conceptually similar policy to prohibit gun-free zones).

This process resulted in 13 classes of firearm policies that we subsequently reviewed with multiple representatives of two advocacy organizations (one strongly aligned with enhanced gun regulation, and one strongly aligned with reduced gun regulation). The purpose of these consultations was to establish whether we had identified policies that are important, coherent, and relevant to current gun policy debates. This consultation resulted in substituting two of our original 13 classes of laws. As noted in Chapter One, the final set of policies, defined and explained in Chapters Three through Fifteen, is as follows:

1. background checks
2. bans on the sale of assault weapons and high-capacity magazines
3. stand-your-ground laws
4. prohibitions associated with mental illness
5. lost or stolen firearm reporting requirements
6. licensing and permitting requirements
7. firearm sales reporting and recording requirements
8. child-access prevention laws
9. surrender of firearms by prohibited possessors
10. minimum age requirements
11. concealed-carry laws
12. waiting periods
13. gun-free zones.

These classes of gun policies do not comprehensively account for all—or necessarily the most effective—laws or programs that have been implemented in the United States with the aim of reducing gun violence. For example, our set of policies does not include mandatory minimum sentencing guidelines for crimes with firearms. Further, by restricting our evaluation to state policies, we exclude local interventions (e.g., problem-oriented policing, focused deterrence strategies) that have been found to reduce overall crime in prior meta-analyses (Braga, Papachristos, and Hureau, 2014; Braga and Weisburd, 2012). However, we recognize the potential importance of these other interventions and believe a similar systematic review of their effects on outcomes relevant to the firearm policy debate merits future research.¹

While Part B of this report evaluates the existing literature on the effects of these 13 classes of firearm policies, Part C includes essays describing scientific research on possible mechanisms by which laws may affect firearm-related outcomes, such as by affecting the prevalence of gun ownership (see Chapters Sixteen and Seventeen).

Selecting and Reviewing Studies

Our selection and review of the identified literature involved the following steps:

1. **Article retrieval:** Across all outcomes, we identified a common set of search terms to capture articles relevant to firearm prevalence or firearm policies. We then identified search terms unique for each outcome.
2. **Title and abstract review:** We conducted separate title and abstract reviews for each outcome using DistillerSR to code criteria used to determine whether the article appeared to meet minimum inclusion criteria (described later).
3. **Full-text review:** All studies retained after abstract review received full-text review and coding using DistillerSR. The purpose of this review was to identify studies that examined the effects of one or more of our policies on any of our outcomes and that employed methods designed to clarify the causal effects of the policy.
4. **Synthesis of evidence:** Once we identified the subset of quasi-experimental studies for each outcome and policy,² members of the multidisciplinary methodology team met to discuss each study's strengths and limitations. Then, the group discussed each set of studies available for a policy-outcome pair to make a determination about the level of evidence supporting the effect of the policy on each outcome.

¹ For a recent review of the evidence on criminal justice interventions to reduce criminal access to firearms, see Braga, 2017.

² We identified no experimental studies.

Article Retrieval

In spring 2016, we queried all databases listed in Table 2.1 for English-language studies. Because the National Research Council (NRC) (2004) and the Community Preventive Services Task Force (Hahn et al., 2005) published comprehensive and high-quality research reviews in 2004 and 2005, we limited our search primarily to research published during or after 2003 (assuming a lag from the time the NRC review was complete and the final report was published). We supplemented this search with a review of all studies reviewed by NRC (2004) and Hahn et al. (2005). Finally, to ensure inclusion of the most-seminal studies, including those that may have been missed by NRC or Hahn et al., we conducted additional searches in the Web of Science and Scopus

Table 2.1
Databases Searched for Studies Examining the Effects of Firearm Policies

Database	Details
PubMed	National Library of Medicine's database of medical literature. <i>Not used for gun industry or hunting searches.</i>
PsycINFO	Journal articles, books, reports, and dissertations on psychology and related fields. <i>Not used for gun industry or hunting searches.</i>
Index to Legal Periodicals	Includes indexing of scholarly articles, symposia, jurisdictional surveys, court decisions, books, and book reviews.
Social Science Abstracts	Journal articles and book reviews on anthropology, crime, economics, law, political science, psychology, public administration, and sociology.
Web of Science	Includes the Book Citation Index, Science Citation, Social Science Citation, Arts & Humanities Citation Indexes, and Conference Proceedings Citation Indexes for Science, Social Science, and Humanities, which include all cited references from indexed articles.
Criminal Justice Abstracts	Abstracts related to criminal justice and criminology; includes current books, book chapters, journal articles, government reports, and dissertations published worldwide.
National Criminal Justice Reference Service	Contains summaries of the more than 185,000 criminal justice publications housed in the National Criminal Justice Reference Service Library collection.
Sociological Abstracts	Citations and abstracts of sociological literature, including journal articles, books, book chapters, dissertations, and conference papers.
EconLit	Journal articles, books, and working papers on economics.
Business Source Complete	Business and economics journal articles, country profiles, and industry reports.
WorldCat	Catalog of books, web resources, and other material worldwide.
Scopus	An abstract and citation database with links to full-text content, covering peer-reviewed research and web sources in scientific, technical, medical, and social science fields, as well as arts and humanities.
LawReviews (LexisNexis)	A database of legal reviews.

databases for any study that had been cited in the literature 70 or more times, regardless of its publication date. Finally, after completing our search, several relevant studies were published in summer and fall 2016. When we became aware of these, we included them in our review.

We conducted separate searches for each of the eight outcomes. The search strings that were applied universally across all outcomes included the following:

- gun or guns or firearm* or handgun* or shotgun* or rifle* or longgun* or machinegun* or pistol* OR automatic weapon OR assault weapon OR semi-automatic weapon OR automatic weapons OR assault weapons OR semi-automatic weapons
AND
- ownership OR own OR owns OR availab* OR access* OR possess* OR purchas* OR restrict* OR regulat* OR distribut* OR “weapon carrying” OR “weapon-carrying” OR legislation OR legislating OR legislative OR law OR laws OR legal* OR policy OR policies OR “ban” OR “bans” OR “banned.”

In addition, we searched for the following outcome-specific search terms:

- suicide: (suicide* OR self-harm* OR self-injur*);
 - the following were the only terms used for “firearms” for this search: gun or guns or firearm* or handgun* or shotgun* or rifle* or longgun* or machine-gun* or pistol*
- violent crime: homicide* OR murder* OR manslaughter OR “domestic violence” OR “spousal abuse” OR “elder abuse” OR “child abuse” OR “family violence” OR “child maltreatment” OR “spousal maltreatment” OR “elder maltreatment” OR “intimate relationship violence” OR “intimate partner violence” OR “dating violence” OR (violen* AND [crime* OR criminal*]) OR rape OR rapes OR rapist* OR “personal crime” OR “personal crimes” OR robbery OR assault* OR stalk* OR terroris*
- unintentional injuries and deaths: accident* OR unintentional
- mass shootings: “mass shooting” OR “mass shootings”
- officer-involved shootings: “law enforcement” OR police* OR policing
- defensive gun use: self-defense OR “self defense” OR “personal defense” OR defens* OR self-protect* OR self protect* OR DGU OR SDGU
- hunting and recreation: hunt OR hunting OR “sport shooting” OR “shooting sports” OR recreation* (The terms “ammunition” and “bullets” were also included in the set containing the terms for “firearms.”)
- gun industry: industr* OR manufactur* OR produc* OR distribut* OR supply OR trade OR price* OR export* OR revenue* OR sales OR employ* OR profit* OR cost OR costs OR costing OR “gun show” OR tax OR taxes OR taxing OR taxation OR payroll OR “federal firearms license.”

We used a three-stage study review process and standardized review criteria (described next) to identify all studies with evidence for policy effects meeting minimum evidence standards. When possible, we calculated and graphed standardized effect sizes for reported effects included in our research syntheses (Chapters Three through Fifteen).

In addition to the planned research syntheses analyzing the effects of the 13 policies outlined in Chapter One, we summarized evidence on other topics when members of the research team believed that a topic provided important supplemental evidence or explanatory information (see Chapters Sixteen through Twenty-Four). For instance, we identified a substantial literature examining the effects of firearm prevalence on rates of suicide (Chapter Sixteen) and homicide (Chapter Seventeen). This literature did not evaluate the effects of a specific policy but nevertheless examined a key mechanism by which policies might affect the outcomes. For these discussions, we occasionally augmented the search strategy described earlier, as detailed in the individual chapters.

Title and Abstract Review

At this stage, we screened studies to determine whether they met our inclusion criteria. In all cases, a study was included if it met the following: *any empirical study that demonstrated a relationship between a firearm-related public policy and the relevant outcome OR any empirical study that demonstrated a relationship between firearm ownership and access and a relevant outcome (including proxy measures for gun ownership).*

Studies were excluded if they were case studies, systematic reviews, dissertations, commentaries or conceptual discussions, descriptive studies, studies in which key variables were assumed rather than measured (e.g., a region was assumed to have higher rates of gun ownership), studies that did not concern one of the eight outcomes we selected, studies that did not concern one of the 13 policies we selected (or gun ownership), or studies that duplicated the analyses and results of other included studies.

Full-Text Review

Next, we used full-text review to ensure that the studies included thus far did not meet any of the exclusion criteria and to exclude studies with no credible claim to having identified a causal effect of policies. In addition to coding all studies on the policy and outcome they examined and on their research design, we coded the country or countries in which the policy effects were evaluated. Because of the United States' unique legal, policy, and gun ownership context, we excluded studies examining the effects of policies on foreign populations. However, in the special-topic discussions (Chapters Sixteen through Twenty-Four), we include analysis of some studies in foreign countries (such as an analysis of the Australian experience with gun regulation) and various foreign studies of the effects of gun prevalence on suicide.

Our research syntheses (Chapters Three through Fifteen) focus exclusively on studies that used research methods designed to identify causal effects among observed

associations between policies and outcomes. Specifically, we required, at a minimum, that studies include time-series data and use such data to establish that policies preceded their apparent effects (a requirement for a causal effect) and that studies include a control group or comparison group (to demonstrate that the purported causal effect was not found among those who were not exposed to the policy). Experimental designs provide the gold standard for establishing causal effects, but we identified none in our literature reviews. On a case-by-case basis, we examined studies that made a credible claim to causal inference on the basis of data that did not include a time series. In practice, these discussions determined that some studies using instrumental-variable approaches to isolating causal effects satisfied our minimum standards for inclusion.

We refer to the studies that met our inclusion criteria as *quasi-experimental*. We distinguish these from simple *cross-sectional* studies that may show an association between states with a given policy and some outcome but that have no strategy for ensuring that it is the policy that caused the observed differences across states. For instance, there could be some other factor associated with both state policy differences and outcome differences or there could be reverse causality (that is, differences in the outcome across states could have caused states to adopt different policies). In excluding cross-sectional studies from this review, we have adopted a more stringent standard of evidence for causal effects than has often been used in systematic reviews of gun policy.

Although excluding cross-sectional research eliminates a large number of studies on gun policy, longitudinal data are much better for estimating the causal effect of a policy. Specifically, empirical demonstration of causation generally requires three types of evidence (Mill, 1843):

- The cause and effect regularly co-occur (i.e., association).
- The cause occurs before the effect (i.e., precedence).
- Alternative explanations for the association have been ruled out (i.e., elimination of confounds).

Cross-sectional research is largely limited to demonstrating association. Longitudinal studies that include people or regions that are exposed to a policy and those that are not exposed have the potential to provide all three types of evidence. Such a design can demonstrate that the policy preceded the change in the outcome of interest, and it can rule out a wider range of potential confounds, including historical time trends and the time-invariant characteristics of the jurisdictions in which the policies were implemented (Wooldridge, 2002).

We also excluded studies that offered no insight into the causal effects of individual policies. For instance, we excluded studies that evaluated the effects of an aggregate state score describing the totality of each state's gun policies or studies of the aggregate effects of legislation that included multiple gun policies. In rare cases, we excluded from consideration studies that provided insufficient information about their methodologies to evaluate whether they used a credible approach to isolating a causal

effect of policies. In one case (Kalesan et al., 2016), we excluded a study that examined the effects of many of our selected policies on firearm deaths. We did so because of significant methodological problems that we concluded made the findings uninformative, as documented in Schell and Morral (2016). In cases in which authors updated prior published analyses, we generally chose the updated study. However, in one case (Cook and Ludwig, 2003), we present the results from the earlier analysis (Ludwig and Cook, 2000), which was inclusive of more years of data, provided more detail, and included multiple model specifications (although findings were qualitatively the same). The identified studies included individual-level studies (i.e., studies comparing outcomes among people over time) and ecological studies (i.e., studies comparing outcomes in regions over time).

Finally, we excluded studies published prior to 2003 on one policy-outcome pair—concealed-carry laws and violent crime. Our discussion of this topic (see Chapter Thirteen) reviews much of the earlier literature in this area, but we do not count the earlier work in our evidence ratings for several reasons. For starters, this area of gun policy has received the greatest research attention since 2003, and considerable advances have been made in understanding the effects of these laws. In addition, researchers have uncovered serious problems with data sets that were frequently used before 2003. Indeed, Hahn et al. (2005) dismissed all the earlier work that had been done with county-level data (which meant most of the work) on grounds that it was too flawed to rely on for evidence. We do not take that position but do agree with NRC (2004) and Hahn et al. (2005) that the primary conclusion that can be drawn from this earlier literature is that estimates of the effects of concealed-carry laws are highly sensitive to model specification choices, meaning no conclusive evidence can be drawn from the estimates. Because many of the authors engaged in the pre-2003 concealed-carry research continued to publish improved models on improved data sets, we restrict our evidence ratings to just this later work. We do not exclude pre-2003 studies of concealed-carry laws for outcomes other than violent crime, because there are much fewer later studies on which to base evidence ratings for these other outcomes.

Using these inclusion and exclusion criteria, we identified the studies providing the highest-quality evidence of a causal relationship between a policy and an outcome. In judging the quality of studies, we always explicitly considered common methodological shortcomings found in the existing gun policy scientific literature (see Appendix A), especially the following:

- *Models that may have too many estimated parameters for the number of available observations.* We consistently note whenever estimates were based on models with a ratio of less than ten observations per estimated parameter. When the ratio of observations to estimated parameters dropped below five to one and no supplemental evidence of model fit was provided (such as the use of cross-validation or evidence from an analysis of the relative fit of different model specifications), we discount the study's results and do not calculate effect sizes for its estimates.

- *Models making no adjustment to standard errors for the serial correlation regularly found in panel data frequently used in gun policy studies.* We consistently note when studies did not report having made any such adjustment. When a study noted a correction for only heteroscedasticity, we consider that to be evidence of some correction, although this does not generally fully correct bias in the standard errors due to clustering (Aneja, Donohue, and Zhang, 2014).
- *Models for which the dependent variable appears to violate model assumptions, such as linear models of dichotomous outcomes or linear models of rate outcomes (many of which are close to zero).* We consistently note when the data appeared to violate modeling assumptions.
- *Effects with large changes in direction and magnitude across primary model specifications.* We consistently note when a study presented evidence that model results were highly sensitive to different model specifications.
- *Models that identify the effect of policies with too few cases.* We consistently note when the effects of policies were identified on the experiences of a single state or a small number of states. These analyses generally provide less persuasive evidence that observed differences between treated and control cases result from the effects of the policy as opposed to other contemporaneous influences on the outcome.

In Appendix A, we describe other common shortcomings in the existing literature that we do not explicitly discuss in our research syntheses. For instance, in the main chapters of the report, we do not note when papers provided no goodness-of-fit tests or other statistical evidence to justify their covariate selections. Neither do we focus on interpretational difficulties and confusion frequently present in studies using spline or hybrid models to estimate the effects of policies, although we discuss this problem in detail in Appendix A. These problems are so common in this literature that consistently commenting on them as shortcomings would become repetitive and cumbersome.

Synthesis of Evidence

Members of the research team summarized all available evidence from prioritized studies for each of the 13 policies on each of the eight outcomes. When at least one study met inclusion criteria, a multidisciplinary group of methodologists on the research team discussed each study to identify its strengths and weaknesses. The consensus judgments from these group discussions are summarized in the research syntheses. Then, the group discussed the set of available studies as a whole to make a determination about the level of evidence supporting the effect of the policy on each outcome.

When considering the evidence provided by each analysis in a study, we counted effects with p -values greater than 0.20 as providing *uncertain* evidence for the effect of a policy. We use this designation to avoid any suggestion that the failure to find a statistically significant effect means that the policy has no effect. We assume that every policy will have some effect, however small or unintended, so any failure to detect it is a shortcoming of the science, not the policy. When the identified effect has a p -value

less than 0.05, we refer to it as a *significant effect*. Finally, when the p -value is between 0.05 and 0.20, we refer to the effect as *suggestive*.

We include the suggestive category for several reasons. First, the literature we are reviewing is often underpowered. This means that the probability of rejecting the null hypothesis of no effect even when the policy has a true effect is often very low. As we argue in Appendix A, conducting analyses with low statistical power results in an uncomfortably high probability that effects found to be statistically significant at $p < 0.05$ are in the wrong direction and all effects have exaggerated effect sizes (Gelman and Carlin, 2014). If we had restricted our assessment of evidence to just statistically significant effects, we might base our judgments on an unreliable and biased set of estimates while ignoring the cumulative evidence available in studies reporting nonsignificant results. While the selection of $p < 0.20$ as the criterion for rating evidence as suggestive is arbitrary, this threshold corresponds to effects that are meaningfully more likely to be in the observed direction than in the opposite direction. For instance, if we assume that the policy has about as much chance of having a nonzero effect as having no effect, and the power of the test is 0.8, then $p < 0.20$ suggests that there is only a 20-percent probability of incorrectly rejecting the null hypothesis of no effect. For tests that are more weakly powered, as is common in models we review, a p -value less than 0.20 will result in false rejection less than half the time so long as the power of the test is above 0.2 (see, for example, Colquhoun, 2014).

In the final step, we rated the overall strength of the evidence in support of each possible effect of the policy. We approached these evidence ratings with the knowledge that research in this area is modest. Compared with the study of the effects of smoking on cancer, for instance, the study of gun policy effects is in its infancy, so it cannot hope to have anything like the strength of evidence that has accrued in many other areas of social science. Nevertheless, we believed that it would be useful to distinguish the gun policy effects that have relatively stronger or weaker evidence, given the limited evidence base currently available. We did this by establishing the following relativistic scale describing the strength of available evidence:

1. *No studies*. This designation was made when no studies meeting our inclusion criteria evaluated the policy's effect on the outcome.
2. *Inconclusive evidence*. This designation was made when studies with comparable methodological rigor identified inconsistent evidence for the policy's effect on an outcome or when a single study found only uncertain or suggestive effects.
3. *Limited evidence*. This designation was made when at least one study meeting our inclusion criteria and not otherwise compromised by serious methodological problems reported a significant effect of the policy on the outcome, even if other studies meeting our inclusion criteria identified only uncertain or suggestive evidence for the effect of the policy.

4. *Moderate evidence.* This designation was made when two or more studies found significant effects in the same direction and contradictory evidence was not found in other studies with equivalent or strong methods.
5. *Supportive evidence.* This designation was made when (1) at least three studies found suggestive or significant effects in the same direction using at least two independent data sets or (2) the effect was observed in a rigorous experimental study. Our requirement that the effect be found in distinct data sets reflects the fact that many gun policy studies use identical or overlapping data sets (e.g., state homicide rates over several years). Chance associations in these data sets are likely to be identified by all who analyze them. Therefore, our supportive evidence category requires that the effect be confirmed in a separate data set.

These rating criteria provided a framework for our assessments of where the weight of evidence currently lies for each of the policies, but they did not eliminate subjectivity from the review process. In particular, the studies we reviewed spanned a wide range of methodological rigor. When we judged a study to be particularly weak, we discounted its evidence in comparison with stronger studies, which sometimes led us to apply lower evidence rating labels than had the study been stronger.

Effects of the Inclusion and Exclusion Criteria on the Literature Reviewed

Table 2.2 presents the results of the literature search across all eight outcomes. The final column shows the number of studies meeting all inclusion criteria. No studies satisfying our inclusion criteria were found for two of the eight outcomes.

Table 2.2
Number of Studies Selected for Review at Each Stage of the Review Process

Outcome	Total Search Results	Included After Title and Abstract Review	Included After Full-Text Review
Suicide	1,274	183	11
Violent crime	2,656	373	47
Unintentional injuries and deaths	531	27	3
Mass shootings	77	11	8
Officer-involved shootings	187	34	0
Defensive gun use	1,435	115	1
Hunting and recreation	229	0	0
Gun industry	3,180	19	2

Of the studies that were published before 2003, all but Duwe, Kovandzic, and Moody (2002) were considered in the earlier reviews (Hahn et al., 2005; NRC, 2004). Table 2.3 lists the 63 studies meeting all inclusion criteria.

Table 2.3
Studies Meeting Inclusion Criteria

No.	Study	No.	Study
1	Aneja, Donohue, and Zhang (2011)	33	La Valle and Glover (2012)
2	Aneja, Donohue, and Zhang (2014)	34	Lott (2003)
3	Ayres and Donohue (2003a)	35	Lott (2010)
4	Ayres and Donohue (2003b)	36	Lott and Mustard (1997)
5	Ayres and Donohue (2009a)	37	Lott and Whitley (2001)
6	Ayres and Donohue (2009b)	38	Lott and Whitley (2003)
7	Cheng and Hoekstra (2013)	39	Lott and Whitley (2007)
8	Cook and Ludwig (2003)	40	Luca, Deepak, and Poliquin (2016)
9	Crifasi et al. (2015)	41	Ludwig and Cook (2000)
10	Cummings et al. (1997a)	42	Maltz and Targonski (2002)
11	DeSimone, Markowitz, and Xu (2013)	43	Manski and Pepper (2015)
12	Donohue (2003)	44	Martin and Legault (2005)
13	Donohue (2004)	45	Moody and Marvell (2008)
14	Duggan (2001)	46	Moody and Marvell (2009)
15	Duggan, Hjalmarrsson, and Jacob (2011)	47	Moody et al. (2014)
16	Durlauf, Navarro, and Rivers (2016)	48	Plassman and Whitley (2003)
17	Duwe, Kovandzic, and Moody (2002)	49	Raissian (2016)
18	French and Heagerty (2008)	50	Roberts (2009)
19	Gius (2014)	51	Rosengart et al. (2005)
20	Gius (2015a)	52	Rudolph et al. (2015)
21	Gius (2015b)	53	Sen and Panjamapirom (2012)
22	Gius (2015c)	54	Strnad (2007)
23	Grambsch (2008)	55	Swanson et al. (2013)
24	Helland and Tabarrok (2004)	56	Swanson et al. (2016)
25	Hepburn et al. (2006)	57	Vigdor and Mercy (2003)
26	Humphreys, Gasparrini, and Wiebe (2017)	58	Vigdor and Mercy (2006)
27	Kendall and Tamura (2010)	59	Webster, Crifasi, and Vernick (2014)
28	Koper (2004)	60	Webster and Starnes (2000)
29	Kovandzic, Marvell, and Vieraitis (2005)	61	Webster et al. (2004)
30	La Valle (2007)	62	Wright, Wintemute, and Rivara (1999)
31	La Valle (2010)	63	Zeoli and Webster (2010)
32	La Valle (2013)		

In a few cases, some studies published updates to earlier works that expanded the time frame of the analysis, corrected errors, or applied more-advanced statistical methods to a nearly identical data set. In these cases, we do not treat both the earlier and later works as each contributing an equally valid estimate of the effects of a policy. Instead, we treat the latest version of the analysis as superseding the earlier versions, and we focus our reviews on the superseding analysis. In one case, we substituted an earlier study (Ludwig and Cook, 2000) for a later study (Cook and Ludwig, 2003). We did this because the earlier study included a longer data series, used a model with greater statistical power, and provided more-detailed results; in addition, the estimated effects of policies in the two papers were identical for the estimates of interest to us in this review. Table 2.4 lists the superseded studies and their superseding versions.

Table 2.5 describes the policies and outcomes evaluated by each study that was not superseded, and studies are indicated with their corresponding number in Table 2.3. These studies are discussed in detail in subsequent chapters.

Table 2.4
Superseded Studies

Superseded	Superseding
Aneja, Donohue, and Zhang (2011); Ayres and Donohue (2003a, 2003b, 2009a, 2009b); Donohue (2003, 2004)	Aneja, Donohue, and Zhang (2014)
La Valle (2007, 2010)	La Valle (2013), La Valle and Glover (2012)
Moody and Marvell (2008, 2009)	Moody et al. (2014)
Vigdor and Mercy (2003)	Vigdor and Mercy (2006)

Table 2.5
Included Studies, by Policy and Outcome

Policy	Suicide	Violent Crime	Unintentional Injuries and Deaths	Mass Shootings	Officer-Involved Shootings	Defensive Gun Use	Hunting and Recreation	Gun Industry	Total
Background checks	15, 41, 53	15, 20, 32, 35, 41, 53, 55, 56, 58, 62		40					11
Bans on the sale of assault weapons and high-capacity magazines		19, 35		22, 40				28	5
Stand-your-ground laws	26	7, 26, 59				7			3
Prohibitions associated with mental illness	53, 56	53, 55, 56							3
Lost or stolen firearm reporting requirements									0
Licensing and permitting requirements	9, 61	32, 52, 59		40					6
Firearm sales reporting and recording requirements									0
Child-access prevention laws	10, 11, 21, 37, 61	10, 37	10, 11, 21, 25, 37, 60, 61	34					8
Surrender of firearms by prohibited possessors		49, 58, 63							3
Minimum age requirements	21, 51, 61	51, 52	21	40					5
Concealed-carry laws	11, 51	2, 16, 18, 19, 23, 24, 27, 29, 32, 33, 38, 39, 42, 43, 44, 47, 48, 50, 51, 54, 59	11, 36	17, 34, 40				14	27
Waiting periods	41	41, 50		34, 40					4
Gun-free zones									0
Total	12	37	8	4	0	1	0	2	50

NOTE: Numbers refer to individual studies; see Table 2.3 to view which study corresponds to which number. Totals along the bottom row do not exactly match those in Table 2.2 because superseded studies are not counted in this table, and other studies were identified after the initial literature search.

Effect Size Estimates

To compare the magnitude of effects across studies, we calculated and present incidence rate ratios (IRRs) for most of the estimates of policy effects that we considered in reaching our consensus ratings. In rare cases noted in the text, we were unable to calculate IRRs from the information provided in the report. Studies reporting the results from a negative binomial or Poisson regression model are directly reported in our report figures as IRRs with their associated confidence intervals (CIs). Given the low probability of most of our outcomes, odds ratios were interpreted and reported as IRRs with their associated CIs.

Many studies used fixed-effects ordinary linear regression models. In these cases, an average base rate (usually taken from the study's paper itself) of the outcome of interest was determined. We then used the base rate to transform the regression estimate, β , to an IRR using the following formula:

$$IRR = \frac{(\text{average base rate} + \beta)}{\text{average base rate}}.$$

However, if the linear model used a logged dependent variable, we used the exponentiated estimate as its IRR. CIs for the IRRs derived from the linear regression models were transformed in a similar fashion.

When a study did not report a measure of variation, we performed back calculation from a test statistic to estimate the CIs. For Rudolph et al. (2015), we inferred approximate standard errors from the p -value associated with a permutation test presented to demonstrate the likely statistical significance of the reported finding. For Crifasi et al. (2015), we present the IRR and CI for a secondary specification that used a negative binomial model. For several other studies, we note that we could not extrapolate an IRR or its CIs from the data provided in the paper.

Models estimating linear or other trend effects for policies do not have a constant effect size over time. Even if we selected an arbitrary period over which to calculate an effect size, these papers do not provide sufficient information to estimate CIs for such effects. Therefore, we do not calculate or display IRR values that take into account trend effects or effects calculated as the combination of a trend and a step effect (*hybrid models*). Although we report the authors' interpretation of these effects, we do not count them as compelling evidence for the effects of a policy, for reasons discussed in Appendix A.

IRRs are calculated and graphed so that estimates of the effects of policies can be compared on a common metric. We do not use them to construct meta-analytic estimates of policy effects for two reasons. First, most studies we reviewed examining the effect of a policy on a particular outcome used nearly identical data sets, meaning the studies do not offer independent estimates of the effect. Second, there are usually only

two or three studies available on which to estimate the effect of the policy, and these studies often differ considerably in their methodological rigor. These limitations in the existing literature led us to pursue a more qualitative evaluation of the conclusions that available studies can support.

Chapter Two References

- Aneja, Abhay, John J. Donohue III, and Alexandria Zhang, “The Impact of Right-to-Carry Laws and the NRC Report: Lessons for the Empirical Evaluation of Law and Policy,” *American Law and Economics Review*, Vol. 13, No. 2, 2011, pp. 565–631.
- , *The Impact of Right to Carry Laws and the NRC Report: The Latest Lessons for the Empirical Evaluation of Law and Policy*, Stanford, Calif.: Stanford Law School, Olin Working Paper No. 461, December 1, 2014. As of May 21, 2017:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443681
- Ayres, Ian, and John J. Donohue III, “Shooting Down the More Guns, Less Crime Hypothesis,” *Stanford Law Review*, Vol. 55, No. 4, 2003a, pp. 1193–1312.
- , “The Latest Misfires in Support of the More Guns, Less Crime Hypothesis,” *Stanford Law Review*, Vol. 55, No. 4, 2003b, pp. 1371–1398.
- , “Yet Another Refutation of the More Guns, Less Crime Hypothesis—with Some Help from Moody and Marvell,” *Econ Journal Watch*, Vol. 6, No. 1, January 2009a, pp. 35–59.
- , “More Guns, Less Crime Fails Again: The Latest Evidence from 1977–2006,” *Econ Journal Watch*, Vol. 6, No. 2, May 2009b, pp. 218–238.
- Braga, Anthony A., “Guns and Crime,” in F. Parisi, ed., *The Oxford Handbook of Law and Economics*, Vol. 3: *Public Law and Legal Institutions*, New York: Oxford University Press, 2017, pp. 344–369.
- Braga, Anthony A., Andrew V. Papachristos, and David M. Hureau, “The Effects of Hot Spots Policing on Crime: An Updated Systematic Review and Meta-Analysis,” *Justice Quarterly*, Vol. 31, No. 4, 2014, pp. 633–663.
- Braga, Anthony A., and David L. Weisburd, “The Effects of Focused Deterrence Strategies on Crime: A Systematic Review and Meta-Analysis of the Empirical Evidence,” *Journal of Research in Crime and Delinquency*, Vol. 49, No. 3, 2012, pp. 323–358.
- Campbell Collaboration, *Guidelines for Preparation of Review Protocols*, Version 1.0, Oslo, Norway, January 1, 2001. As of October 13, 2017:
https://www.campbellcollaboration.org/images/pdf/plain-language/C2_Protocols_guidelines_v1.pdf
- Cheng, Cheng, and Mark Hoekstra, “Does Strengthening Self-Defense Law Deter Crime or Escalate Violence? Evidence from Expansions to Castle Doctrine,” *Journal of Human Resources*, Vol. 48, No. 3, 2013, pp. 821–853.
- Colquhoun, D., “An Investigation of the False Discovery Rate and the Misinterpretation of p -Values,” *Royal Society Open Science*, Vol. 1, No. 3, 2014.
- Cook, P. J., and Jens Ludwig, “The Effect of the Brady Act on Gun Violence,” in B. Harcourt, ed., *Guns, Crime, and Punishment in America*, New York: New York University Press, 2003, pp. 283–298.
- Crifasi, C. K., J. S. Meyers, J. S. Vernick, and D. W. Webster, “Effects of Changes in Permit-to-Purchase Handgun Laws in Connecticut and Missouri on Suicide Rates,” *Preventive Medicine*, Vol. 79, 2015, pp. 43–49.
- Cummings, P., D. C. Grossman, F. P. Rivara, and T. D. Koepsell, “State Gun Safe Storage Laws and Child Mortality Due to Firearms,” *JAMA*, Vol. 278, No. 13, 1997a, pp. 1084–1086.
- DeSimone, J., S. Markowitz, and J. Xu, “Child Access Prevention Laws and Nonfatal Gun Injuries,” *Southern Economic Journal*, Vol. 80, No. 1, 2013, pp. 5–25.

Donohue, John J., "The Impact of Concealed Carry Laws," in Jens Ludwig and Phillip J. Cook, eds., *Evaluating Gun Policy: Effects on Crime and Violence*, Washington, D.C.: Brookings Institution Press, 2003, pp. 287–341.

———, "Guns, Crime, and the Impact of State Right-to-Carry Laws," *Fordham Law Review*, Vol. 73, No. 2, 2004, pp. 623–652.

Duggan, Mark, "More Guns, More Crime," *Journal of Political Economy*, Vol. 109, No. 5, 2001, pp. 1086–1114.

Duggan, Mark, Randi Hjalmarsson, and Brian A. Jacob, "The Short-Term and Localized Effect of Gun Shows: Evidence from California and Texas," *Review of Economics and Statistics*, Vol. 93, No. 3, 2011, pp. 786–799.

Durlauf, Steven, S. Navarro, and D. A. Rivers, "Model Uncertainty and the Effect of Shall-Issue Right-to-Carry Laws on Crime," *European Economic Review*, Vol. 81, 2016, pp. 32–67.

Duwe, Grant, Tomislav Kovandzic, and Carlisle E. Moody, "The Impact of Right-to-Carry Concealed Firearm Laws on Mass Public Shootings," *Homicide Studies*, Vol. 6, No. 4, 2002, pp. 271–296.

French, B., and P. J. Heagerty, "Analysis of Longitudinal Data to Evaluate a Policy Change," *Statistics in Medicine*, Vol. 27, No. 24, 2008, pp. 5005–5025.

Gelman, Andrew, and John Carlin, "Power Calculations: Assessing Type S (Sign) and Type M (Magnitude) Errors," *Perspectives on Psychological Science*, Vol. 9, No. 6, 2014, pp. 641–651.

Gius, Mark, "An Examination of the Effects of Concealed Weapons Laws and Assault Weapons Bans on State-Level Murder Rates," *Applied Economics Letters*, Vol. 21, No. 4, 2014, pp. 265–267.

———, "The Effects of State and Federal Background Checks on State-Level Gun-Related Murder Rates," *Applied Economics*, Vol. 47, No. 38, 2015a, pp. 4090–4101.

———, "The Impact of Minimum Age and Child Access Prevention Laws on Firearm-Related Youth Suicides and Unintentional Deaths," *Social Science Journal*, Vol. 52, No. 2, 2015b, pp. 168–175.

———, "The Impact of State and Federal Assault Weapons Bans on Public Mass Shootings," *Applied Economics Letters*, Vol. 22, No. 4, 2015c, pp. 281–284.

Grambsch, P., "Regression to the Mean, Murder Rates, and Shall-Issue Laws," *American Statistician*, Vol. 62, No. 4, 2008, pp. 289–295.

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Helland, E., and A. Tabarrok, "Using Placebo Laws to Test 'More Guns, Less Crime,'" *Advances in Economic Analysis and Policy*, Vol. 4, No. 1, 2004.

Hepburn, L., D. Azrael, M. Miller, and D. Hemenway, "The Effect of Child Access Prevention Laws on Unintentional Child Firearm Fatalities, 1979–2000," *Journal of Trauma-Injury Infection and Critical Care*, Vol. 61, No. 2, 2006, pp. 423–428.

Higgins, Julian P. T., and Sally Green, eds., *Cochrane Handbook for Systematic Reviews of Interventions*, Version 5.1.0, London: Cochrane Collaboration, March 2011. As of October 13, 2017: <http://handbook.cochrane.org>

Humphreys, David K., Antonio Gasparrini, and Douglas J. Wiebe, "Evaluating the Impact of Florida's 'Stand Your Ground' Self-Defense Law on Homicide and Suicide by Firearm: An Interrupted Time Series Study," *JAMA Internal Medicine*, Vol. 177, No. 1, 2017, pp. 44–50.

- Institute of Medicine, *Finding What Works in Health Care: Standards for Systematic Reviews*, Washington, D.C.: National Academies Press, 2011.
- Kalesan, Bindu, Matthew E. Mobily, Olivia Keiser, Jeffrey A. Fagan, and Sandro Galea, “Firearm Legislation and Firearm Mortality in the USA: A Cross-Sectional, State-Level Study,” *Lancet*, Vol. 387, No. 10030, April 30, 2016, pp. 1847–1855.
- Kendall, Todd D., and Robert Tamura, “Unmarried Fertility, Crime, and Social Stigma,” *Journal of Law and Economics*, Vol. 53, No. 1, 2010, pp. 185–221.
- Khan, Khalid S., Regina Kunz, Jos Kleijnen, and Gerd Antes, “Five Steps to Conducting a Systematic Review,” *Journal of the Royal Society of Medicine*, Vol. 96, No. 3, 2003, pp. 118–121.
- Koper, Christopher S., *Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence 1994–2003*, Washington, D.C.: National Institute of Justice, U.S. Department of Justice, 2004.
- Kovandzic, T. V., T. B. Marvell, and L. M. Vieraitis, “The Impact of ‘Shall-Issue’ Concealed Handgun Laws on Violent Crime Rates—Evidence from Panel Data for Large Urban Cities,” *Homicide Studies*, Vol. 9, No. 4, 2005, pp. 292–323.
- La Valle, James M., “Rebuilding at Gunpoint: A City-Level Re-Estimation of the Brady Law and RTC Laws in the Wake of Hurricane Katrina,” *Criminal Justice Policy Review*, Vol. 18, No. 4, 2007, pp. 451–465.
- , “Re-Estimating Gun-Policy Effects According to a National Science Academy Report: Were Previous Reports of Failure Premature?” *Journal of Crime and Justice*, Vol. 33, No. 1, 2010, pp. 71–95.
- , “‘Gun Control’ vs. ‘Self-Protection’: A Case Against the Ideological Divide,” *Justice Policy Journal*, Vol. 10, No. 1, 2013, pp. 1–26.
- La Valle, James M., and Thomas C. Glover, “Revisiting Licensed Handgun Carrying: Personal Protection or Interpersonal Liability?” *American Journal of Criminal Justice*, Vol. 37, No. 4, 2012, pp. 580–601.
- Lott, John R., Jr., *The Bias Against Guns: Why Almost Everything You’ve Heard About Gun Control Is Wrong*, Washington, D.C.: Regnery Publishing, Inc., 2003.
- , *More Guns, Less Crime: Understanding Crime and Gun-Control Laws*, 3rd ed., Chicago, Ill.: University of Chicago Press, 2010.
- Lott, John R., Jr., and D. B. Mustard, “Crime, Deterrence, and Right-to-Carry Concealed Handguns,” *Journal of Legal Studies*, Vol. 26, No. 1, 1997, pp. 1–68.
- Lott, John R., Jr., and John E. Whitley, “Safe-Storage Gun Laws: Accidental Deaths, Suicides, and Crime,” *Journal of Law and Economics*, Vol. 44, No. 2, 2001, pp. 659–689.
- , “Measurement Error in County-Level UCR Data,” *Journal of Quantitative Criminology*, Vol. 19, No. 2, June 2003, pp. 185–198.
- , “Abortion and Crime: Unwanted Children and Out-of-Wedlock Births,” *Economic Inquiry*, Vol. 45, No. 2, 2007, pp. 304–324.
- Luca, Michael, Lahotra Deepak, and Christopher Poliquin, *The Impact of Mass Shootings on Gun Policy*, working paper, Boston, Mass.: Harvard Business School, 2016.
- Ludwig, J., and P. J. Cook, “Homicide and Suicide Rates Associated with Implementation of the Brady Handgun Violence Prevention Act,” *JAMA*, Vol. 284, No. 5, 2000, pp. 585–591.

- Maltz, M. D., and J. Targonski, "A Note on the Use of County-Level UCR Data," *Journal of Quantitative Criminology*, Vol. 18, No. 2, 2002, pp. 297–318.
- Manski, Charles F., and John V. Pepper, *How Do Right-to-Carry Laws Affect Crime Rates? Coping with Ambiguity Using Bounded-Variation Assumptions*, Cambridge, Mass.: National Bureau for Economic Research, NBER Working Paper 21701, November 2015.
- Martin, Robert A., and Richard L. Legault, "Systematic Measurement Error with State-Level Crime Data: Evidence from the 'More Guns, Less Crime' Debate," *Journal of Research in Crime and Delinquency*, Vol. 42, No. 2, May 2005, pp. 187–210.
- Mill, John Stuart, *A System of Logic*, London: Parker, 1843.
- Moody, Carlisle E., and Thomas B. Marvell, "The Debate on Shall-Issue Laws," *Econ Journal Watch*, Vol. 5, No. 3, 2008, pp. 269–293.
- , "The Debate on Shall-Issue Laws, Continued," *Econ Journal Watch*, Vol. 6, No. 2, 2009.
- Moody, Carlisle E., Thomas B. Marvell, Paul R. Zimmerman, and Fasil Alemante, "The Impact of Right-to-Carry Laws on Crime: An Exercise in Replication," *Review of Economics and Finance*, Vol. 4, 2014, pp. 33–43.
- National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.
- NRC—See National Research Council.
- Plassmann, F., and J. E. Whitley, "Comments: Confirming More Guns, Less Crime," *Stanford Law Review*, Vol. 55, No. 4, 2003, pp. 1313–1369.
- Raissian, Kerri M., "Hold Your Fire: Did the 1996 Federal Gun Control Act Expansion Reduce Domestic Homicides?" *Journal of Policy Analysis and Management*, Vol. 35, No. 1, Winter 2016, pp. 67–93.
- Roberts, Darryl W., "Intimate Partner Homicide: Relationships to Alcohol and Firearms," *Journal of Contemporary Criminal Justice*, Vol. 25, No. 1, 2009, pp. 67–88.
- Rosengart, M., P. Cummings, A. Nathens, P. Heagerty, R. Maier, and F. Rivara, "An Evaluation of State Firearm Regulations and Homicide and Suicide Death Rates," *Injury Prevention*, Vol. 11, No. 2, 2005, pp. 77–83.
- Rudolph, K. E., E. A. Stuart, J. S. Vernick, and D. W. Webster, "Association Between Connecticut's Permit-to-Purchase Handgun Law and Homicides," *American Journal of Public Health*, Vol. 105, No. 8, 2015, pp. E49–E54.
- Schell, Terry L., and Andrew R. Morral, *Evaluating Methods and Findings from a Study of State Gun Policies*, Santa Monica, Calif.: RAND Corporation, RR-1642-RC, 2016. As of January 13, 2017: http://www.rand.org/pubs/research_reports/RR1642.html
- Sen, B., and A. Panjamapirom, "State Background Checks for Gun Purchase and Firearm Deaths: An Exploratory Study," *Preventive Medicine*, Vol. 55, No. 4, 2012, pp. 346–350.
- Strnad, Jeff, "Should Legal Empiricists Go Bayesian?" *American Law and Economics Review*, Vol. 9, No. 1, Spring 2007, pp. 195–303.
- Swanson, Jeffrey W., Michele M. Easter, Allison G. Robertson, Marvin S. Swartz, Kelly Alanis-Hirsch, Daniel Moseley, Charles Dion, and John Petrila, "Gun Violence, Mental Illness, and Laws That Prohibit Gun Possession: Evidence from Two Florida Counties," *Health Affairs*, Vol. 35, No. 6, 2016, pp. 1067–1075.

Swanson, J. W., A. G. Robertson, L. K. Frisman, M. A. Norko, H. Lin, M. S. Swartz, and P. J. Cook, "Preventing Gun Violence Involving People with Serious Mental Illness," in D. W. Webster and J. S. Vernick, eds., *Reducing Gun Violence in America: Informing Policy with Evidence and Analysis*, Baltimore, Md.: Johns Hopkins University Press, 2013, pp. 33–51.

Vigdor, E. R., and J. A. Mercy, "Disarming Batterers: The Impact of Domestic Violence Firearms Laws," in Jens Ludwig and Phillip J. Cook, eds., *Evaluating Gun Policy: Effects on Crime and Violence*, Washington, D.C.: Brookings Institution Press, 2003, pp. 157–200.

———, "Do Laws Restricting Access to Firearms by Domestic Violence Offenders Prevent Intimate Partner Homicide?" *Evaluation Review*, Vol. 30, No. 3, 2006, pp. 313–346.

Webster, D., C. K. Crifasi, and J. S. Vernick, "Effects of the Repeal of Missouri's Handgun Purchaser Licensing Law on Homicides," *Journal of Urban Health*, Vol. 91, No. 2, 2014, pp. 293–302.

Webster, D. W., J. S. Vernick, A. M. Zeoli, and J. A. Manganello, "Association Between Youth-Focused Firearm Laws and Youth Suicides," *JAMA*, Vol. 292, No. 5, 2004, pp. 594–601.

Wooldridge, J. M., *Econometric Analysis of Cross Section and Panel Data*, Cambridge, Mass.: MIT Press, 2002.

Wright, M. A., G. J. Wintemute, and F. P. Rivara, "Effectiveness of Denial of Handgun Purchase to Persons Believed to Be at High Risk for Firearm Violence," *American Journal of Public Health*, Vol. 89, No. 1, 1999, pp. 88–90.

Zeoli, A. M., and D. W. Webster, "Effects of Domestic Violence Policies, Alcohol Taxes and Police Staffing Levels on Intimate Partner Homicide in Large U.S. Cities," *Injury Prevention*, Vol. 16, No. 2, 2010, pp. 90–95.

PART B

Evidence on the Effects of 13 Policies

CHAPTER THREE

Background Checks

Background checks for gun purchases are designed to prevent access to guns by convicted felons and other prohibited possessors—such as minors, fugitives from justice, those who live in the United States illegally, users of controlled substances, those with certain histories of mental illness, those who have been dishonorably discharged from the military, those who have renounced their U.S. citizenship, those subject to a restraining order, and those convicted of domestic violence offenses (18 U.S.C. 922).

The Brady Handgun Violence Prevention Act (the Brady Act), which went into effect in 1994, imposed federal requirements for background checks on sales by licensed dealers (18 U.S.C. 922) but not for private sales or transfers of firearms (such as gifts). Several states have expanded this federal requirement to mandate that background checks be conducted for all firearm sales and transfers, including those between private parties. Such laws are referred to as *universal background check* laws.

Background check laws prevent firearm purchase or possession by individuals thought to be at high risk of presenting a danger to themselves or others. By restricting the means by which dangerous individuals could otherwise access guns, these laws are designed to reduce gun crime and violence. While compliance is likely to be imperfect, a universal background check may still reduce gun-related homicides or suicides by deterring prohibited possessors from attempting to acquire firearms or by making it harder for them to succeed in doing so. Universal background checks may also reduce illegal gun trafficking. For instance, when analyzing crime guns,¹ Webster, Vernick, and Bulzacchelli (2009) found that fewer of the out-of-state guns originated in states with universal background checks than in states with no background checks for private sales of firearms. The magnitude of the effects of such laws will, in part, be influenced by the level of enforcement and the availability of firearms through alternative markets, such as illegal markets or legal markets in states without background checks for private transactions.

¹ The Bureau of Alcohol, Tobacco, and Firearms (2002, p. A-3) defined *crime gun* as “any firearm that is illegally possessed, used in a crime, or suspected to have been used in a crime. An abandoned firearm may also be categorized as a crime gun if it is suspected it was used in a crime or illegally possessed.”

We found no routinely collected data on how individuals obtain guns, but a 2015 national survey of gun owners who obtained a firearm within the previous two years found that 22 percent had purchased, or received as a gift or an inheritance, their most recent firearm without undergoing a background check (Miller, Hepburn, and Azrael, 2017). For firearms purchased through private sources, 50 percent were acquired without a background check (Miller, Hepburn, and Azrael, 2017). Obtaining firearms from private sources is likely substantially more common among prohibited possessors. Indeed, a 2004 survey of state prison inmates found that among those who used a gun, only 10 percent purchased the weapon from a licensed dealer, whereas 70 percent acquired it from a friend, family member, or “street” source, such as an illicit broker (Cook, Parker, and Pollack, 2015). Using the same survey data but restricting the sample to 13 states considered by the authors to have less-restrictive firearm regulations, another study found that among inmates who acquired their gun from a friend, family member, or “street” source, just more than 40 percent had a disqualifying condition (e.g., prior felony conviction, dishonorable discharge, under age 18) that should have prohibited them from obtaining the firearm had they undergone a background check (Vittes, Vernick, and Webster, 2012).

Universal background check policies may do little to limit existing illegal sources of firearms to criminal offenders (Kopel, 2016), and background check policies can, at best, prevent such individuals only from acquiring new firearms, not from maintaining possession of those they owned before becoming a prohibited possessor. However, if the implementation and enforcement of such policies is successful in stemming the flow of new firearms and ammunition to criminal markets, universal background check laws could reduce gun crime by increasing the price of firearms in the secondary markets on which criminals mostly rely (Cook, Molliconi, and Cole, 1995).

The effects of background check policies will hinge on the scope of disqualifications for high-risk individuals and whether these disqualifications correctly target individuals who present greater danger to themselves or others. As of April 2017, the Federal Bureau of Investigation (FBI)’s National Instant Criminal Background Check System (NICS) database currently includes more than 16,500,000 active records on prohibited possessors (FBI, 2017). However, this figure substantially undercounts prohibited possessors because states’ reporting is incomplete and the FBI does not maintain records on those prohibited only for being underage. The excess risk of firearm violence attributable to prohibited individuals is unknown, although research has shown that the majority of violent offenders have previous involvement with the criminal justice system (Wright and Wintemute, 2010; Cook, Ludwig, and Braga, 2005; Kleck and Bordua, 1983) and that individuals prohibited from owning a firearm because of mental health problems are at elevated risk of suicide (see Chapter Nineteen).

Although firearms are used relatively rarely in intimate partner violence overall—for example, in fewer than 1 percent of nonfatal intimate partner violence police reports

in New York City (Joshi and Sorenson, 2010)—the majority of domestic homicides involve firearms (Cooper and Smith, 2011). In addition, more than two-thirds of these homicides are preceded by a history of assaults (Juodis et al., 2014; Campbell et al., 2003; McFarlane et al., 1999). Furthermore, one study found that of the 116 mass shooting incidents between 2009 and 2016 for which information was available, 44 incidents (34 percent) involved a prohibited possessor (Everytown for Gun Safety Support Fund, 2017b). This share may be much lower for public mass shootings; one analysis reports that the majority of recent public mass shooters purchased at least one of their weapons legally and with a federal background check (Buchanan et al., 2016).

In assessing background check policies, the ideal analyses would estimate effects on outcomes specifically for those populations or individuals whose access to firearms became restricted under the regulations. For instance, to study the impact on suicide of background check laws that disqualify individuals with mental illness, one would like to estimate how, after the law was implemented, suicide rates changed specifically among individuals newly prohibited by the law. Similarly, data on the price of firearms in secondary and illegal markets would be valuable for understanding whether background check laws or their expansion to new populations of prohibited possessors cause access to firearms in secondary markets to become restricted.

However, there are numerous challenges to undertaking this type of analysis, because most data sources available to researchers lack detailed information on the characteristics of criminal offenders or suicide victims beyond age, gender, and race/ethnicity. In some cases (e.g., restraining orders), an individual may be only temporarily prohibited from possessing a firearm, and, in the case of crime outcomes, details on the criminal offender can be known only if the perpetrator is known. (See discussion of data limitations in Chapter Twenty-Five.) Given these challenges, it is unsurprising that most of the articles meeting our inclusion criteria for this policy did not use these types of data. Nevertheless, two studies (Swanson et al., 2013; Swanson et al., 2016) were able to merge administrative records from public health and criminal justice agencies to focus on violent crime outcomes for individuals with disqualifying mental health conditions.

State Implementation of Background Checks

As of January 1, 2017, 19 states and the District of Columbia have promulgated some universal background check laws (Giffords Law Center to Prevent Gun Violence, undated-f). Eight states and the District of Columbia have comprehensive background check laws that require checks at the point of transfer for all firearms.² Even within

² California, Colorado, Delaware, Nevada, New York, Oregon, Rhode Island, and Washington. See Calif. Penal Code §§28220; Colo. Rev. Stat. § 18-12-112; 11 Del.C. § 1448A; Nev. Rev. Stat. Ann. § 202.254; N.Y.

these states, there are some differences in the laws. For example, California, Colorado, Delaware, Nevada, New York, Washington, and the District of Columbia require that all transfers to individuals (with some minor exceptions) are processed through licensed dealers, who conduct the background checks.³ Somewhat similarly, Oregon requires all transfers and background checks to be processed through dealers, except that sellers at gun shows may request background checks directly with the Department of State Police.⁴ Two more states, Pennsylvania and Maryland, have the same universal background check requirements, but they are applicable only to handguns.⁵

Other states require background checks before law enforcement can issue a permit to purchase. Five states have promulgated such laws for all firearms,⁶ while four states have such laws for handguns only.⁷ Under these laws, firearms (or handguns in the latter four states) may not be purchased without permits, but the permitting systems and rules differ. For example, in Hawaii, a permit for a handgun must be used within ten days of receipt, and a new permit must be issued for each handgun transfer.⁸ In Illinois, however, a permit lasts ten years.⁹ Furthermore, some states allow exceptions for those who hold permits to carry or concealed-carry permits, which may have longer durations than the permits to purchase.¹⁰

Gen. Bus. Law §§ 897, 898; O.R.S. § 166.435; R.I. Gen. Laws §§ 11-47-35; Wash. Rev. Code Ann. § 9.41.113; D.C. Code Ann. §§ 7-2502.01, 7-2502.03.

³ Calif. Penal Code §§ 27545, 27875; Colo. Rev. Stat. § 18-12-112; 24 Del.C. § 904A; Nev. Rev. Stat. Ann. § 202.254; N.Y. Gen. Bus. Law § 898; Wash. Rev. Code Ann. § 9.41.113; D.C. Code Ann. § 7-2505.02.

⁴ O.R.S. §§ 166.435, 166.436.

⁵ 18 Pa. Cons. Stat. Ann. § 6111; Md. Code Ann., Pub. Safety § 5-124. In Pennsylvania, the checks must be processed through a licensed dealer. In Maryland, the seller may go through a dealer or contact the law enforcement agency personally.

⁶ Connecticut, Hawaii, Illinois, Massachusetts, and New Jersey. See Conn. Gen. Stat. §§ 29-33, 28, 36f, 36g; Hawaii Rev. Stat. Ann. § 134-2; 430 Ill. Comp. Stat. 65/2, 65/4; Mass. Gen. Laws Ch.140 §§ 129B, 129C; N.J. Stat. Ann. § 2C: 58-3.

⁷ Iowa, Michigan, Nebraska, and North Carolina. See Ia. Code § 724.15; Mich. Comp. Laws § 28.422; Neb. Rev. Stat. Ann. § 69-2404 69-2405; N.C. Gen. Stat. § 14-402, 14-404.

⁸ Hawaii Rev. Stat. Ann. § 134-2. But note that long-gun permits last for one year and can be used for multiple purchases.

⁹ 430 Ill. Comp. Stat. 65/7.

¹⁰ For example, individuals purchasing a firearm in Massachusetts must obtain a firearm identification card, which lasts three years; however, there is an exception for holders of permits to carry, which last up to six years (Mass. Gen. Laws Ch. 140 §§ 122, 129C). In Illinois, there is an exception for holders of concealed-carry permits, but those last only five years (compared with the ten years for the permit to purchase), so the exception does not typically extend the permit period for gun purchases (430 Ill. Comp. Stat. 65/2).

Effects on Suicide

Research Synthesis Findings

In 2004, the National Research Council (NRC) identified only four quasi-experimental studies that examine the impact of gun policies on suicide outcomes. One of these four was Ludwig and Cook (2000), which studied the impact of the 1994 Brady Act and found uncertain effects of the policy on total suicides, firearm suicides, and the proportion of adult suicides caused by a firearm. When restricted to suicides among those aged 55 and older, however, there was a statistically significant decrease in firearm suicides of around 6 percent and in the proportion of suicides involving a firearm of 2.2 percent. However, there was an offsetting increase in suicides by other means and thus only suggestive evidence of a statistically significant decrease in total suicides in this age group. A limitation of the Ludwig and Cook (2000) study is that it had an unfavorable ratio of estimated parameters to observations (less than one to six), meaning it could have misleading parameter estimates and confidence intervals (CIs) due to model overfitting.¹¹

In another systematic review, Hahn et al. (2005) evaluated the effects of the gun-acquisition prohibitions that background checks enforce. That review identified one other study of suicide, but it was cross-sectional and did not meet our inclusion criteria. Hahn and colleagues concluded that “available evidence is insufficient to determine the effects of firearms acquisition restriction on public health and criminal violence” (p. 51).

Since the NRC (2004) and Hahn et al. (2005) reports, two additional studies provided evidence on the impact of background checks on suicide. Sen and Panjama-pirom (2012) assessed how different *types* of background checks conducted by states affected suicides between 1996 and 2005. They noted that the supply of state and local records to the NICS is voluntary and that substantial variation exists in state laws regarding the categories of records included in background checks. The authors characterized variation across states in background check requirements using an index of the comprehensiveness of such checks, as well as individual indicators for whether states check on restraining orders, mental illness, fugitive status, misdemeanors, and other miscellaneous records. Using state-level data from 1996 to 2005, the authors examined the effects of these types of checks and the effects of a state having a pre-Brady Act background check requirement on both firearm and total suicides. Their regression models included state-level covariates, a lagged outcome variable, and fixed effects for year and census subregion.

¹¹ Ludwig and Cook (2000) also tested the effects of background checks specifically (separate from waiting periods, also imposed by the Brady Act) by comparing five of 32 states that were required to implement background checks but that did not experience a change in their waiting periods (either because they already had a waiting period of five days or more when the Brady Act required this nationally or they implemented an instantaneous background check). These analyses had a ratio of estimated parameters to observations of less than five to one, which did not meet our inclusion criteria.

Sen and Panjamapirom (2012) found an effect of the total number of background check categories on firearm suicides (adjusted incidence rate ratio [IRR] = 0.98; 95-percent CI: 0.96, 1.00). Background checks for mental illness were related to lower firearm suicide and total suicide rates. Sen and Panjamapirom's estimates suggest the post-policy firearm suicide rate to be 96 percent of the expected rate had this policy not been in effect and the total suicide rate to be 97 percent of the expected rate. Background checks for fugitive status were also associated with lower firearm suicide and total suicide rates; the estimated effect for checks of fugitive status suggests that these checks lower firearm suicide rates to 95 percent of what they would otherwise be, and they lower total suicide rates to 91 percent of the expected rate. In this case, however, so few states changed this policy during the study time frame that these effects cannot persuasively be attributed to the background check policy as opposed to other factors affecting suicides in the states around the same time their laws changed. Checks for misdemeanor offenses were also associated with a firearm suicide rate just 95 percent of the expected rate without such checks, although the effect on total suicide was uncertain.

One additional study (Duggan, Hjalmarsson, and Jacob, 2011) examined the short-term effect of gun shows on firearm suicides. Absent state legislation to the contrary, gun-show vendors (and other private sellers) that are not federally licensed dealers are not required to conduct background checks on purchasers, which Duggan, Hjalmarsson, and Jacob (2011) referred to as the *gun-show loophole and which is hereafter termed the gun-show exception*. Some states have passed legislation requiring background checks for all buyers at gun shows. Duggan, Hjalmarsson, and Jacob (2011) examined whether there is a differential effect of gun shows on suicides (separating firearm from nonfirearm suicides, but not estimating total suicides) in a state that has a *gun-show exception* (Texas) compared with a state that has no such *exception* (California). Although they found small but suggestive decreases in firearm suicides in the four weeks after gun shows in Texas, effects were uncertain for nonfirearm suicides in Texas and for either outcome in California. However, the study focused only on background check requirements as they relate to gun shows and not on a broader set of background check policies. Moreover, as the authors acknowledged, their focus was on very short-term (four-week) and localized effects. The study had low statistical power, meaning that even if *gun-show exceptions* had meaningful effects on violence or homicide, these might not have been detected using this paper's procedures (see Wintemute et al., 2010). No covariates were included in the model to account for demographic, social, or economic differences between regions that could obscure any differential effects gun shows have in states with and without the *exception*.

Finally, Swanson et al. (2016) evaluated how changes in state reporting of gun-disqualifying mental health records to the NICS affected suicide rates among individuals in Florida with a disqualifying mental health condition relative to individuals diagnosed with serious mental health illness but not prohibited from purchasing a fire-

arm. The authors found no significant difference between suicide rates before and after implementing expanded NICS reporting for the two groups.

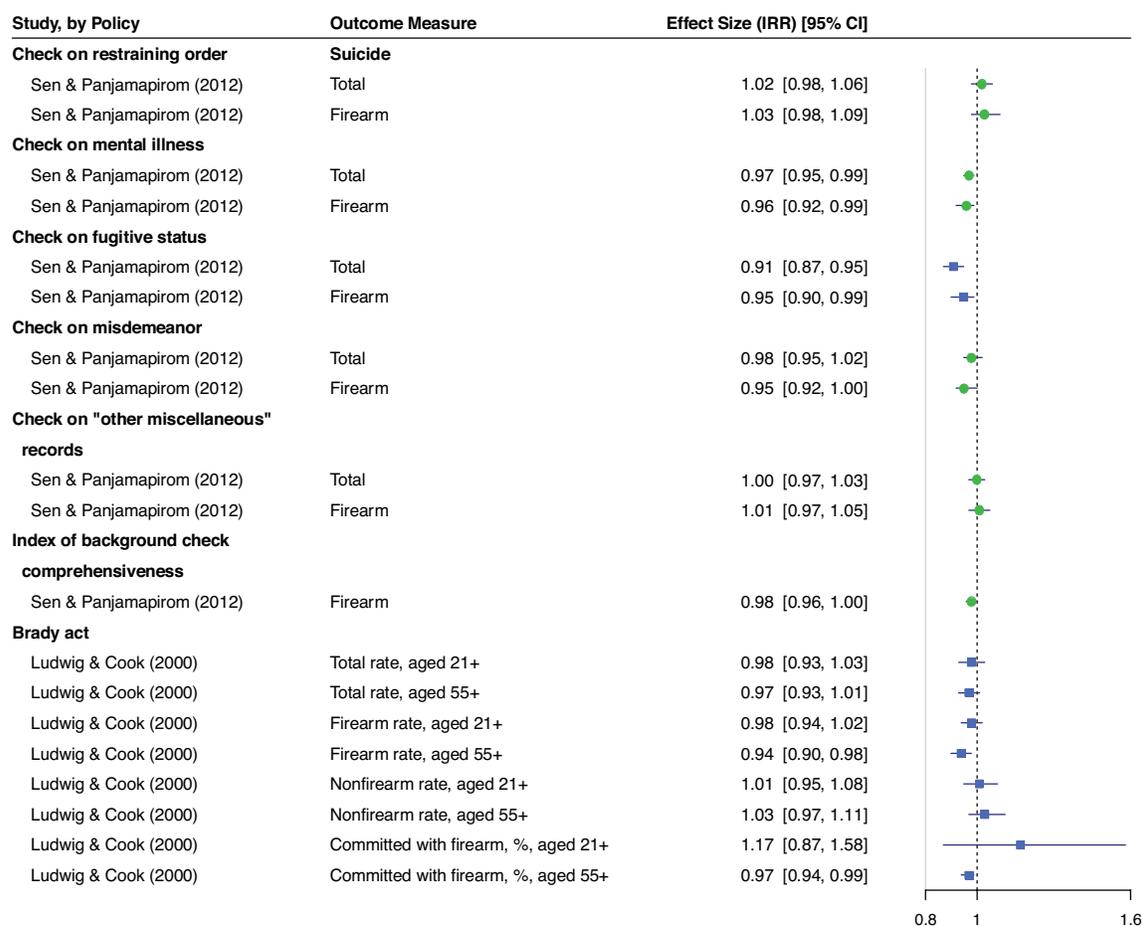
Figure 3.1 displays the IRRs and CIs associated with the background check policies examined in these studies. Because Swanson et al. (2013) and Swanson et al. (2016) did not provide effect estimates or test statistics for their findings, we do not include effect sizes for these studies in the figure. Duggan, Hjalmarsson, and Jacob (2011) did not test the effect of interest here and did provide enough information for us to calculate effect estimates or test statistics, so they too are omitted from the figure.

How to Read Forest Plots

The forest-plot figures in this report show the standardized effect sizes (or incidence rate ratios [IRRs]) and their 95-percent confidence intervals (CIs) for each outcome, by policy or law, as revealed in the studies examined. (See Chapter Two for details on how we calculated these effect sizes.) An effect size of 1.00 indicates that, after a state passes the law, we would expect the outcome (e.g., suicide or firearm suicide) to be unaffected. That is, the rate of suicide after the law was passed would be 1 times the rate before the law was passed. An effect size of less than 1.00 indicates that the law appears to reduce the outcome. For example, if the effect size for the effect of background checks on suicides were 0.92, we would expect the suicide rate to fall to 0.92 times the rate prior to passage of the background check law. Conversely, an effect size of more than 1.00 indicates that the law appears to increase the outcome by a factor equivalent to the effect size value. When the CIs do not include the value of 1.00, the estimated effect is statistically significant at $p < 0.05$.

Where relevant, we note in the text when individual analyses relied on methods that we thought might produce inaccurate estimates or CIs. IRRs corresponding to analyses for which we expressed such concerns are indicated by blue squares in the forest plots. Green circles indicate IRR estimates about which we raise no specific methodological concern. Information on the source data and methodological ratings is available in Appendix B.

Figure 3.1
Incidence Rate Ratios Associated with the Effect of Background Checks on Suicide



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details.

Conclusions

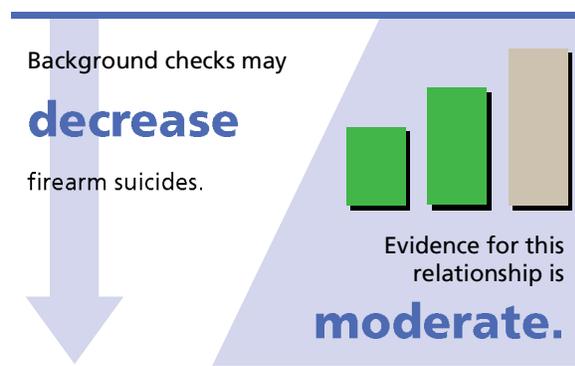
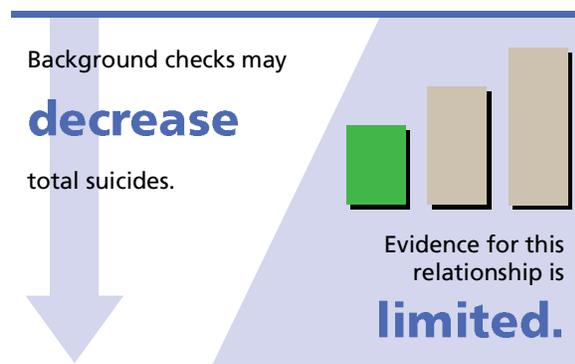
Total suicides. We identified two qualifying studies that evaluated the effects of background checks on the total number of suicides using largely independent data sets (one examined state suicide rates from 1990 to 1997, and the other examined state rates from 1996 to 2015). The first concluded that dealer background checks have an uncertain effect on total suicide rates among those aged 21 or older (Ludwig and Cook, 2000). In a secondary analysis, the study found a significant effect that background checks might reduce total suicides in the subgroup of adults aged 55 or older. All of these effects were partially confounded with possible effects of waiting periods that were simultaneously introduced in many states when the Brady Act was implemented. The second study, Sen and Panjamapirom (2012), examined components of background

checks, finding significant effects indicating that checks on mental illness and checks on fugitive status reduce total suicide rates. Three other components of background checks (checks on restraining orders, checks on misdemeanor records, and other miscellaneous checks) had only uncertain effects on total suicide rates.

Considering the relative strengths of these studies, we conclude that available research provides *limited evidence that background checks may reduce total suicides*.

Firearm suicides. We identified three qualifying studies that evaluated the effects of background checks on firearm suicide rates, including the two studies that examined total suicides. These studies provided two analyses of the total effect of background checks on firearm suicides. Ludwig and Cook (2000) found an uncertain effect of dealer background checks on this outcome among those aged 21 or older, although they reported a statistically significant decrease in firearm suicides associated with background checks for those aged 55 or older. Sen and Panjamapirom (2012) found a statistically significant association between their background check comprehensiveness index and reduced firearm suicides. Across five other reported component analyses, checks on mental illness, fugitive status, and misdemeanors were associated with significant reduction in firearm suicides, whereas checks on restraining orders and other miscellaneous checks had only uncertain effects. Duggan, Hjalmarsson, and Jacob (2011), examining private-seller background checks at gun shows, found that these had uncertain effects.

With largely consistent evidence across three studies, and considering the relative strengths of these studies, we conclude that the available studies provide *moderate evidence that background checks reduce firearm suicides*.



Effects on Violent Crime

Research Synthesis Findings

Hahn et al. (2005) found insufficient evidence for determining the effectiveness of gun-acquisition restrictions, including background checks, on violent crime. NRC (2004) concluded, “There is not much empirical evidence that assesses whether attempts to reduce criminal access to firearms will reduce gun availability or gun crime.” NRC reviewed Ludwig and Cook (2000), which found no difference in homicide rates across states that had laws comparable to those the Brady Act would impose (which initially included both background checks and a waiting period) and states that experienced larger changes in the law when the Brady Act was implemented.¹² The Ludwig and Cook study had an unfavorable ratio of estimated parameters to observations (less than one to six), meaning its parameter estimates and CIs may not be accurate because of model overfitting.

Of studies that examined the relationship between background checks and violent crime, we identified eight that met our inclusion criteria.¹³

Gius (2015a) examined the effect of the federal Brady Act, state-mandated dealer background checks (either a check that was in place before the Brady Act or checks for categories of state-prohibited possessors other than those mandated by the Brady Act), and state-mandated private-seller background checks on gun-related homicides (the paper did not evaluate the effect of these variables on total homicides). The analysis of the federal Brady Act does not meet our criteria for inclusion because although the regression model evaluated whether changes occurred after implementation of the Brady Act, there was no comparison (control) group. State dealer background checks were found to significantly reduce firearm homicides by 20 percent (see Figure 3.2), but the study’s design cannot distinguish whether this effect is attributable to a state’s implementation of background checks prior to the Brady Act, prohibition of more classes of people from owning guns after the Brady Act was passed, or some combination of the two. Private-seller background checks appeared to increase firearm homi-

¹² Ludwig and Cook (2000) also tested the effects of background checks specifically (separate from waiting periods, also imposed by the Brady Act) by comparing five of 32 states that were required to implement background checks but that did not experience a change in their waiting periods (either because they already had a waiting period of five days or more when the Brady Act required this nationally or they implemented an instantaneous background check). These analyses had a ratio of estimated parameters to observations of less than five to one, which did not meet our inclusion criteria. Cook and Ludwig (2003) presents results for a shorter time period but that are qualitatively similar.

¹³ We did not consider the findings from two studies because of methodological limitations. Although Ruddell and Mays (2005) had longitudinal data spanning 1999 through 2001 and compared states with various forms of background check systems, the authors created and analyzed a single average homicide rate for each state that spanned this time period. We excluded this study from further consideration because of the resulting cross-sectional nature of the analysis. Likewise, while Sumner, Layde, and Guse (2008) used data from 2002 through 2004, they aggregated the independent and dependent variables over this time period, resulting in a cross-sectional analysis.

cides to levels 131 percent of what would be expected without the policy. Gius (2015a) does not provide information on the variation in state laws over the period evaluated, so the quality of causal effect estimates is uncertain.

La Valle (2013) examined the effect of the existence of a pre-Brady Act state background check law on gun homicides and total homicides (as well as other state policies). Using data from 56 large U.S. cities over 1980–2010, the author found in his preferred models (weighted models with a one-year lag and using control variables that were interpolated over the period, but where the dependent variable was not interpolated) that pre-Brady Act state background check requirements had an uncertain effect on either gun homicides or total homicides.

Sen and Panjamapirom (2012) examined the effects of the *types* of background checks conducted by states on homicides. They noted that the supply of state and local records to the NICS is voluntary and that substantial variation exists in state laws regarding the categories of records included in background checks, such as restraining orders, mental illness, fugitive status, and misdemeanors. The authors characterized variation across states in background check requirements using an index of the comprehensiveness of such checks, as well as individual indicators for whether states check on restraining orders, mental illness, fugitive status, misdemeanors, and other miscellaneous records. Using state-level data from 1996 to 2005, the authors examined the effect of these types of checks on both firearm and total homicides. They found that, compared with background checks that examine only criminal history, background checks that include restraining orders, mental illness, and fugitive status are associated with significantly fewer total homicides and firearm homicides. Background checks that include restraining orders were associated with 13-percent drops in firearm homicide rates and 9-percent drops in overall homicide rates; background checks for mental illness were associated with 7-percent drops in both firearm and overall homicide rates; and background checks for fugitive status were associated with 21-percent and 23-percent reductions in firearm and total homicide rates, respectively (see Figure 3.2). However, so few states changed criminal history background check or fugitive check policies during the study time frame that these effects cannot confidently be attributed to the background check policies as opposed to other factors affecting homicides in the states around the same time their laws changed. Although the authors also included a control for whether a state had a pre-Brady Act background check requirement, the variation in this policy variable was only across states and not over time because the period of analysis was post-Brady only. Thus, the analysis of the effect of pre-Brady background check policy does not meet our criteria for inclusion.

Duggan, Hjalmarsson, and Jacob (2011) examined the localized, short-term effect of gun shows on firearm homicides. Absent state legislation to the contrary, gun-show vendors (and other private sellers) that are not federally licensed dealers are not required to conduct background checks on purchasers, which Duggan, Hjalmarsson, and Jacob (2011) referred to as the *gun-show loophole* and which we call the *gun-show*

exception. Some states have legislation requiring background checks for all buyers at gun shows. Duggan, Hjalmarsson, and Jacob (2011) examined whether there is a differential effect of gun shows on violent crime or homicide in a state that has a gun-show *exception* (Texas) compared with a state that has no such *exception* (California). The authors found only uncertain effects of state background check policies on homicides that occur near where gun shows were recently held. However, the study focused only on background check requirements as they relate to gun shows and not on a broader set of background check policies. Moreover, as the authors acknowledged, their focus was on very short-term (four-week) and localized effects. The study had low statistical power, meaning that even if gun-show background check policies had meaningful effects on violence or homicide, these might not have been detected using this paper's procedures (see Wintemute et al., 2010).

Lott (2010) examined how state-required background checks for private sales affect violent crime. Detailed results that include coefficients and test statistics were available for only one specification and for the outcome of homicide (Lott, 2010, Table A6.3). This model indicated an uncertain effect of background checks on homicide rates. This model had an unfavorable ratio of estimated parameters to observations (less than one to ten), meaning the estimated effects and significance values may be inaccurate because of model overfitting.

Swanson et al. (2013) and Swanson et al. (2016) merged administrative records from public health and criminal justice agencies to evaluate how changes in state reporting of gun-disqualifying mental health records to the NICS affected violent crime arrest rates for individuals with a disqualifying mental health condition relative to individuals diagnosed with serious mental health illness but not prohibited from purchasing a firearm. Swanson et al. (2013) obtained data from 2002 to 2009 for individuals in Connecticut who had been hospitalized for schizophrenia, bipolar disorder, or major depressive disorder. The authors estimated changes in violent crime arrest rates for individuals with at least one of the mental health adjudications reported to the NICS before and after Connecticut began reporting mental health records in 2007. The authors found a significant 31-percent decline in the probability of violent crime arrest in their sample of individuals who had a mental health adjudication but no disqualifying criminal record (see Figure 3.2). The authors also estimated the likelihood of violent crime arrest for individuals with at least one voluntary psychiatric hospitalization but no mental health adjudication. Relative to the legally disqualified population, the nondisqualified group had a lower likelihood of violent crime arrest both before and after the NICS reporting change, but the magnitude of the decrease following NICS reporting was smaller than the reduction experienced by the "treated" group with a disqualifying mental health condition. However, neither test statistics nor CIs for this difference were reported.

Swanson et al. (2016) employed analogous methods to analyze the effects of NICS reporting changes in 2007 for two Florida counties using data from 2002 to

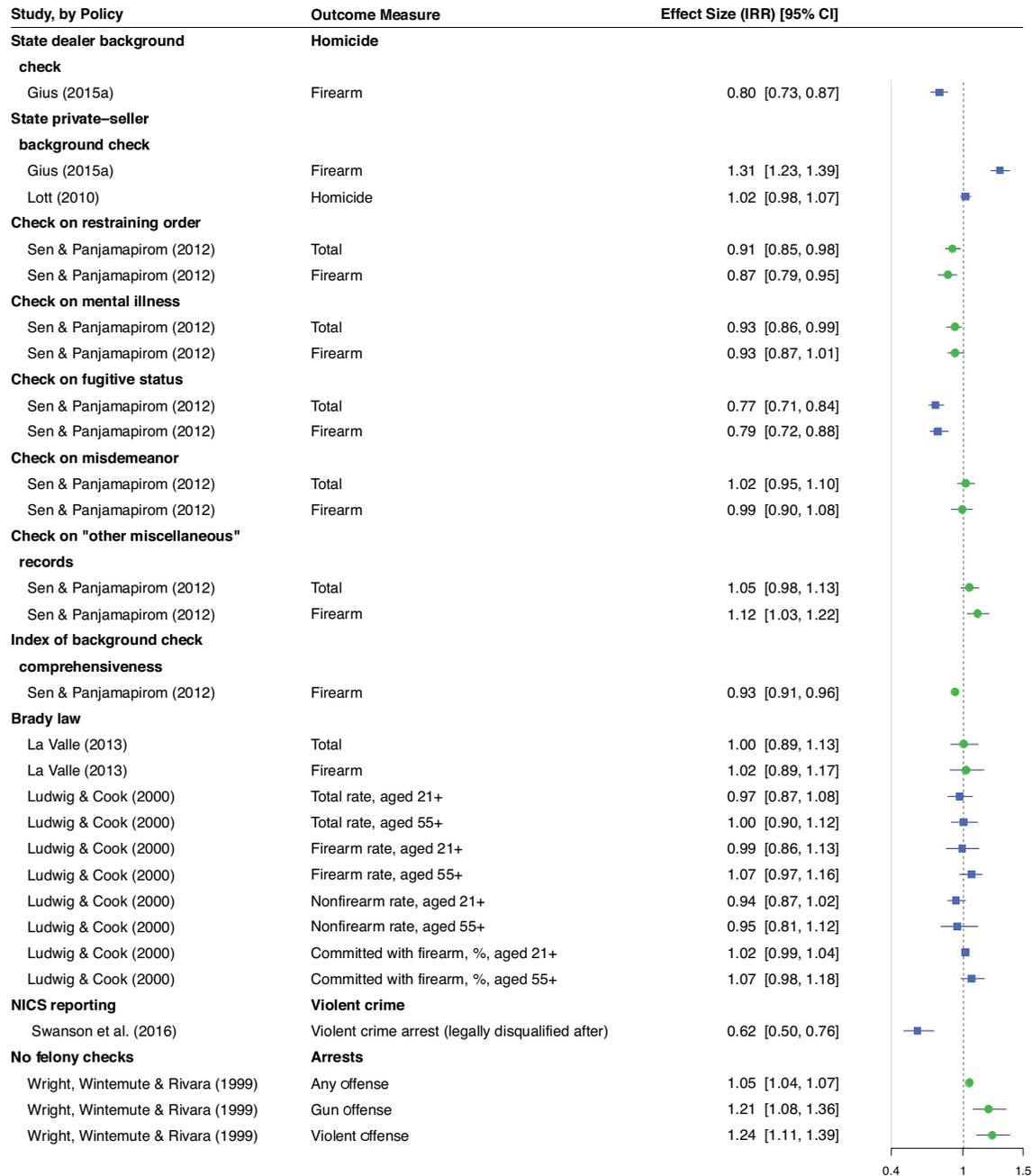
2011. The authors similarly found a larger reduction in violent crime arrest rates for individuals with a disqualifying mental health condition compared with individuals with a serious mental health illness that did not legally prohibit firearm acquisition. This difference, a decline of 38 percent (see Figure 3.2), was statistically significant. However, estimates became insignificant when the outcome variable was restricted specifically to violent crimes involving firearms, which could indicate the absence of a causal connection or could be due to measurement error in classifying crimes as involving firearms (Swanson et al., 2016).

Wright, Wintemute, and Rivara (1999) used a retrospective cohort design to assess whether firearm purchase denial based on criminal record background checks affects subsequent criminal activity among a sample of individuals with a prior felony arrest in California. Specifically, the authors examined subsequent arrest rates for a sample of individuals with a prior felony arrest who attempted to purchase a handgun in California in 1997, comparing outcomes for a group of individuals who were able to purchase a handgun successfully because they had a prior felony arrest but no conviction (“purchaser cohort”) with a group of individuals who should have been denied purchase because of a felony conviction (“denied cohort”). In individual-level analyses, controlling for number of prior weapons and violent arrest charges, the authors found that the purchaser cohort was significantly more likely to be arrested for a subsequent offense in the three-year follow-up period. Estimates showed that, relative to the denied cohort, the purchaser cohort experienced an increase in the risk of arrest of 5 percent for any offense, 21 percent for gun offenses, and 24 percent for violent offenses (see Figure 3.2). While this study did not specifically examine the effects of background check laws, the findings suggest that enforcing background checks for felony records may reduce violent crime.

Finally, Vigdor and Mercy (2006) examined the effects of restraining order and violent misdemeanor background checks on intimate partner homicides and firearm intimate partner homicides, by comparing states with more-comprehensive or less-comprehensive approaches to performing those checks. The authors found small differences in rates of such homicides between states with high and low capacities for performing such checks, but they did not provide a test of the significance of these differences.

Figure 3.2 displays the IRRs and CIs associated with the background check policies examined in these studies. Duggan, Hjalmarsson, and Jacob (2011); Swanson et al. (2013); and Vigdor and Mercy (2006) did not provide sufficient data for us to calculate IRRs and CIs for the effect size of interest, so these are not displayed in figure. Furthermore, we exclude the estimate of the Brady Act from Gius (2015a) because the estimate does not meet our criteria for inclusion. The Swanson et al. (2016) estimate in the figure is the change from before and after the NICS reporting requirements for legally disqualified individuals relative to the change for nonlegally disqualified individuals.

Figure 3.2
Incidence Rate Ratios Associated with the Effect of Background Checks on Violent Crime



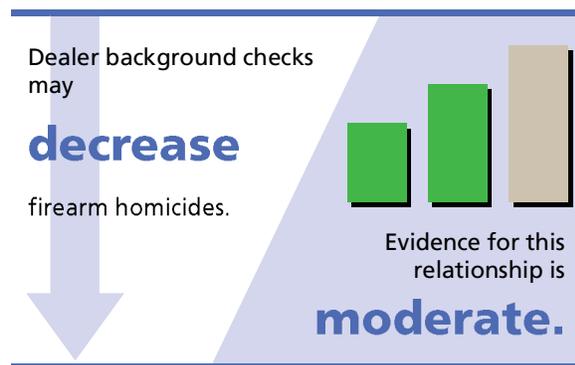
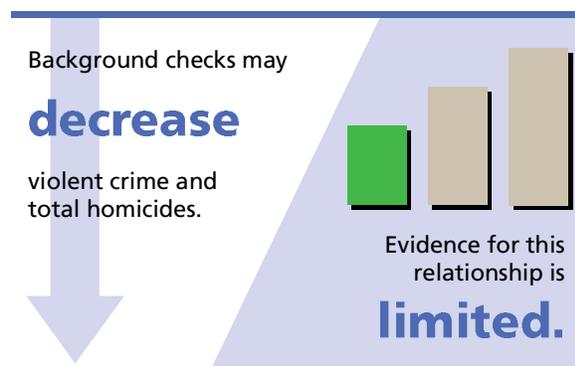
NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details.

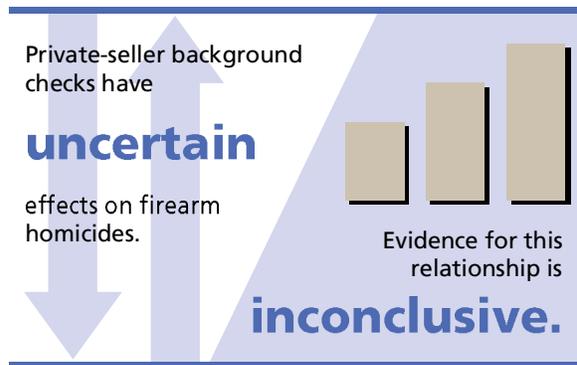
Conclusions

Homicides and violent crime. We identified six qualifying studies providing evidence on the effects of background checks, or some component of background checks, on violent crime. Three of these studies provided an overall effect of either dealer background checks or private-seller background checks on total homicide rates, although two of these estimated effects were partially confounded with the effect of waiting periods that were simultaneously introduced in many states when the Brady Act was passed. All three studies found those effects to be uncertain (the analyses of effects on those aged 21 and older in Ludwig and Cook, 2000; the Brady Act effect in La Valle, 2013; and the private-seller background check effect in Lott, 2010). Three background check component analyses identified significant effects indicating that mental illness checks, restraining order checks, or fugitive status checks reduced violent crime specific to homicides (Sen and Panjamapirom, 2012). A fourth component analysis found that mental illness checks significantly reduce violent crime arrests (Swanson et al., 2016). A component analysis of misdemeanor checks found that they had uncertain effects on homicides, while “other miscellaneous checks” had a suggestive effect consistent with increases in homicides (Sen and Panjamapirom, 2012). Finally, a component analysis of background checks targeting firearm purchase by individuals with prior felony convictions (Wright, Wintemute, and Rivara, 1999) found significant effects consistent with a reduction in arrests for firearm and violent crime offenses.

The cumulative evidence is puzzling, as overall effects of background checks appear to be uncertain, but some components of background checks appear to significantly reduce homicides or violent crime. Because the studies examining component effects of background checks generally suffer from fewer noted weaknesses, we conclude that available studies provide *limited evidence that background checks reduce violent crime and total homicide rates*.

Firearm homicide rates. We identified four qualifying studies that provided estimates for the effects of background checks, or some component of background checks, on firearm homicide rates. Four studies examined the overall effect of dealer background checks on firearm homicide rates; two used large independent data sets and





found significant effects indicating that dealer background checks reduce firearm homicides (Gius, 2015a; Sen and Panjamapirom, 2012), and two found uncertain effects (La Valle, 2013; Ludwig and Cook, 2000). One analysis found significant effects consistent with private-seller checks increasing firearm homicides (Gius, 2015a). Component analyses from

a single study found significant effects indicating that restraining order and fugitive checks reduce firearm homicides (Sen and Panjamapirom, 2012). The analyses also found that mental illness checks have suggestive effects consistent with a reduction in firearm homicides, uncertain effects for misdemeanor checks, and a significant effect indicating that “miscellaneous checks” increase firearm homicides.

Based on these findings and an assessment of the relative strengths of the studies, we conclude that *available studies provide moderate evidence that dealer background checks may reduce firearm homicides and inconclusive evidence for the effect of private-seller background checks on firearm homicides.*

Effects on Mass Shootings

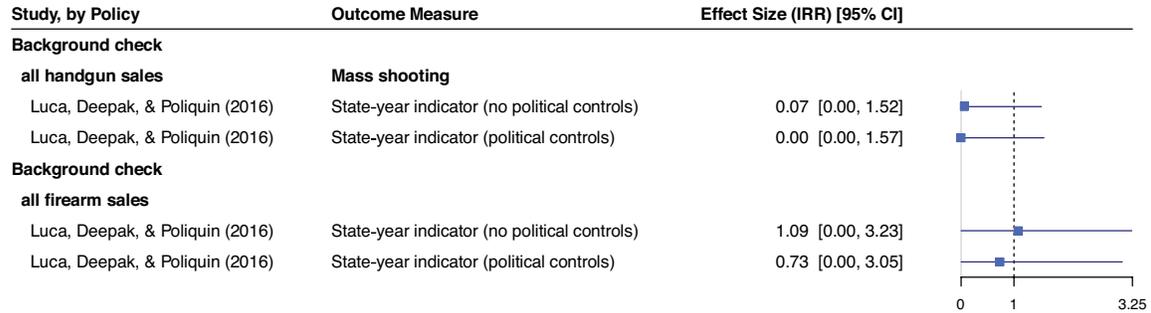
Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified research examining the effects of gun policies on mass shootings in the United States. Using a two-way fixed-effects linear probability model, Luca, Deepak, and Poliquin (2016) estimated the effects of background check laws on a binary indicator for whether a mass shooting occurred in a given state-year. The authors included two measures of background check laws: an indicator for whether laws required a background check for all handgun transactions (including private sales) and an indicator for whether laws required a background check for all firearm transactions (including private sales). The authors’ regression analysis covered 1989–2014 and included controls for time-invariant state characteristics; national trends; a host of other state-level gun policies; and time-varying state-level demographic, socioeconomic, and political characteristics. Their findings showed an uncertain relationship between background check laws and the probability of at least one mass shooting event occurring (see Figure 3.3). However, assessing the effects of gun policies on mass shootings was not the primary focus of the study, and the authors intended the estimates to serve solely as a robustness check for their main specification (the effects of mass shootings on gun policy). Although the paper provided limited information to use in evaluating the reported statistical models (e.g., on how these poli-

cies were coded), it is clear that the analysis used a linear model to predict a dichotomous outcome. Therefore, model assumptions were violated, making CIs unreliable.

Figure 3.3 displays the IRRs and CIs associated with the background check policies examined in Luca, Deepak, and Poliquin (2016).

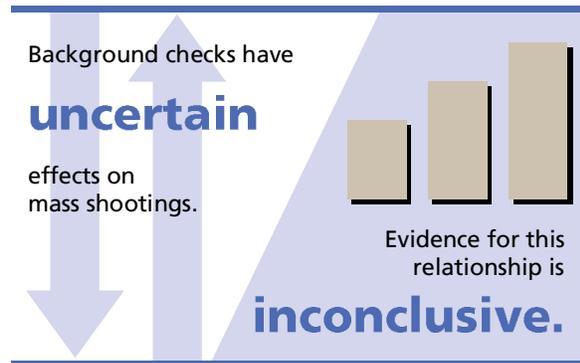
Figure 3.3
Incidence Rate Ratios Associated with the Effect of Background Checks on Mass Shootings



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified a single qualifying study that estimated the effects of background checks for all handgun sales and for all firearm sales on mass shootings (Luca, Deepak, and Poliquin, 2016). This study found uncertain effects of these universal background check laws on whether at least one mass shooting occurred in a state. Therefore, the available study provides *inconclusive evidence for the effect of background checks on mass shootings*.



Outcomes Without Studies Examining the Effects of Background Checks

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of background check policies on the following outcomes, and we identified no such studies that met our inclusion criteria:

- unintentional injuries and deaths
- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

Chapter Three References

- Buchanan, Larry, Josh Keller, Richard A. Oppel, Jr., and Daniel Victor, "How They Got Their Guns," *New York Times*, June 12, 2016. As of March 22, 2017:
https://www.nytimes.com/interactive/2015/10/03/us/how-mass-shooters-got-their-guns.html?_r=0
- Bureau of Alcohol, Tobacco, and Firearms, *Crime Gun Trace Reports (2000): Memphis, Tennessee*, Washington, D.C.: U.S. Department of the Treasury, July 2002.
- Campbell, J. C., D. Webster, J. Kozio-McLain, C. Block, D. Campbell, M. A. Curry, F. Gary, N. Glass, J. McFarlane, C. Sachs, P. Sharps, Y. Ulrich, S. A. Wilt, J. Manganello, X. Xu, J. Schollenberger, V. Frye, and K. Laughon, "Risk Factors for Femicide in Abusive Relationships: Results from a Multisite Case Control Study," *American Journal of Public Health*, Vol. 93, No. 7, 2003, pp. 1089–1097.
- Cook, Philip J., and Jens Ludwig, "The Effect of the Brady Act on Gun Violence," in B. Harcourt, ed., *Guns, Crime, and Punishment in America*, New York: New York University Press, 2003, pp. 283–298.
- Cook, Philip J., J. Ludwig, and A. A. Braga, "Criminal Records of Homicide Offenders," *JAMA*, Vol. 294, No. 5, 2005, pp. 598–601.
- Cook, Philip J., Stephanie Molliconi, and Thomas B. Cole, "Regulating Gun Markets," *Journal of Criminal Law and Criminology*, Vol. 86, No. 1, 1995, pp. 59–92.
- Cook, Philip J., Susan T. Parker, and Harold A. Pollack, "Sources of Guns to Dangerous People: What We Learn by Asking Them," *Preventive Medicine*, Vol. 79, 2015, pp. 28–36.
- Cooper, Alexia, and Erica L. Smith, *Homicide Trends in the United States, 1980–2008*, Washington, D.C.: U.S. Department of Justice, November 2011.
- Duggan, Mark, Randi Hjalmarsson, and Brian A. Jacob, "The Short-Term and Localized Effect of Gun Shows: Evidence from California and Texas," *Review of Economics and Statistics*, Vol. 93, No. 3, 2011, pp. 786–799.
- Everytown for Gun Safety Support Fund, "Mass Shootings in the United States: 2009–2016," April 11, 2017b. As of May 3, 2017:
<http://everytownresearch.org/reports/mass-shootings-analysis/>
- FBI—See Federal Bureau of Investigation.
- Federal Bureau of Investigation, "Active Records in the NICS Index," April 30, 2017. As of May 8, 2017:
https://www.fbi.gov/file-repository/active_records_in_the_nics-index.pdf/view
- Giffords Law Center to Prevent Gun Violence, "Universal Background Checks," web page, undated-f. As of October 18, 2017:
<http://lawcenter.giffords.org/gun-laws/policy-areas/background-checks/universal-background-checks/>
- Gius, Mark, "The Effects of State and Federal Background Checks on State-Level Gun-Related Murder Rates," *Applied Economics*, Vol. 47, No. 38, 2015a, pp. 4090–4101.
- Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.
- Joshi, M., and S. B. Sorenson, "Intimate Partner Violence at the Scene: Incident Characteristics and Implications for Public Health Surveillance," *Evaluation Review*, Vol. 34, No. 2, 2010, pp. 116–136.

Juodis, Marcus, Andrew Starzomski, Stephen Porter, and Michael Woodworth, "A Comparison of Domestic and Non-Domestic Homicides: Further Evidence for Distinct Dynamics and Heterogeneity of Domestic Homicide Perpetrators," *Journal of Family Violence*, Vol. 29, No. 3, 2014, pp. 299–313.

Kleck, G., and D. J. Bordua, "The Factual Foundation for Certain Key Assumptions of Gun Control," *Law and Policy*, Vol. 5, No. 3, 1983, pp. 271–298.

Kopel, D. B., "Background Checks for Firearms Sales and Loans: Law, History, and Policy," *Harvard Journal on Legislation*, Vol. 53, 2016, pp. 303–367.

La Valle, James M., "'Gun Control' vs. 'Self-Protection': A Case Against the Ideological Divide," *Justice Policy Journal*, Vol. 10, No. 1, 2013, pp. 1–26.

Lott, John R., Jr., *More Guns, Less Crime: Understanding Crime and Gun-Control Laws*, 3rd ed., Chicago, Ill.: University of Chicago Press, 2010.

Luca, Michael, Lahotra Deepak, and Christopher Poliquin, *The Impact of Mass Shootings on Gun Policy*, working paper, Boston, Mass.: Harvard Business School, 2016.

Ludwig, J., and P. J. Cook, "Homicide and Suicide Rates Associated with Implementation of the Brady Handgun Violence Prevention Act," *JAMA*, Vol. 284, No. 5, 2000, pp. 585–591.

McFarlane, J., J. C. Campbell, S. Wilt, C. Sachs, Y. Ulrich, and X. Xu, "Stalking and Intimate Partner Femicide," *Homicide Studies*, Vol. 3, 1999, pp. 300–316.

Miller, M., L. Hepburn, and D. Azrael, "Firearm Acquisition Without Background Checks: Results of a National Survey," *Annals of Internal Medicine*, Vol. 166, 2017, pp. 233–239.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Ruddell, R., and G. L. Mays, "State Background Checks and Firearms Homicides," *Journal of Criminal Justice*, Vol. 33, No. 2, 2005, pp. 127–136.

Sen, B., and A. Panjamapirom, "State Background Checks for Gun Purchase and Firearm Deaths: An Exploratory Study," *Preventive Medicine*, Vol. 55, No. 4, 2012, pp. 346–350.

Sumner, S. A., P. M. Layde, and C. E. Guse, "Firearm Death Rates and Association with Level of Firearm Purchase Background Check," *American Journal of Preventive Medicine*, Vol. 35, No. 1, 2008, pp. 1–6.

Swanson, Jeffrey W., Michele M. Easter, Allison G. Robertson, Marvin S. Swartz, Kelly Alanis-Hirsch, Daniel Moseley, Charles Dion, and John Petrila, "Gun Violence, Mental Illness, and Laws That Prohibit Gun Possession: Evidence from Two Florida Counties," *Health Affairs*, Vol. 35, No. 6, 2016, pp. 1067–1075.

Swanson, J. W., A. G. Robertson, L. K. Frisman, M. A. Norko, H. Lin, M. S. Swartz, and P. J. Cook, "Preventing Gun Violence Involving People with Serious Mental Illness," in D. W. Webster and J. S. Vernick, eds., *Reducing Gun Violence in America: Informing Policy with Evidence and Analysis*, Baltimore, Md.: Johns Hopkins University Press, 2013, pp. 33–51.

United States Code, Title 18, Section 922, Unlawful Acts.

Vigdor, E. R., and J. A. Mercy, "Do Laws Restricting Access to Firearms by Domestic Violence Offenders Prevent Intimate Partner Homicide?" *Evaluation Review*, Vol. 30, No. 3, 2006, pp. 313–346.

Vittes, K. A., J. S. Vernick, and D. W. Webster, "Legal Status and Source of Offenders' Firearms for States with the Least Stringent Criteria for Gun Ownership," *Injury Prevention*, Vol. 19, No. 1, June 23, 2012, pp. 26–31.

Webster, Daniel W., Jon S. Vernick, and Maria T. Bulzacchelli, "Effects of State-Level Firearm Seller Accountability Policies on Firearm Trafficking," *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, Vol. 86, No. 4, 2009, pp. 525–537.

Wintemute, G. J., D. Hemenway, D. Webster, G. Pierce, and A. A. Braga, "Gun Shows and Gun Violence: Fatally Flawed Study Yields Misleading Results," *American Journal of Public Health*, Vol. 100, No. 10, 2010, pp. 1856–1860.

Wright, M. A., and G. J. Wintemute, "Felony of Violent Criminal Activity That Prohibits Gun Ownership Among Prior Purchasers of Handguns: Incidence and Risk Factors," *Journal of Trauma and Acute Care Surgery*, Vol. 69, No. 4, 2010, pp. 948–955.

Wright, M. A., G. J. Wintemute, and F. P. Rivara, "Effectiveness of Denial of Handgun Purchase to Persons Believed to Be at High Risk for Firearm Violence," *American Journal of Public Health*, Vol. 89, No. 1, 1999, pp. 88–90.

CHAPTER FOUR

Bans on the Sale of Assault Weapons and High-Capacity Magazines

The term *assault weapon* is controversial. In state and federal gun laws, it generally refers to specific semiautomatic firearm models that are designed to fire a high volume of ammunition in a controlled way or to firearms that have specified design features, such as folding stocks or pistol grips (Giffords Law Center to Prevent Gun Violence, undated-a).¹ Those in the gun industry refer to many of these firearms as *modern sporting rifles*, contending that *assault rifle* should apply only to automatic weapons used by militaries. Furthermore, they argue that the characteristics used to differentiate banned firearms from nonbanned semiautomatic weapons are cosmetic and do not make them more deadly than similar weapons without those features. In 1994, Congress passed the Violent Crime Control and Law Enforcement Act, which banned “the manufacture of military-style assault weapons, assault weapons with specific combat features, ‘copy-cat’ models, and certain high-capacity ammunition magazines of more than ten rounds” (U.S. Department of Justice, 1994; see also Pub. L. 103-322). The law included a sunset provision, calling for its repeal after ten years. It was not renewed in 2004, and thus there is not currently a federal assault weapon ban (Plumer, 2012).

Laws banning or restricting assault weapons or high-capacity magazines are primarily intended to reduce firearm-related casualties and fatalities from violent crime—and, more specifically, from mass shooting incidents. The bans could impact firearm-related violence by decreasing the number of shooting incidents, decreasing the number of casualties in a given shooting, and decreasing the case fatality rate. That is, other things being equal, a shooter with an assault weapon or other weapon equipped with a high-capacity magazine can fire more ammunition and hence inflict more casualties in a given length of time than would a shooter using weapons with a lower rate of fire and capacity. In a mass shooting incident, the lower rate of fire should allow for more people to evacuate and for law enforcement or others to intervene. To most precisely

¹ Semiautomatic pistols and rifles, as defined in 27 C.F.R. 478.11, are firearms that use energy expended from the firing cartridge to extract the fired cartridge case and automatically chamber the next round of ammunition but require a pull of the trigger for each shot (Krouse and Richardson, 2015). In contrast, fully automatic weapons (i.e., machine guns) can produce continuous fire by a single trigger function without manual reloading, and their sale and possession has been federally regulated since the National Firearms Act of 1934 (currently codified as amended as 26 U.S.C. 5801 et seq.).

characterize the causal effect of these laws on violent crime or mass shootings, the ideal data would distinguish crime and violence outcomes by whether a designated assault weapon or high-capacity magazine was used. Although limited data on the weapons used in homicides are available through the Federal Bureau of Investigation (FBI)'s Supplementary Homicide Reports and details of the weapons and ammunition used in mass shooting incidents are increasingly being compiled on a case-by-case basis (e.g., by the Stanford University Mass Shootings in America project), none of the articles meeting our inclusion criteria for this policy analyzed crime or violence outcomes by weapon type.

The majority of crimes are not conducted with rifles but with handguns, most of which are not considered assault weapons (although most assault weapon bans also list certain "assault pistols" among the banned firearms). In 2015, 252 of the 9,616 firearm-related murders reported in FBI data involved any type of rifle; the type of firearm used in 2,477 of these murders was not specified (FBI, 2016a). Assuming that no substitution to other types of firearms would occur, the elimination of all rifle homicides would have decreased the number of firearm-related murders by 2.6 percent.

Assault weapons and high-capacity magazines are used disproportionately in mass public shootings and killings of law enforcement officers compared with murders overall. However, these incidents are relatively rare. Data combining 184 mass shooting, spree shooting, and active shooter events from 1982 to 2015 suggest that about 30 percent of incidents involved assault weapons and 37 percent of incidents involved high-capacity magazines (Blau, Gorry, and Wade, 2016). Another analysis that focused on mass shooting events involving four or more fatalities between 2009 and 2016 reported that 15 of these incidents (11 percent) involved an assault weapon or high-capacity magazine, resulting in 155 percent more injuries and 47 percent more fatalities compared with other incidents (Everytown for Gun Safety Support Fund, 2017b). Other research, focused on a small subset of shootings in which multiple victims were targeted, suggests that the rate of fire at mass shootings is not so high that reloading would affect the number of rounds fired (Kleck, 2016). If this finding generalized to all multiple-victim shootings, it would call into question the usefulness of laws banning high-capacity magazines, because the primary objective of such laws is to reduce the number of rounds a shooter can fire before having to reload.

Of the 38 felonious fatal shootings of law enforcement officers in 2015, 18.4 percent involved any type of rifle (FBI, 2016c). Although relatively outdated, estimates from 1994 suggest that between 31 percent and 41 percent of firearms used in murders of police officers involved assault weapons or other guns equipped with high-capacity magazines (Adler et al., 1995).

There is little theoretical basis to suggest that bans of assault weapons and high-capacity magazines would impact rates of suicide or unintentional injury. And although these policies could plausibly impact defensive gun use, the magnitudes of any such

effects are likely small. The FBI reported that, in 2015, eight of the 328 firearm-related justifiable homicides by private citizens involved any type of rifle (FBI, 2016b).

Laws banning assault weapons and high-capacity magazines would have direct market effects for the gun industry, including impacts on production, price, and potential spillovers from primary to secondary markets (Koper, 2004). The market effects of restricting the manufacturing and sales of a class of weapons or ammunition will depend on the relative demand for these items, the availability of nonbanned weapons that serve as close substitutes, and the costs of modifying existing weapon types to meet the requirements of the ban, to name a few. A nationwide ban could also impact the industry more broadly by generating market effects for ancillary gun companies that produce or sell certain replacement parts, accessories, or specialized magazines and precision barrels used primarily for sport shooting.

Overall, the effects of these policies will depend largely on the design and implementation of the law. Except for heavily regulated weapons manufactured prior to May 1986, assault weapons capable of automatic fire are not available for sale in the United States. Thus, the specifics of which weapons or weapon features are prohibited by a particular ban are key to understanding the marginal effect of each policy on outcomes of interest. Targeting weapons with close substitutes or features unrelated to the deadliness of the weapon or its likelihood of being used in the perpetration of violence likely limits any potential policy effects on violent crime. Further, most existing state bans (and the federal ban of 1994) influence the flow of only new weapons or magazines and do little to affect the existing stock; the National Shooting Sports Foundation, a trade association for the gun industry, estimates that more than 8.5 million assault rifles were either manufactured in or imported to the United States between the 1990s and 2013 (Chang, 2013).

State Implementation of Assault Weapon Bans

Seven states and the District of Columbia currently ban assault weapons.² Five of the eight jurisdictions list the specific assault weapons banned and prohibit all weapons with specific features; one state bans only the weapons listed, and two states ban only specific features. The laws that list specific banned models are similar state to state, although the lists are not generally identical.

California is an example of a state that has a list of banned assault weapons, both rifles and shotguns, as well as firearms with specific design features. Specifically, it bans “all AK series including, but not limited to, the models identified,” and explains

² California, Connecticut, Hawaii, Maryland, Massachusetts, New Jersey, New York, and the District of Columbia. See Calif. Penal Code § 30505; Conn. Gen. Stat. § 53-202b; Hawaii Rev. Stat. Ann. § 134-4; Md. Code Ann. § 4-303; Mass. Gen. Laws Ch. 140 § 131M; N.J. Stat. Ann. § 2C:39-1 and 39-5; N.Y. Penal Law § 265.02; D.C. Code Ann. § 7-2502.02.

that the term *series* “includes all other models that are only variations, with minor differences, of those models listed in subdivision (a), regardless of the manufacturer.”³ Furthermore, the state provides a list of features, any one of which renders a firearm an assault weapon and therefore banned.⁴ For example, the law states that a “semi-automatic, centerfire rifle that has the capacity to accept a detachable magazine” is an assault weapon if it also contains any of the following features: “(A) a pistol grip that protrudes conspicuously beneath the action of the weapon; (B) a thumbhole stock; (C) a folding or telescoping stock; (D) a grenade launcher or flare launcher; (E) a flash suppressor; (F) a forward pistol grip.”⁵

Connecticut’s list is similar to California’s, but the language is different. For example, in its subsection banning the AK series of weapons, Connecticut’s law includes “[a]ny of the following specified semiautomatic centerfire rifles, or copies or duplicates thereof with the capability of any such rifles, that were in production prior to or on April 4, 2013.” In addition, like California, Connecticut has a long list of features, any of which render a firearm banned.⁶ The District of Columbia’s list is shorter and does not include statements that the ban includes similar makes and models to the ones listed. However, the law also bans firearms with specific design features.⁷ Maryland and Massachusetts are the other two states that ban by both list and features. Maryland bans weapons that possess any two features from its list.⁸ The Massachusetts law, which refers to the now-expired federal law (Pub. L. 103-322), also requires two features to be included.⁹

New Jersey is the only state that includes a list of banned assault weapons but not generic features.¹⁰ Conversely, New York and Hawaii ban a list of only features, not specified models of firearms.¹¹ However, unlike the other states, Hawaii bans only certain pistols, not rifles.

In addition to definitional differences, the laws are distinct in other ways—notably, their treatment of grandfathered weapons. For example, the District of Columbia does not allow grandfathering of assault weapons (Giffords Law Center to Prevent Gun Violence, undated-a); however, all seven states with assault weapon bans do, but under different regimes. Six of the states require registration of grandfathered assault weap-

³ Calif. Penal Code § 30510.

⁴ Calif. Penal Code § 30515.

⁵ Calif. Penal Code § 30515.

⁶ Conn. Gen. Stat. § 53-202a.

⁷ D.C. Code Ann. § 7-2501.01.

⁸ Md. Code Ann. § 4-301.

⁹ Mass. Gen. Laws Ch. 140 § 121.

¹⁰ N.J. Stat. Ann. § 2C: 39-1.

¹¹ N.Y. Penal Law § 265.00; Hawaii Rev. Stat. Ann. § 134-1.

ons; in New Jersey, registration allows grandfathered assault weapons to be used only for target shooting.¹²

The same jurisdictions that have banned assault weapons have also banned high-capacity magazines, as has Colorado. Hawaii, which bans only assault pistols, similarly bans only high-capacity magazines for pistols.¹³ The rest ban high-capacity magazines for all firearms,¹⁴ although there are differences in definition here too. California, Connecticut, Hawaii, Maryland, Massachusetts, New York, and the District of Columbia ban magazines with a capacity of more than ten rounds.¹⁵ Colorado and New Jersey allow up to 15 rounds.¹⁶

Effects on Violent Crime

Research Synthesis Findings

In their review of available science, Hahn et al. (2005) found insufficient evidence for determining the effectiveness of bans on specific firearms or ammunition on violent crime. In its review, the National Research Council (NRC) (2004) described two studies that examined the effects of the 1994 federal assault weapon ban (Koper and Roth, 2001, 2002). The studies found no short-term (within two years) effect of the ban on gun violence outcomes but a temporary increase in prices of assault weapons in both primary and legal secondary markets.

We identified two studies that evaluated federal and state assault weapon bans and met our criteria. Gius (2014) analyzed state-level data from 1980 through 2009 and controlled for the 1994–2004 federal assault weapon ban and for the existence of state assault weapon bans. The analysis of the federal assault weapon ban does not meet our criteria for inclusion: The author included an indicator for years prior to and after the ban as a control, but there was no comparison (control) group. The author found a suggestive effect consistent with state assault weapon bans decreasing firearm-related homicides (see Figure 4.1). However, the model did not account for serial correlation in panel data, which can result in large biases in standard errors (Aneja, Donohue, Zhang, 2014).

¹² Calif. Penal Code § 30605; Conn. Gen. Stat. § 53-202c; Hawaii Rev. Stat. Ann. § 134-4; Md. Code Ann. § 4-303; Mass. Gen. Laws Ch. 140 §§ 121, 123, 131, 131M; N.J. Stat. Ann. § 2C: 58-12; N.Y. Penal Law § 265.20.

¹³ Hawaii Rev. Stat. Ann. § 134-8.

¹⁴ Calif. Penal Code §, 32310; Colo. Rev. Stat. § 18-12-302; Conn. Gen. Stat. § 53-202w; Md. Code Ann. § 4-305; Mass. Gen. Laws Ch. 140 § 131M; N.J. Stat. Ann. § 2C: 39-3; N.Y. Penal Law § 265.02; D.C. Code Ann. § 7-2506.01.

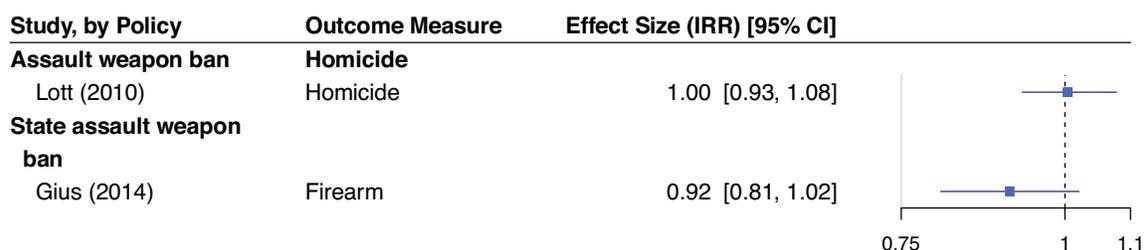
¹⁵ Calif. Penal Code §§ 16350, 16740; Conn. Gen. Stat. § 53-202w; Hawaii Rev. Stat. Ann. § 134-8; Md. Code Ann. § 4-305; Mass. Gen. Laws Ch. 140 § 121; N.Y. Penal Law § 265.00; D.C. Code Ann. § 7-2506.01.

¹⁶ Colo. Rev. Stat. § 18-12-301; N.J. Stat. Ann. § 2C: 39-1.

Lott (2010) examined the effect of assault weapon bans on violent crime. Detailed results that include coefficients and test statistics were available only for the outcome of homicide (Lott, 2010, Table A6.3). This model indicated an uncertain effect of assault weapon bans on homicide rates, but it had an unfavorable ratio of estimated parameters to observations (less than one to ten), meaning the model may have been overfit, and thus its effect estimates and significance levels may be inaccurate.

Figure 4.1 displays the incidence rate ratios (IRRs) and confidence intervals (CIs) associated with the assault weapon ban policies examined in these studies. We exclude the estimate of the federal assault weapon ban from Gius (2014) because the estimate does not meet our criteria for inclusion.

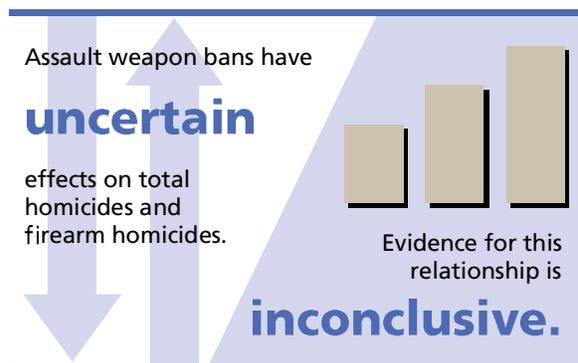
Figure 4.1
Incidence Rate Ratios Associated with the Effect of Assault Weapon Bans on Violent Crime



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified two qualifying studies that estimated the effects of assault weapon bans on different violent crime outcomes. One found uncertain effects of such bans on total homicide rates (Lott, 2010); the other found a suggestive effect consistent with assault weapon bans decreasing firearm homicides (Gius, 2014). Considering the relative strengths of these studies, available evidence is *inconclusive for the effect of assault weapon bans on total homicides and firearm homicides*.



Assault weapon bans have **uncertain** effects on total homicides and firearm homicides. Evidence for this relationship is **inconclusive.**

Effects on Mass Shootings

Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) reviewed evidence for the effects of assault weapon bans on mass shootings. Two studies since then met our inclusion criteria. Both used a two-way fixed-effects model, controlling for both state-specific and year-specific effects, to estimate the effects of state or federal assault weapon bans on mass shooting incidents or casualties.¹⁷

Using a Poisson model and data from 1982 through 2011, Gius (2015c) tested whether state assault weapon bans influence public mass shooting fatalities or public mass shooting injuries, controlling for the federal assault weapon ban and state-level variation in demographic, socioeconomic, and criminal justice characteristics. Although the author found a large and statistically significant association between implementation of the *federal* assault weapon ban and reductions in mass shooting deaths and injuries, the analysis of the federal ban does not meet our criteria for inclusion because the model included an indicator for years prior to and after the federal ban as a control, but there was no comparison group. However, findings showed that *state* assault weapon bans had a statistically significant but smaller effect of reducing mass shooting death rates to 55 percent of what would have been expected without the bans, but uncertain effects on mass shooting injuries (see Figure 4.2). This report provided little detail describing variation in the timing of the state bans in relation to the federal ban, and it is unclear whether the estimated effects were confounded by correlation between the state and federal bans. The model did not account for serial correlation in panel data, which can result in large biases in standard errors (Aneja, Donohue, Zhang, 2014).

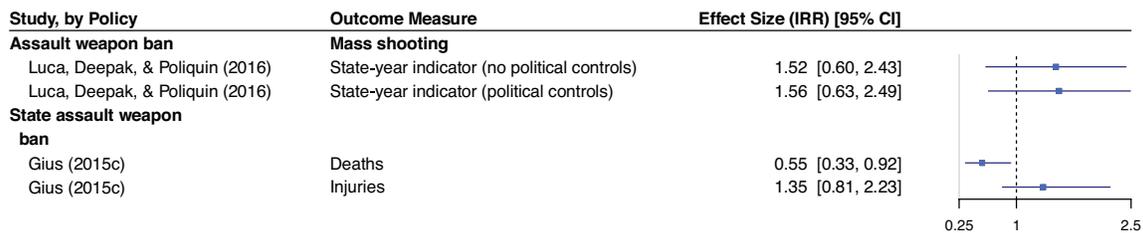
Using a linear probability model and data from a later period (1989–2014), Luca, Deepak, and Poliquin (2016) estimated the effects of state assault weapon bans on a binary indicator for whether a mass shooting occurred in a given state-year. In contrast to Gius (2015c), Luca, Deepak, and Poliquin (2016) did not control for the federal assault weapon ban from 1994 through 2004, but they controlled for a host of other state-level gun policies and for state-level demographic, socioeconomic, and political characteristics. Their findings showed uncertain effects of state assault weapon bans on the probability of a mass shooting incident occurring. However, the effects of gun policies on mass shootings were not the primary focus of Luca, Deepak, and Poliquin

¹⁷ The two studies adopted slightly different definitions for *mass shooting* (see Chapter Twenty-Two for further detail on definitional issues). Gius (2015c) focused on *public mass shootings*, which the author defined as incidents resulting in four or more firearm-related fatalities (excluding the offender), where the shooting occurred in a relatively public place, victims were selected indiscriminately, and the shooting was not related to criminal activity. Luca, Deepak, and Poliquin (2016) set the same casualty threshold and also excluded any incident that occurred in connection with criminal activity, but they did not restrict to public settings and excluded all events in which fewer than three of the fatally injured victims were not related to the shooter (e.g., family, romantic partner).

(2016), and the authors intended the estimates to serve solely as a robustness check for their main specification (the effects of mass shootings on gun policy). Although the paper provided limited information to use in evaluating the reported statistical models (e.g., on how these policies were coded), it is clear that the analysis used a linear model to predict a dichotomous outcome. Therefore, model assumptions were violated, making CIs unreliable.

Figure 4.2 displays the IRRs and CIs associated with the assault weapon ban policies examined in these studies. We exclude estimates of the federal assault weapon ban from Gius (2015c) because they do not meet our criteria for inclusion.

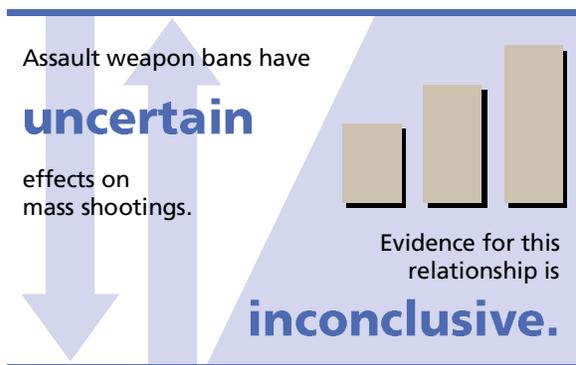
Figure 4.2
Incidence Rate Ratios Associated with the Effect of Assault Weapon Bans on Mass Shootings



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified two qualifying studies that estimated the effects of state assault weapon bans on different aspects of mass shootings. Gius (2015c) found that these bans significantly reduce mass shooting deaths but have uncertain effects on injuries resulting from mass shootings. Using a similar data set, Luca, Deepak, and Poliquin (2016) found uncertain effects of state assault weapon bans on the annual incidence of mass shootings. Based on an assessment of these findings and the relative strengths of these studies, we find *inconclusive evidence for the effect of assault weapon bans on mass shootings.*



from mass shootings. Using a similar data set, Luca, Deepak, and Poliquin (2016) found uncertain effects of state assault weapon bans on the annual incidence of mass shootings. Based on an assessment of these findings and the relative strengths of these studies, we find *inconclusive evidence for the effect of assault weapon bans on mass shootings.*

Effects on the Gun Industry

In its review, NRC (2004) described two studies that examined the effects of the 1994 federal assault weapon ban (Koper and Roth, 2001, 2002). The studies found that the bans were associated with a temporary increase in prices of assault weapons in both primary and legal secondary markets. Hahn et al. (2005) identified no studies on this topic meeting our inclusion criteria.

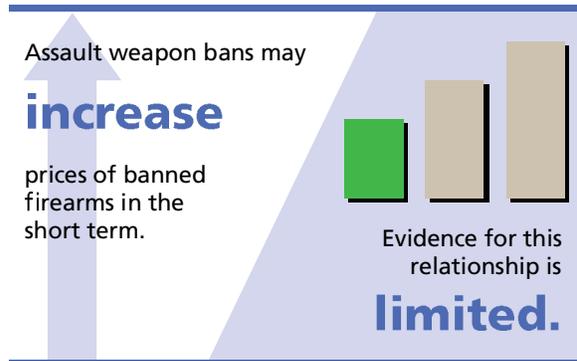
Since 2003, we identified one study examining the effects of the federal assault weapon ban on prices in secondary markets of assault weapons that were purchased before 1994 and thus not prohibited from being sold under the terms of the federal ban. In an update to the earlier Koper and Roth (2001, 2002) studies, Koper (2004) compared secondary-market prices for firearms banned under the law with prices for similar firearms unaffected by the ban between 1991 and 1999, a period that includes when the federal ban took effect (September 13, 2004). In an analysis of assault pistols covered under the ban, the author reported no significant changes in price before or after the ban. Although the comparison firearms, “Saturday night special” handguns (i.e., inexpensive, small-caliber guns), showed steady declines in price over the same period, the effect of the federal law on these different price trends was not well identified. An analysis of secondary-market prices for banned assault rifles compared with other semiautomatic rifles not covered under the ban found sharp increases in price of the banned rifles in 1994 and 1995, but prices returned to pre-ban levels for the remainder of the study period. In contrast, the price of comparison rifles remained constant over the same time frame.

Koper (2004) also examined manufacturer production of banned and comparison weapons between 1985 and 2001. He found that production of banned assault pistols rose substantially in 1993 and 1994 before the ban took place, but then fell to below pre-ban levels even though several manufacturers were producing modified versions of the banned assault pistols that were not covered by the law. Surprisingly, however, a similar surge and subsequent decline was found for the manufacture of “Saturday night special” handguns, which were not subject to the ban, although these shifts were not as large.

Production of assault rifles also surged immediately prior to the ban but declined to pre-ban levels by 1996. In contrast with assault pistols, a strong demand for semi-automatic rifles modified so as not to be covered by the ban is reflected in a surge of production by the end of the 1990s, and production remained above pre-1993 levels in 2000 and 2001.

Conclusions

One study provided some evidence that secondary-market prices of assault rifles, but not assault pistols, surged immediately before and in the year after the ban took effect. The ban appeared to affect manufacturer behavior, with production of assault pistols and



assault rifles rising in the two or three years prior to the law taking effect. The production of semiautomatic pistols modified so as not to be covered by the ban did not recover to pre-ban levels over the study period, at least for the four manufacturers analyzed. Production of semiautomatic rifles modified so as not to be covered ban did recover to greater than pre-ban levels. Because this is a single study on just one version

of an assault weapon ban, we conclude that there is *limited evidence that assault weapon bans led to short-term price increases and had mixed effects on the production of different classes of banned weapons.*

Outcomes Without Studies Examining the Effects of Assault Weapon Bans

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of assault weapon bans on the following outcomes, and we identified no such studies that met our inclusion criteria:

- suicide
- unintentional injuries and deaths
- officer-involved shootings
- defensive gun use
- hunting and recreation.

Chapter Four References

Adler, W. C., F. M. Bielke, D. J. Doi, and J. F. Kennedy, *Cops Under Fire: Law Enforcement Officers Killed with Assault Weapons or Guns with High Capacity*, Washington, D.C.: Handgun Control, Inc., 1995.

Aneja, Abhay, John J. Donohue III, and Alexandria Zhang, *The Impact of Right to Carry Laws and the NRC Report: The Latest Lessons for the Empirical Evaluation of Law and Policy*, Stanford, Calif.: Stanford Law School, Olin Working Paper No. 461, December 1, 2014. As of May 21, 2017: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443681

Blau, Benjamin M., Devon H. Gorry, and Chip Wade, “Guns, Laws, and Public Shootings in the United States,” *Applied Economics*, Vol. 48, No. 49, 2016, pp. 4732–4746.

Chang, Ailsa, “Why the AR-15 Is More Than Just a Gun,” NPR, June 24, 2013. As of June 29, 2017: <http://www.npr.org/2013/06/24/194228925/why-the-ar-15-is-more-than-just-a-gun>

Code of Federal Regulations, Title 27, Section 478.11, Meaning of Terms.

Everytown for Gun Safety Support Fund, “Mass Shootings in the United States: 2009–2016,” April 11, 2017b. As of May 3, 2017: <http://everytownresearch.org/reports/mass-shootings-analysis/>

FBI—See Federal Bureau of Investigation.

Federal Bureau of Investigation, “Crime in the United States 2015: Expanded Homicide Data Table 8,” web page, 2016a. As of May 9, 2017: https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/tables/expanded_homicide_data_table_8_murder_victims_by_weapon_2011-2015.xls

———, “Crime in the United States 2015: Expanded Homicide Data Table 15,” web page, 2016b. As of May 9, 2017: https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/tables/expanded_homicide_data_table_15_justifiable_homicide_by_weapon_private_citizen_2011-2015.xls

———, “Crime in the United States 2015: Expanded Homicide Data Table 28,” web page, 2016c. As of May 9, 2017: https://ucr.fbi.gov/leoka/2015/tables/table_28_leos_fk_type_of_weapon_2006-2015.xls

Giffords Law Center to Prevent Gun Violence, “Assault Weapons,” web page, undated-a. As of October 18, 2017: <http://lawcenter.giffords.org/gun-laws/policy-areas/hardware-ammunition/assault-weapons/>

Gius, Mark, “An Examination of the Effects of Concealed Weapons Laws and Assault Weapons Bans on State-Level Murder Rates,” *Applied Economics Letters*, Vol. 21, No. 4, 2014, pp. 265–267.

———, “The Impact of State and Federal Assault Weapons Bans on Public Mass Shootings,” *Applied Economics Letters*, Vol. 22, No. 4, 2015c, pp. 281–284.

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, “Firearms Laws and the Reduction of Violence: A Systematic Review,” *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Kleck, Gary, “Large-Capacity Magazines and the Casualty Counts in Mass Shootings: The Plausibility of Linkages,” *Justice Research and Policy*, Vol. 17, No. 1, 2016, pp. 28–47.

Koper, Christopher S., *Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence 1994–2003*, Washington, D.C.: National Institute of Justice, U.S. Department of Justice, 2004.

Koper, Christopher S., and Jeffrey A. Roth, “The Impact of the 1994 Federal Assault Weapon Ban on Gun Violence Outcomes: An Assessment of Multiple Outcome Measures and Some Lessons for Policy Evaluation,” *Journal of Quantitative Criminology*, Vol. 17, No. 1, 2001, pp. 33–74.

———, “Impact of the 1994 Federal Assault Weapons Ban on Gun Markets: An Assessment of Short-Term Primary and Secondary Market Effects,” *Journal of Quantitative Criminology*, Vol. 18, 2002, pp. 239–266.

Krouse, William J., and Daniel J. Richardson, *Mass Murder with Firearms: Incidents and Victims, 1999–2013*, Washington, D.C.: Congressional Research Service, R44126, 2015.

Lott, John R., Jr., *More Guns, Less Crime: Understanding Crime and Gun-Control Laws*, 3rd ed., Chicago, Ill.: University of Chicago Press, 2010.

Luca, Michael, Lahotra Deepak, and Christopher Poliquin, *The Impact of Mass Shootings on Gun Policy*, working paper, Boston, Mass.: Harvard Business School, 2016.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Plumer, Brad, “Everything You Need to Know About the Assault Weapons Ban, in One Post,” *Washington Post*, December 17, 2012. As of May 30, 2017:
<https://www.washingtonpost.com/news/wonk/wp/2012/12/17/everything-you-need-to-know-about-banning-assault-weapons-in-one-post/>

Public Law 103-322, Violent Crime Control and Law Enforcement Act of 1994, 1994.

United States Code, Title 26, Section 5801, Imposition of Tax.

U.S. Department of Justice, “Violent Crime Control and Law Enforcement Act of 1994 Fact Sheet,” Washington, D.C., October 24, 1994. As of May 30, 2017:
<https://www.ncjrs.gov/txtfiles/billfs.txt>

CHAPTER FIVE

Stand-Your-Ground Laws

Self-defense has long been available as a criminal defense for fatal and nonfatal confrontations. Traditionally, this defense imposes a duty to retreat before using force, if safe retreat is available. Stand-your-ground laws—referred to by some as *shoot-first laws*—remove this duty to retreat in some cases of self-defense. By removing that rule, stand-your-ground laws are intended to reduce barriers for self-defense with the aim of further deterring aggressive or antisocial behavior. Given the availability of self-defense laws for situations in which safe retreat is not possible, stand-your-ground laws primarily apply when an individual could safely retreat from an attack, or when the availability of safe retreat is ambiguous.

By reducing the threshold for the justified use of lethal force for self-protection, stand-your-ground laws should increase defensive gun use and, if a deterrent effect exists, may reduce rates of crime and violence. Specifically, stand-your-ground laws reduce the expected legal costs of defensive gun use by reducing the probability of incurring criminal or civil liability for inflicting fatal or nonfatal injury. The laws, in turn, increase the expected costs of violent criminal behavior, as victims are more likely to respond using deadly force. This mechanism could serve to lower crime rates or could induce criminals to substitute to other types of crime in which they are less likely to encounter armed resistance. In that case, crime rates could remain stable while the composition of crime types (e.g., robbery versus larceny) shifts.

Alternatively, by lowering the legal risks of using deadly force, these laws could encourage the escalation of aggressive encounters, resulting in an overall increase in firearm homicides or injuries. Furthermore, the greater likelihood of facing a citizen willing to use a firearm defensively under these policies could induce criminals to carry firearms more often and thus increase the share of violent or property crimes involving firearms.

To disentangle these mechanisms, the ideal analyses would distinguish between the effects of stand-your-ground laws on criminal violence and the effects on violence committed in self-defense. Data on homicides, violent crime, and property crime are readily available. Methodological weaknesses in collecting data on defensive gun use are well-documented, but several data sources do exist (see Chapter Twenty-Three for further discussion). Ideally, analyses of the effects of stand-your-ground laws on defen-

sive gun use would use data that capture whether the laws affected self-defense rates in the home (where castle-doctrine law already relieves victims of a duty to retreat) or in other areas as allowed under expanded stand-your-ground laws. However, this level of detail on the circumstances surrounding defensive gun use is not readily available from existing data sources, and there may be additional concerns about changes in the reporting of defensive gun use (as opposed to changes in actual prevalence) should estimation rely on self-reported data on gun use for self-protection. One of the two studies we identified that met our inclusion criteria for this policy separately examined total homicides (as well as other crime types) and justifiable homicides using statistics collected through the Federal Bureau of Investigation (FBI)'s Uniform Crime Reporting Program—although, as the authors point out, the program's definition of *justifiable homicide* does not capture certain incidents that would explicitly count as defensive gun use under expanded stand-your-ground laws (Cheng and Hoekstra, 2013).

There is likely to be little effect of stand-your-ground laws on hunting or recreational gun use. However, should these policies encourage more individuals to obtain or carry firearms, we might expect increased gun sales, unintentional injuries and deaths, and suicides outside the home following passage of the law. To assess this possibility, one would ideally like to know whether there are greater increases in gun ownership and carrying following passage of stand-your-ground laws compared with other states, but data on gun ownership have not been collected systematically over time. Only one of the studies we identified that met our criteria evaluated the effects of stand-your-ground laws on these outcomes: Humphreys, Gasparrini, and Wiebe (2017) estimated the impact of such laws on suicide rates as a placebo test (i.e., on the theory that stand-your-ground laws should have no effect on suicides).

State Implementation of Stand-Your-Ground Laws

Utah passed a stand-your-ground law in 1994, but widespread legislative change did not begin until 2005. That year, Florida adopted such a law, which became the basis for a model law adopted by the American Legislative Exchange Council. In the ensuing decade, an additional 26 states passed similar laws (Giffords Law Center to Prevent Gun Violence, undated-e). It is important to note that different experts use “stand-your-ground” terminology differently. In particular, we include states where castle doctrine is expanded to motor vehicles. Other sources, therefore, count fewer states with stand-your-ground laws (e.g., Everytown for Gun Safety Support Fund, 2013).

Utah's law states, “A person does not have a duty to retreat from the force or threatened force described in Subsection (1) in a place where that person has lawfully entered or remained, except as provided in Subsection (2)(a)(iii).” Subsection 1 says, in part, that force that is likely to cause death or serious injury is justified to “prevent death or serious bodily injury . . . as a result of another person's imminent use of

unlawful force, or to prevent the commission of a forcible felony.” The exception in (2)(a)(iii) applies to a situation where the individual in question was the aggressor or was “engaged in combat by agreement,” unless they have withdrawn from the combat or expressed their intention to do so.¹

Florida’s stand-your-ground law is similar to Utah’s. It says that a “person who is attacked in his or her dwelling, residence, or vehicle has no duty to retreat and has the right to stand his or her ground and use or threaten to use force, including deadly force, if he or she uses or threatens to use force in accordance with Sections 776.012(1) or (2) or sections 776.013(1) or (2).”² Section 776.012(2) and 776.013(2) both provide that deadly force is justified when “necessary to prevent imminent death or great bodily harm to [oneself] or another or to prevent the imminent commission of a forcible felony.”³

States that followed Florida generally modeled their laws on those of Florida and Utah,⁴ sometimes with distinct features.⁵ A few other laws strayed further from the Florida and Utah statutes.⁶ For instance, Mississippi’s law uses the term *felony* rather than the narrower *forcible felony*.⁷ Other states do not include the language that there is no duty to retreat to prevent the commission of a forcible felony, but they do allow individuals to use deadly force to prevent specific, named felonies. In most states, this is quite broad, either listing many types of felonies or describing a class of felonies.⁸ In

¹ Utah Code Ann. § 76-2-402.

² Florida Stat. Ann. § 776.013.

³ Florida Stat. Ann. §§ 776.012, 776.013.

⁴ In particular, Georgia, Indiana, Montana, and Oklahoma. See Ga. Code Ann. §§ 16-3-23.1, 16-3-21; Ind. Code Ann. § 35-41-3-2; Mont. Ann. Code §§ 45-3-102, 103, 104, 110; Okla. Stat. Ann. Tit. 21 § 1289.25.

⁵ Alabama, Alaska, Arizona, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Nevada, New Hampshire, North Carolina, North Dakota, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, and Wisconsin. See Ala. Code § 13A-3-23; Alaska Stat. Ann. § 11.81.335; Ariz. Rev. Stat. Ann. § 13-411; Kan. Stat. Ann. §§ 21-5222, 5223, 5230; Ky. Rev. Stat. Ann. §§ 503.050, 503.055; La. Stat. Ann. § 14:20; Mich. Comp. Laws § 780.972; Miss. Ann. Code § 97-3-15; Mo. Stat. Ann. § 563.031; Nev. Rev. Stat. Ann. § 200.120; N.H. Rev. Stat. Ann. §§ 627:4, 627:7; N.C. Gen. Stat. Ann. §§ 14-51.3, 51.2; N.D. Ann. Code § 12.1-05-07; 18 Pa. Const. Stat. § 505; S.C. Ann. Code §§ 16-11-440, 16-1-60; S.D. Laws § 22-18-4; Tenn. Ann. Code § 39-11-611; Tex. Penal Code § 9.32; Wisc. Stat. Ann. § 939.48.

⁶ Iowa, Ohio, and West Virginia. See Iowa Code Ann. § 704.1, which states that deadly force may be used even if there is an alternative, if the alternative requires one to retreat from one’s dwelling or workplace. Ohio Rev. Code Ann. § 2901.09, which applies to every section in the code that sets forth a criminal offense. W. Va. Ann. Code § 55-7-22, which strays from Florida’s and Utah’s laws in the section dealing with civil actions, discussing lawsuits brought by intruders or attackers for injuries sustained.

⁷ Miss. Ann. Code § 97-3-15.

⁸ For example, Ala. Code § 13-A-3-23 (kidnapping; assault; burglary; robbery; forcible rape; forcible sodomy; “using or about to use physical force against an owner, employee, or other person authorized to be on business property when the business is closed to the public while committing or attempting to commit a crime involving death, serious physical injury, robbery, kidnapping, rape, sodomy, or a crime of a sexual nature involving

some states, the list of felonies is quite limited.⁹ Finally, four states limit their laws to defense of self and others in the face of death or serious physical injury, thereby implicitly excluding any other felonies.¹⁰

West Virginia, which discusses stand-your-ground laws only in the context of civil actions, does not require an individual to retreat if facing risk of death, serious bodily harm, or commission of a felony in his or her own home. However, the law requires the risk of death or serious bodily harm for the stand-your-ground provisions to apply when outside the home.¹¹ In North Dakota, the stand-your-ground law applies in an individual's home, workplace, or occupied motor home or travel trailer, unless the individual "is assailed by another individual who the individual knows also dwells or works there or who is lawfully in the motor home or travel trailer."¹² Ohio's statute applies only in the person's home, vehicle, or vehicle owned by an immediate family member.¹³ In Wisconsin, the law applies in an individual's home, motor vehicle, or place of business.¹⁴ In Iowa and Connecticut, it applies in the home or workplace.¹⁵

a child under the age of 12"; or against someone who "in the process of unlawfully and forcefully entering, or has unlawfully and forcefully entered, a dwelling, residence, business property, or occupied vehicle, or federally licensed nuclear power facility, or is in the process of sabotaging or attempting to sabotage a federally licensed nuclear power facility, or is attempting to remove, or has forcefully removed, a person against his or her will from any dwelling, residence, business property, or occupied vehicle when the person has a legal right to be there, and provided that the person using the deadly physical force knows or has reason to believe that an unlawful and forcible entry or unlawful and forcible act is occurring"); Alaska Stat. Ann. § 11.81.335 (in addition to death and serious physical injury, lists kidnapping, sexual assault, sexual abuse of a minor, and robbery); Ky. Rev. Stat. Ann. § 503.050, 503.055 (503.050 states that an individual may stand his or her ground when at risk of kidnapping or sexual intercourse compelled by force or threat of force, in addition to death, great bodily harm, or felony by force, while 503.055 states that individuals may stand their ground when they or other individuals face only death, great bodily harm, or felony by force); Mo. Stat. Ann. § 563.031 (adds defense of unborn child); and Nev. Rev. Stat. Ann. § 200.120 ("necessary self-defense, or in defense of an occupied habitation, an occupied motor vehicle or a person, against one who manifestly intends or endeavors to commit a crime of violence, or against any person or persons who manifestly intend and endeavor, in a violent, riotous, tumultuous or surreptitious manner, to enter the occupied habitation or occupied motor vehicle, of another for the purpose of assaulting or offering personal violence to any person dwelling or being therein"). See also La. Stat. Ann. § 14:20; N.H. Rev. Stat. Ann. §§ 627:4, 627:7; N.D. Ann. Code § 12.1-05-07; Ohio Rev. Code Ann. § 2901.09; S.C. Ann. Code §§ 16-11-440, 16-1-60; S.D. Laws §§ 22-18-4, 22-18-34, 22-18-35; Tex. Penal Code § 9.32.

⁹ Mich. Comp. Laws § 780.972 (sexual assault); N.C. Gen. Stat. Ann. §§ 14-51.3, 51.2 (forcibly entering home, motor vehicle, or workplace or attempting to remove someone from their home, motor vehicle, or workplace); 18 Pa. Cons. Stat. § 505 (kidnapping or sexual intercourse by force or threat).

¹⁰ Iowa, Kansas, Tennessee, and Wisconsin. See Iowa Code Ann. § 704.1; Kan. Stat. Ann. §§ 21-5222, 5223, 5230; Tenn. Ann. Code § 39-11-611; Wisc. Stat. Ann. § 939.48.

¹¹ W. Va. Ann. Code § 55-7-22.

¹² N.D. Ann. Code § 12.1-05-07.

¹³ Ohio Rev. Code Ann. § 2901.09.

¹⁴ Wisc. Stat. Ann. § 939.48.

¹⁵ Iowa Code Ann. § 704.1; Conn. Gen. Stat. Ann. § 53a-20.

Some states exclude specific situations from applying under the stand-your-ground doctrine. In Louisiana, it “shall not apply when the person committing the homicide is engaged, at the time of the homicide, in the acquisition of, the distribution of, or possession of, with intent to distribute a controlled dangerous substance in violation of the provisions of the Uniform Controlled Dangerous Substances Law.”¹⁶ Other policies are broader, excluding any situation where the individual is “actively engaged in conduct in furtherance of criminal activity.”¹⁷

Effects on Suicide

Research Synthesis Findings

Neither the National Research Council (NRC) (2004) nor Hahn et al. (2005) identified any research examining the effects of stand-your-ground laws on suicide. However, we identified one study that met our criteria (Humphreys, Gasparrini, and Wiebe, 2017), although this study’s analysis of the impact of stand-your-ground laws on suicide rates was used as a placebo test (i.e., on the theory that stand-your-ground laws should have no effect on suicides) to support the authors’ primary findings of an effect of the laws on homicide rates.¹⁸

Humphreys, Gasparrini, and Wiebe (2017) examined changes between 1999 and 2014 in Florida’s monthly total and firearm suicide rates before and after the introduction of Florida’s 2005 stand-your-ground law compared with changes over time in these rates in four of the 27 states without stand-your-ground laws at the beginning of the period (New Jersey, New York, Ohio, and Virginia). The paper reported that these were the only states with consistent monthly homicide data. It did not indicate if suicide data were available on a wider set of control states. The authors found uncertain evidence of an effect of the stand-your-ground law on either total or firearm suicides in Florida; they did find a suggestive reduction in control states’ firearm suicide rates after Florida’s stand-your-ground law was passed, but no evidence that this effect was different from the uncertain change in Florida. Their model included no covariates to adjust for other sources of differences between Florida and control states in suicide rates over time, potentially obscuring the effects of the stand-your-ground law in Florida.

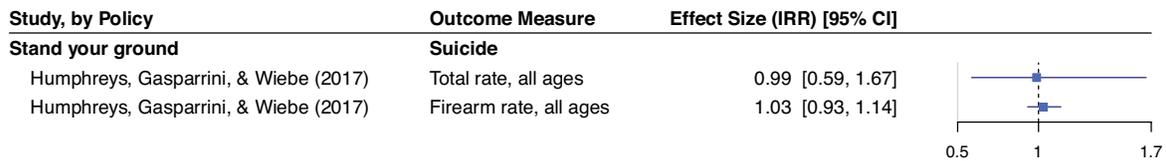
Figure 5.1 displays the incidence rate ratios (IRRs) and confidence intervals (CIs) associated with the stand-your-ground policies examined in Humphreys, Gasparrini, and Wiebe (2017).

¹⁶ La. Stat. Ann. § 14:20.

¹⁷ Nev. Rev. Stat. Ann. § 200.120; Tex. Penal Code § 9.32; Wisc. Stat. Ann. § 939.48.

¹⁸ We identified one additional study that examined the effects of castle-doctrine legislation on the proportion of firearm suicides as a proxy for firearm ownership (Wallace, 2014). However, without simultaneously examining firearm or total suicide rates, this outcome is difficult to interpret as providing a causal effect of stand-your-ground law, so the study did not meet our inclusion criteria.

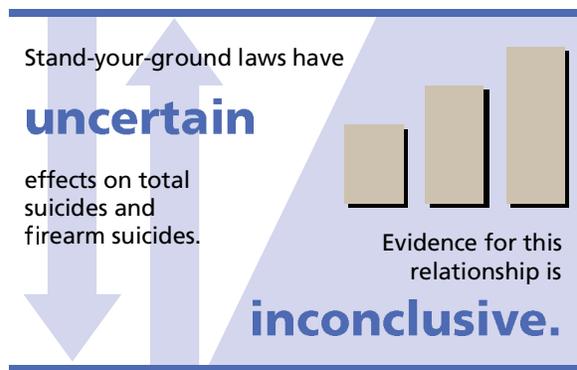
Figure 5.1
Incidence Rate Ratios Associated with the Effect of Stand-Your-Ground Laws on Suicide



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified one qualifying study that estimated the effects of stand-your-ground



laws on total suicides and firearm suicides. The estimates for these effects in Humphreys, Gasparrini, and Wiebe (2017) suggest that such laws have an uncertain effect on both total suicides and firearm suicides. Therefore, available studies provide *inconclusive evidence for the effect of stand-your-ground laws on total suicides and firearm suicides.*

Effects on Violent Crime

Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of stand-your-ground laws on violent crime.

We identified three studies that met our criteria. Cheng and Hoekstra (2013) exploited state and time variation in the passage of stand-your-ground laws using data from 2000 to 2010 to estimate the laws’ effects on homicide rates. The authors defined stand-your-ground laws using a binary variable equal to one for polices that “remove the duty to retreat in some place outside the home” (Cheng and Hoekstra, 2013, p. 825). Controlling for state and year fixed effects, the study explored several model specifications, including additional controls for region-by-year fixed effects, time-varying covariates that account for changes in policing and incarceration rates, and state-specific linear trends. Using negative binomial regression models, they found stand-your-ground laws to be associated with significant increases in homicide rates of 6 to 11 percent, a result that is relatively robust across model specifications. However, given the relatively short time frame studied and large set of controls, the

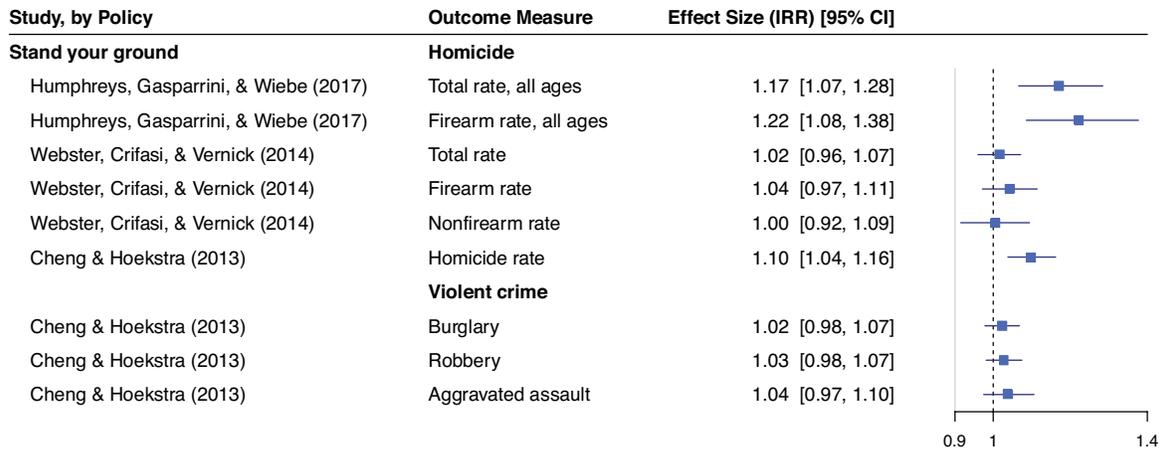
ratio of estimated parameters to observations is less than one to six in specifications that include time-varying covariates, indicating that the model may have been overfit, and thus its estimates and their CIs may be unreliable indicators of the true effect of the law.

Covering a similar period (1999–2010) with state-level data, Webster, Crifasi, and Vernick (2014) analyzed the effects of stand-your-ground laws on age-adjusted homicide rates. Using generalized least-squares regression models, their estimates showed an uncertain association between stand-your-ground laws and homicides rates, firearm homicide rates, and nonfirearm homicide rates. The statistical model used to arrive at these results used a large number of estimated parameters relative to observations (a ratio of about one to eight), meaning the model may have been overfit, and thus its estimates of the laws' effects may not generalize to other implementations of a stand-your-ground law.

Humphreys, Gasparrini, and Wiebe (2017) used segmented quasi-Poisson regression analysis to examine changes between 1999 and 2014 in Florida's monthly homicide rate before and after the introduction of Florida's 2005 stand-your-ground law. They compared these changes in four of the 27 states without stand-your-ground laws at the beginning of the period (New Jersey, New York, Ohio, and Virginia). The paper reported that these were the only states with reliable monthly homicide data. The authors found that the stand-your-ground law increased both total homicides and firearm homicides. Their estimates show that Florida experienced a significant 24-percent increase in total homicides and 32-percent increase in firearm homicides following enactment of the stand-your-ground law in 2005 (see Figure 5.2). The comparison states experienced a statistically insignificant 6-percent increase in total homicides and 8-percent increase in firearm homicides after 2005. The authors' model included no covariates to adjust for other sources of differences between Florida and control states in homicide rates over time, meaning that factors other than the stand-your-ground law cannot be ruled out as the cause of the observed differences between Florida and the control states.

Figure 5.2 displays the IRRs and CIs associated with the stand-your-ground policies examined in these studies.

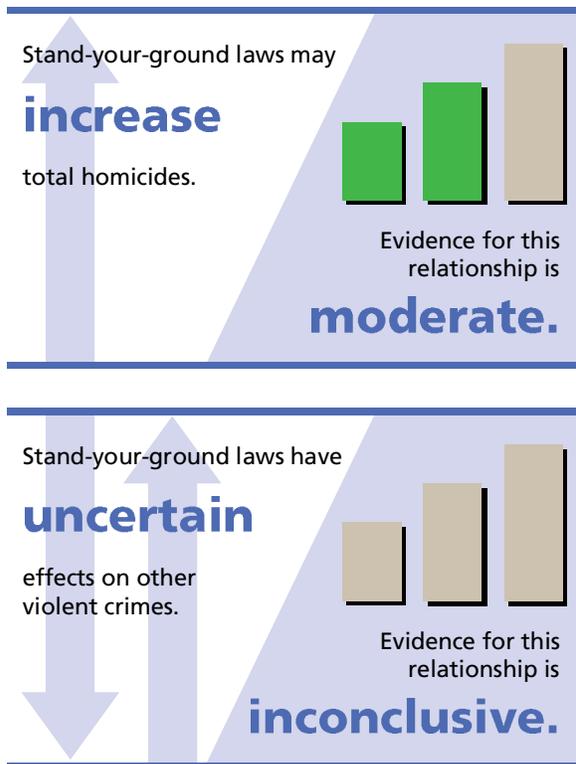
Figure 5.2
Incidence Rate Ratios Associated with the Effect of Stand-Your-Ground Laws on Violent Crime



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

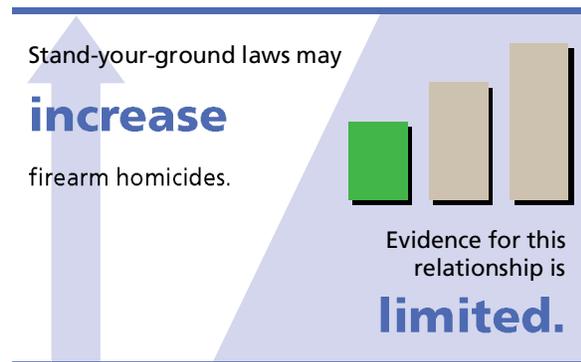
Homicides and other violent crime. We identified three qualifying studies that estimated the effects of stand-your-ground laws on total homicides or other violent crimes. Cheng and Hoekstra (2013) found that these laws significantly increase homicide rates, but they have uncertain effects on robbery, aggravated assault, and burglary rates. Webster, Crifasi, and Vernick (2014) found that these laws have an uncertain effect on the total homicide rate. Finally, Humphreys, Gasparrini, and Wiebe (2017) found significant effects consistent with the law increasing total homicides in Florida after its passage. These studies draw on two distinct data sources: FBI crime-rate data from the Uniform Crime Reports system and the Center for Disease Control and Prevention’s Fatal Injury Reports.



Based on these findings, we conclude that there is *moderate evidence that stand-your-ground laws may*

increase homicide rates but inconclusive evidence for the effect of stand-your ground laws on other types of violent crime.

Firearm homicides. We identified two qualifying studies that estimated the effects of stand-your-ground laws on firearm homicide rates. Webster, Crifasi, and Vernick (2014) found that these laws have uncertain effects on firearm homicides. Humphreys, Gasparrini, and Wiebe (2017) found a significant effect suggesting that after the law's introduction, it increased firearm homicides in Florida. Based on these findings, we conclude that there is *limited evidence that stand-your-ground laws may increase firearm homicides.*



Based on these findings, we conclude that there is *limited evidence that stand-your-ground laws may increase firearm homicides.*

Effects on Defensive Gun Use

Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of stand-your-ground laws on defensive gun use. We identified one such study meeting our inclusion criteria.

Cheng and Hoekstra (2013) exploited state-time variation in the passage of stand-your-ground laws using data from 2000 to 2010 to estimate such laws' effects on justifiable homicides committed by private citizens. The authors defined stand-your-ground laws using a binary variable equal to one for polices that "remove the duty to retreat in some place outside the home" (Cheng and Hoekstra, 2013, p. 825), and data on justifiable homicides were collected from the FBI's supplementary homicide data. Under the FBI's classification in this data set, for a homicide to be considered justifiable, the incident must have occurred in conjunction with other offenses (e.g., the fatal shooting of an armed robber by a storeowner during the commission of the robbery), and those other offenses must have been reported. As noted by the authors, justifiable homicides are likely severely underreported in this data source. Controlling for state and year fixed effects, the study explored several model specifications, including additional controls for region-by-year fixed effects, time-varying covariates that account for changes in policing and incarceration rates, and contemporaneous crime rates. Using negative binomial regression models, they found stand-your-ground laws to be associated with increases in justifiable homicide, ranging from an uncertain 28-percent rise to a significant 57-percent rise depending on the model specification. However, given the relatively short time frame studied and large set of controls, the ratio of estimated parameters to observations is less than one to six in specifications that include time-varying

covariates, indicating that the model may have been overfit, and thus it may yield estimates that are unreliable indicators of the true causal effect of stand-your-ground laws.

Figure 5.3 displays the IRRs and CIs associated with the stand-your-ground policies examined in Cheng and Hoekstra (2013).

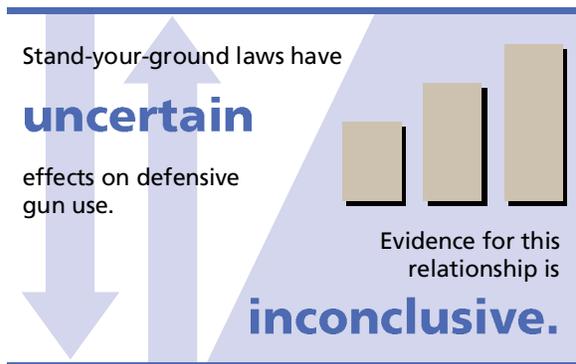
Figure 5.3
Incidence Rate Ratios Associated with the Effect of Stand-Your-Ground Laws on Defensive Gun Use

Study, by Policy	Outcome Measure	Effect Size (IRR) [95% CI]
Stand your ground laws		
Cheng & Hoekstra (2013)	Justifiable homicide	1.33 [0.84, 2.10]

NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified one study that estimated the effects of stand-your-ground laws on justifiable homicides, which is an imperfect measure of the rate of defensive gun use. In their



specification that accounts for how justifiable homicides are counted and controls for time-varying state characteristics, Cheng and Hoekstra (2013) found that the effect of the law on this outcome is uncertain. Therefore, we find *inconclusive evidence for the effect of stand-your-ground laws on defensive gun use.*

Outcomes Without Studies Examining the Effects of Stand-Your-Ground Laws

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of stand-your-ground laws on the following outcomes, and we identified no such studies that met our inclusion criteria:

- unintentional injuries and deaths
- mass shootings
- officer-involved shootings
- hunting and recreation
- gun industry.

Chapter Five References

Cheng, Cheng, and Mark Hoekstra, “Does Strengthening Self-Defense Law Deter Crime or Escalate Violence? Evidence from Expansions to Castle Doctrine,” *Journal of Human Resources*, Vol. 48, No. 3, 2013, pp. 821–853.

Everytown for Gun Safety Support Fund, *Shoot First: “Stand Your Ground” Laws and Their Effect on Violent Crime and the Criminal Justice System*, New York, 2013.

Giffords Law Center to Prevent Gun Violence, “‘Stand Your Ground’ Laws,” web page, undated-e. As of October 18, 2017:

<http://lawcenter.giffords.org/gun-laws/policy-areas/guns-in-public/stand-your-ground-laws/>

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, “Firearms Laws and the Reduction of Violence: A Systematic Review,” *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Humphreys, David K., Antonio Gasparini, and Douglas J. Wiebe, “Evaluating the Impact of Florida’s ‘Stand Your Ground’ Self-Defense Law on Homicide and Suicide by Firearm: An Interrupted Time Series Study,” *JAMA Internal Medicine*, Vol. 177, No. 1, 2017, pp. 44–50.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Wallace, Lacey N., “Castle Doctrine Legislation: Unintended Effects for Gun Ownership?” *Justice Policy Journal*, Vol. 11, No. 2, Fall 2014.

Webster, D., C. K. Crifasi, and J. S. Vernick, “Effects of the Repeal of Missouri’s Handgun Purchaser Licensing Law on Homicides,” *Journal of Urban Health*, Vol. 91, No. 2, 2014, pp. 293–302.

CHAPTER SIX

Prohibitions Associated with Mental Illness

Federal law prohibits the possession or purchase of firearms by certain individuals who have been adjudicated as mentally ill (18 U.S.C. 922).¹ The number of people covered by that exclusion is not known. An estimated 44 million adults in the United States have some form of *mental illness*, defined as any “diagnosable mental, behavioral, or emotional disorder, other than a developmental or substance use disorder” (Substance Abuse and Mental Health Services Administration, 2016). Of these adults, approximately 10 million suffer from a “serious mental illness” that results in substantial impairment in carrying out major life activities. Existing laws that prohibit those with mental health conditions from accessing firearms affect a subset of individuals who likely fall into the “serious mental illness” category. Expanding such prohibitions has the potential to affect a much larger subset of individuals who fall within the “any mental illness” category, although broadening the scope of mental health restrictions poses technological, coordination, and legal (i.e., privacy) challenges (Liu et al., 2013).

If individuals with mental illness present a higher violence risk to themselves or others compared with those without mental illness, then restricting their access to firearms should reduce suicides or homicides. The magnitude of these effects will depend primarily on the reliability of the screening process instituted to identify disqualifying mental health conditions, the size of the marginal population affected by the expanded prohibitions, and the likelihood of individuals in that population committing harm to others or to themselves.

Epidemiological evidence suggests that a diagnosis of mental illness alone has little relation to risk of interpersonal violence (Swanson et al., 2015); in particular, studies estimate that between 2 percent and 4 percent of all violent behavior may be attributable to mental illness (Corrigan and Watson, 2005; Swanson, 1994). One study found that among a sample of convicted murderers in Indiana, perpetrators with serious mental illness were significantly less likely to have used a firearm compared with other perpetrators (Matejkowski et al., 2014). A study of 82,000 individuals with mental illness in Florida showed that the arrest rate for violent crimes involving a firearm

¹ The Gun Control Act of 1968 prohibited the sale of firearms to any person who has been “adjudicated as a mental defective or has been committed to any mental institution” (Pub. L. 90-618).

was the same among the study population as the estimated general population rate—approximately 215 arrests per 100,000 people (Swanson et al., 2016). Elevated rates of violence tend to be reported for involuntarily committed patients (Choe, Teplin, and Abram, 2008), but this population is already barred from acquiring firearms through existing federal mental health–related prohibitions. Overall, between 2001 and 2010, less than 5 percent of the 120,000 firearm-related homicides in the United States were committed by individuals diagnosed with a mental illness (Metzl and MacLeish, 2015), suggesting that expanded prohibitions based on mental health status may not have a large effect on firearm crimes.

Although media coverage often links mass shootings with serious mental illness (McGinty et al., 2014), an analysis of 133 mass shooting events between 2009 and 2015 (Everytown for Gun Safety Support Fund, 2017b) reported that in only one incident (0.8 percent) did the perpetrator have a history of mental illness that prohibited purchase of a firearm from a federally licensed dealer; however, formal concerns about the mental health of the perpetrator had been previously expressed for 15 cases (11.3 percent), and informal concerns about the shooter’s mental health had been previously expressed for 13 additional cases (9.8 percent). Although public mass shooters are more likely to have a psychotic disorder compared with perpetrators of multiple-victim shootings related to familicide or profit-motivation, the prevalence of severe mental illness among this subgroup is still quite low (Fox and Levin, 2015). Counting less-severe forms of mental illness, Follman, Aronsen, and Pan (2017) found that 50 of the 90 public mass shootings between 1982 and 2017 that were identified by *Mother Jones* magazine involved a shooter with a history of possible mental health problems.

At the same time, research indicates that individuals with mental disorders are more likely to be victims than perpetrators of violence (Desmarais et al., 2014). One study of persons with severe mental illness (in treatment at mental health agencies in Chicago) found that their annual exposure to violent crime victimization was more than four times higher than rates in the general population (Teplin et al., 2005). Another meta-analysis produced similar results, finding the prevalence of violent victimization among individuals with mental illness to be 24 percent (with estimates of the reviewed studies ranging from 7 percent to 63 percent) (Hughes et al., 2012). Extrapolating this estimate to the national population of individuals with serious mental illness in 2015 would suggest that approximately 2.3 million individuals with serious mental illness are victims of violent crime each year; however, this is likely an overestimate because most studies sampled individuals who were receiving inpatient or outpatient treatment for diagnosed psychiatric illnesses or focused on severe mental illnesses (such as schizophrenia) (Hughes et al., 2012). For instance, while the National Crime Victimization Survey (NCVS) does not collect information on mental health directly, NCVS estimates suggest that there are about 780,000 cases annually of violent crime against individuals with cognitive disabilities (defined as serious difficulty in concentrating, remembering, or making decisions because of a physical, mental, or emotional condi-

tion) (Harrell, 2017). Therefore, expanding the class of prohibited possessors to include more people with severe mental illness may lead to additional victimization because those people have reduced opportunities for defensive gun use. At the same time, such an expansion may decrease violent crime, mass shootings, and suicides carried out by this population.

Indeed, evidence supports that expanding prohibitions associated with mental illness may have larger effects in reducing rates of firearm suicides. Research has demonstrated a strong link between mental illness and suicide; it is estimated that between 47 percent and 74 percent of suicides are attributed to mental disorders (Li et al., 2011; Cavanagh et al., 2003). A study of 82,000 individuals with mental illness in Florida found that suicide was nearly four times as prevalent among this subpopulation compared with the general population, but firearms were half as likely to be used as a means of suicide; in more than 70 percent of these firearm suicide cases, the individual's mental health condition did not prohibit him or her from obtaining a firearm legally (Swanson et al., 2016).

To assess the effects of expanded mental health–related prohibitions, the ideal data would distinguish outcomes between those who are affected by the expanded prohibitions and those who are not. This type of analysis would necessitate a detailed database containing rich information on the mental health conditions of perpetrators of crime or victims of suicide. Because an individual's medical records are private, it may be particularly difficult to identify firearm-involved crime incidents in which the perpetrator was a prohibited possessor because of mental illness. Given these data challenges, as well as wide variation across states in mental health disqualifiers and inconsistencies in reporting, it is not surprising that we identified no studies meeting our inclusion criteria that estimated the effects of expanded prohibitions associated with mental illness. Nevertheless, three studies reviewed in Chapter Three (on background checks) examined the effect of implementing the Brady Handgun Violence Prevention Act (the Brady Act) checks on certain mentally ill people. Implementation of this law had the effect of expanding the class of mentally ill people who could not purchase a firearm, so we review those studies in this chapter as well.

State Implementation of Prohibitions Associated with Mental Illness

The District of Columbia and 33 states have laws restricting access to firearms by individuals with mental illness. Although the laws may use different language,² many

² For example, Alabama prohibits “anyone of unsound mind” from owning, possessing, or controlling a firearm and defines *unsound mind* as anyone

(1) Found by a court, board, commission, or other lawful authority that, as a result of marked subnormal intelligence, mental illness, incompetency, condition, or disease, is a danger to himself or herself or others or lacks the mental capacity to contract or manage his or her own affairs; . . . [or] (3) Involuntarily committed for a

states have basically adopted the same standards as the federal Brady Act, which went into effect in 1994.³

In other cases, states have narrower prohibitions than found in the Brady Act. For example, several states prohibit firearm possession by only those committed to psychiatric institutions, not those adjudicated as mentally incompetent.⁴ In some states, such as Missouri, only those adjudicated as mentally incompetent are prohibited.⁵ In Michigan and North Carolina, the prohibition applies only to handguns.⁶ Oklahoma and Tennessee prohibit only the transfer of firearms to these prohibited individuals, but the laws are silent on whether such individuals may possess a firearm.⁷

In contrast, California, Connecticut, Illinois, Maryland, and the District of Columbia have expanded the Brady Act prohibitions to include individuals who have been voluntarily admitted into psychiatric hospitals.⁸ Hawaii has extended the prohibition to those diagnosed with “significant” mental disorders, and California, Connecticut, Illinois, and Maryland have widened the class of prohibited possessors in other ways.⁹

final commitment for inpatient treatment to the Department of Mental Health or a Veterans’ Administration hospital by a court after a hearing. (Ala. Code § 13A-11-72)

Alabama also includes individuals who have been “found to be insane, [found to be] not guilty by reason of mental disease or defect, found mentally incompetent to stand trial, or found not guilty by reason of a lack of mental responsibility.” The Center to Prevent Gun Violence considers these restrictions separately, and we agree.

³ Alabama, Arkansas, California, Florida, Nevada, New York, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Utah, Virginia, West Virginia, and Wyoming. See Ala. Code § 13A-11-72; Ark. Code Ann. § 5-73-103; Calif. Welf. and Inst. Code §§ 8100, 8103; Fla. Stat. Ann. § 790.065; Nev. Rev. Stat. Ann. § 202.360; N.Y. Penal Law §§ 265.00, 400, N.Y. Mental Hygiene Law § 9.46; Ohio Rev. Code Ann § 2923.13; Ore. Rev. Stat. Ann. §§ 166.250, 426.130; 18 Pa. Cons. Stat. § 6105; R.I. Gen. Laws. § 11-47-6; S.C. Ann. Code § 23-31-1040; Utah Code Ann. § 76-10-503; Va. Ann. Code § 18.2-308.1:2; W. Va. Ann. Code § 61-7-7; Wyo. Stat. Ann. § 6-8-404.

⁴ Arizona, Connecticut, Delaware, Hawaii, Kansas, Maine, Maryland, Massachusetts, Minnesota, New Jersey, North Dakota, Washington, Wisconsin, and the District of Columbia. See Ariz. Rev. Stat Ann. §§ 13-3101, 13-3102, 36-540; Conn. Gen. Stat. § 53a-217; Del. Code Ann. Tit. 11 § 1448; Hawaii Rev. Stat. Ann. § 134-7; Kan. Stat. Ann. §§ 21-6301, 59-2946; Me. Rev. Stat. Ann. § 393; Md. Ann. Code § 5-133; Mass. Gen. Laws Ann. § 129B; Minn. Stat. Ann. § 624.713; N.J. Stat. Ann. § 2C:39-7; N.D. Cent. Code § 62.1-02-01; Wash. Rev. Code § 941.040; Wisc. Stat. §§ 941.29, 51.20, 54.10; D.C. Ann. Code § 7-2502.03.

⁵ Mo. Stat. Ann. § 571.070.

⁶ Mich. Comp. Laws. Ann. § 28.422; N.C. Gen. Stat. Ann. § 140-402. Furthermore, in Michigan, the prohibition applies only to those committed to psychiatric institutions.

⁷ Okla. Stat. Ann. § 1289.10; Tenn. Code Ann. § 39-17-1316.

⁸ Calif. Welf. and Inst. Code § 8100 (while voluntarily in treatment for being a threat to themselves or others); Conn. Gen. Stat. Ann. § 53a-217 (admitted within previous six months); 430 Ill. Comp. Stat 65/1.1, 65/8 (admitted within past five years), 405 Ill. Comp. Stat. 5/6-103.1; Md. Ann. Code § 5-133 (admitted for more than 30 consecutive days); D.C. Code Ann. § 7-2502.03 (admitted within past five years).

⁹ In Hawaii, possession is prohibited by those “diagnosed as having a significant behavioral, emotional, or mental disorder” (Hawaii Rev. Stat. Ann. § 134-7). California has a long list of disqualifiers, including threats

Arizona, Oregon, Pennsylvania, and Virginia have also extended the mental health–related prohibitions to individuals ordered to attend outpatient treatment.¹⁰ New York extended the prohibitions to individuals who were committed for inpatient treatment.¹¹

Effects on Suicide

Research Synthesis Findings

Neither the National Research Council (NRC) (2004) nor Hahn et al. (2005) identified any research examining the effects of mental health–related prohibitions on suicide. Using state-level data from 1996 to 2005, Sen and Panjamapirom (2012) assessed how different *types* of background checks conducted by states affect suicides. They noted that there is substantial variation in state laws regarding which mental health records must be considered in background checks. The authors characterized variation in whether states can examine relevant mental illness records as part of the background check process. Their regression models included state-level covariates, a lagged outcome variable, and fixed effects for year and census subregion.

Sen and Panjamapirom (2012) found that, compared with states with background checks that investigate only criminal history, checks of mental health records were associated with significantly lower firearm suicide and total suicide rates. Their estimates suggest that after implementing a state check on mental health records, the firearm suicide rate was 96 percent of the expected rate had this policy not been in effect, and the total suicide rate was 97 percent of the expected rate.

Swanson et al. (2016) evaluated how changes in state reporting of gun-disqualifying mental health records to the Federal Bureau of Investigation’s National Instant Criminal Background Check System (NICS) database affected suicide rates among individuals in Florida with a disqualifying mental health condition relative to individuals diagnosed with a serious mental health illness but not prohibited from purchasing a firearm. They found no significant difference between suicide rates before and after implementing expanded NICS reporting for the two groups.

of physical violence, various lengths of detention, and court-ordered evaluation and counseling (Calif. Welf. and Inst. Code §§ 8100, 8103, 5200-5213). Maryland restricts possession from any person who “suffers from a mental disorder . . . and has a history of violent behavior against the person or another” (Md. Ann. Code § 5-133), and Illinois and Connecticut restrict possession from those who threaten violence or demonstrate threatening behavior (430 Ill. Comp. Stat 65/1.1; Conn. Gen. Stat. Ann. § 53a-217).

¹⁰ Ariz. Rev. Stat §§ 36-540(A)(1), 13-3101(A)(7); Ore. Rev. Stat. §§ 166.250(1)(c)(D), 426.133; 18 Pa. Cons. Stat. § 6105; Va. Code. Ann. § 18.2-308.1:3(A).

¹¹ N.Y. Penal Law § 400.001(1), N.Y. Ment. Hyg. Law § 9.27.

Figure 6.1 displays the incidence rate ratios (IRRs) and confidence intervals (CIs) associated with the mental health–related prohibition policies examined in Sen and Panjamapirom (2012). Swanson et al. (2016) did not provide effect estimates or test statistics, so we do not include effect sizes for this study in the figure.

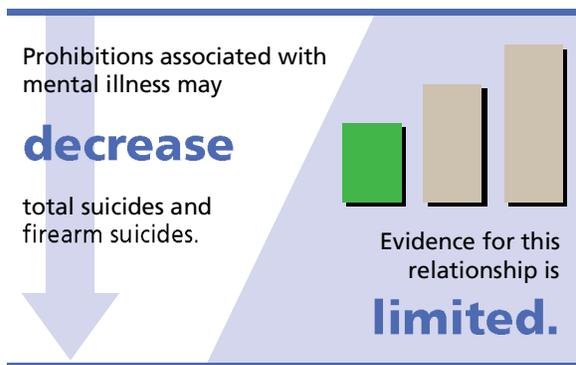
Figure 6.1
Incidence Rate Ratios Associated with the Effect of Mental Health–Related Prohibitions on Suicide

Study, by Policy	Outcome Measure	Effect Size (IRR) [95% CI]
Check on mental illness		
Suicide		
Sen & Panjamapirom (2012)	Total	0.97 [0.95, 0.99]
Sen & Panjamapirom (2012)	Firearm	0.96 [0.92, 0.99]

NOTE: IRR values marked with green circles indicate that we identified no significant methodological concerns. See Appendix B for details.

Conclusions

One study found evidence that when states check mental health records as part of the firearm background check process, their rates of firearm suicide and total suicide are reduced by a few percentage points. This study did not examine the effect of expanding mental health–related prohibitions beyond those in federal law. Instead, it examined how improved compliance with existing federal law concerning mental health checks affects suicide rates. Because improved compliance has the effect of prohibiting gun purchases by some with mental health conditions who would not previously have been prevented from purchasing a weapon, this study provides limited



evidence that prohibitions associated with mental illness can reduce total suicides and firearm suicides. A second study reported finding no effect of implementing NICS mental health–related prohibitions on suicide but did not provide detailed results.

Based on these results, we conclude that there is *limited evidence that some state or federal laws prohibiting those with a mental illness from buying a gun reduce total suicide rates and firearm suicide rates.*

Based on these results, we conclude that there is *limited evidence that some state or federal laws prohibiting those with a mental illness from buying a gun reduce total suicide rates and firearm suicide rates.*

Effects on Violent Crime

Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of mental health–related prohibitions on suicide. Since 2003, three studies examined the effects of implementing background checks for individuals prohibited from purchasing or possessing firearms because of a mental illness. Using state-level data from 1996 to 2005, Sen and Panjamapirom (2012) assessed how different *types* of background checks conducted by states affect total homicides and firearm homicides. They noted that there is substantial variation in state laws regarding which mental health records must be considered in background checks. The authors characterized variation in whether states can examine relevant mental illness records as part of the background check process. Their regression models included state-level covariates, a lagged outcome variable, and fixed effects for year and census subregion.

Sen and Panjamapirom (2012) found that, compared with background checks that examine only criminal history, background checks that include mental illness records are associated with fewer total homicides and firearm homicides. However, only the reductions for total homicides reached conventional levels of statistical significance, and estimates for firearm homicides were suggestive. The authors found that, after implementation of state background checks that included mental illness records, firearm homicide rates declined to 93 percent of the level that would otherwise be expected (see Figure 6.2).

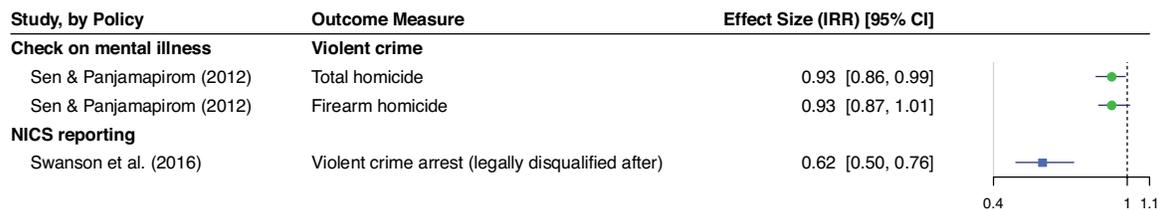
Swanson et al. (2013, 2016) merged administrative records from public health and criminal justice agencies to evaluate how changes in state reporting of gun-disqualifying mental health records to the NICS database affected violent crime arrest rates for individuals with a disqualifying mental health condition relative to individuals diagnosed with a serious mental health illness but not prohibited from purchasing a firearm. Swanson et al. (2013) obtained data from 2002 to 2009 for individuals in Connecticut who had been hospitalized for schizophrenia, bipolar disorder, or major depressive disorder. The authors estimated changes in violent crime arrests for individuals with at least one of the mental health adjudications reported to the NICS before and after Connecticut began reporting mental health records in 2007. The authors found a 31-percent decline in the probability of violent crime arrest in their sample of individuals who had a mental health adjudication but no disqualifying criminal conviction. For comparison, the authors also estimated the likelihood of violent crime arrest for individuals with at least one voluntary psychiatric hospitalization but no mental health adjudication (i.e., individuals with serious mental health problems who were not prohibited from purchasing firearms). Relative to the legally disqualified population, the nondisqualified group had lower rates of arrest both before and after the NICS reporting change, but the magnitude of the decrease following NICS reporting was smaller than the reduction seen in the “treated” group with a disqualifying condi-

tion. However, no statistical tests were provided to demonstrate that the difference was statistically significant.

Using data from 2002 to 2011, Swanson et al. (2016) employed analogous methods to analyze the effects of NICS reporting changes in 2007 for two Florida counties. The authors similarly found a larger reduction in violent crime arrest rates for individuals with a disqualifying mental health condition relative to individuals with a serious mental health illness that did not legally prohibit firearm acquisition. This difference, a relative decline of 38 percent (see Figure 6.2), was statistically significant. However, estimates became insignificant when the outcome variable was restricted specifically to violent crimes involving firearms, which could indicate the absence of a causal connection or could be due to measurement error in classifying crimes as involving firearms (Swanson et al., 2016).

Figure 6.2 displays the IRRs and CIs associated with the mental health–related prohibition policies examined in these studies. Swanson et al. (2013) did not provide enough information for us to calculate IRRs and CIs for the effect size of interest, so we do not include these in the figure. The Swanson et al. (2016) estimate is the change from before and after the NICS reporting requirements for legally disqualified individuals relative to the change for nonlegally disqualified individuals.

Figure 6.2
Incidence Rate Ratios Associated with the Effect of Mental Health–Related Prohibitions on Violent Crime

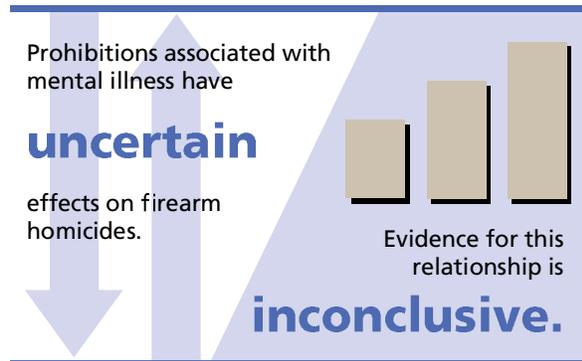
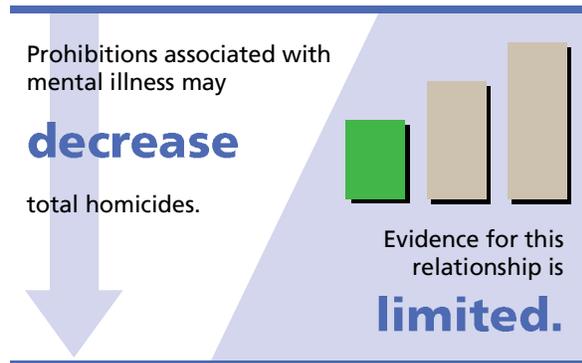
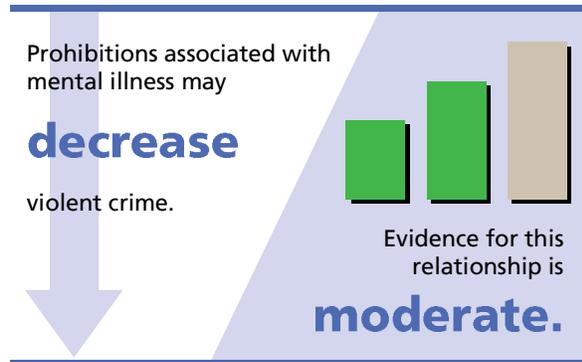


NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details.

Conclusions

We identified two qualifying studies that estimated how laws prohibiting gun purchases by those with a mental illness affect violent crime or homicides. Sen and Panjamapirom (2012) found that procedures to enforce state and federal mental health–related prohibitions significantly reduced total homicides. They also found a suggestive effect consistent with these procedures reducing firearm homicides. Swanson et al. (2016) found that enforcement of such federal prohibitions significantly decreased arrests for violent crime offenses in Florida among the targeted population relative to individuals without a disqualifying mental health adjudication.

Based on these results, we conclude that there is *moderate evidence that some state or federal mental health–related prohibitions on gun ownership reduce violent crime generally and limited evidence that these prohibitions reduce total homicide rates in particular. Evidence for the effect of these prohibitions on firearm homicides is inconclusive.*



Outcomes Without Studies Examining the Effects of Prohibitions Associated with Mental Illness

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of mental health–related prohibitions on the following outcomes, and we identified no such studies that met our inclusion criteria:¹²

- unintentional injuries and deaths
- mass shootings
- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

¹² Sen and Panjamapirom (2012) examined whether state-level mental health records or data were available for conducting background checks, not which mental health–related prohibitions states impose.

Chapter Six References

- Cavanagh, J. T., A. J. Carson, M. Sharpe, and S. M. Lawrie, "Psychological Autopsy Studies of Suicide: A Systematic Review," *Psychological Medicine*, Vol. 33, 2003, pp. 395–405.
- Choe, J. Y., L. A. Teplin, and K. M. Abram, "Perpetration of Violence, Violent Victimization, and Severe Mental Illness: Balancing Public Health Outcomes," *Psychiatric Services*, Vol. 59, No. 2, 2008, pp. 153–164.
- Corrigan, P. W., and A. C. Watson, "Findings from the National Comorbidity Survey on the Frequency of Violent Behavior in Individuals with Psychiatric Disorders," *Psychiatry Research*, Vol. 136, 2005, pp. 153–162.
- Desmarais, S. L., R. A. Van Dorn, K. L. Johnson, K. J. Grimm, K. S. Douglas, and M. S. Swartz, "Community Violence Perpetration and Victimization Among Adults with Mental Illness," *American Journal of Public Health*, Vol. 104, 2014, pp. 2342–2349.
- Everytown for Gun Safety Support Fund, "Mass Shootings in the United States: 2009–2016," April 11, 2017b. As of May 3, 2017:
<http://everytownresearch.org/reports/mass-shootings-analysis/>
- Follman, Mark, Gavin Aronsen, and Deanna Pan, "U.S. Mass Shootings, 1982–2017: Data from *Mother Jones*' Investigation," *Mother Jones*, June 14, 2017. As of August 25, 2017:
<http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data/>
- Fox, James A., and Jack Levin, *Extreme Killing: Understanding Serial and Mass Murder*, 3rd ed., Thousand Oaks, Calif.: Sage Publications, 2015.
- Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.
- Harrell, Erika, *Crime Against Persons with Disabilities, 2009–2015—Statistical Tables*, Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics, NCJ 250632, 2017.
- Hughes, Karen, Mark A. Bellis, Lisa Jones, Sara Wood, Geoff Bates, Lindsay Eckley, Ellie McCoy, Christopher Mikton, Tom Shakespeare, and Alana Officer, "Prevalence and Risk of Violence Against Adults with Disabilities: A Systematic Review and Meta-Analysis of Observational Studies," *Lancet*, Vol. 379, 2012, pp. 1621–1629.
- Li, Z., A. Page, G. Martin, and R. Taylor, "Attributable Risk of Psychiatric and Socio-Economic Factors for Suicide from Individual-Level, Population-Based Studies: A Systematic Review," *Social Science and Medicine*, Vol. 72, No. 4, 2011, pp. 608–616.
- Liu, E. C., E. Bagalman, V. S. Chu, and C. S. Redhead, *Submission of Mental Health Records to the NICS and the HIPAA Privacy Rule*, Washington, D.C.: Congressional Research Service, R43040, 2013.
- Matejkowski, J., J. Fairfax-Columbo, S. W. Cullen, S. C. Marcus, and P. L. Solomon, "Exploring the Potential of Stricter Gun Restrictions for People with Serious Mental Illness to Reduce Homicide in the United States," *Journal of Forensic Psychiatry and Psychology*, Vol. 25, No. 3, 2014, pp. 362–369.
- McGinty, E. E., D. W. Webster, M. Jarlenski, and C. L. Barry, "News Media Framing of Serious Mental Illness and Gun Violence in the United States," *American Journal of Public Health*, Vol. 104, No. 3, 2014, pp. 406–413.
- Metzl, J. M., and K. T. MacLeish, "Mental Illness, Mass Shootings, and the Politics of American Firearms," *American Journal of Public Health*, Vol. 105, No. 2, 2015, pp. 240–249.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Public Law 90-618, Gun Control Act of 1968, October 22, 1968.

Sen, B., and A. Panjamapirom, “State Background Checks for Gun Purchase and Firearm Deaths: An Exploratory Study,” *Preventive Medicine*, Vol. 55, No. 4, 2012, pp. 346–350.

Substance Abuse and Mental Health Services Administration, *Results from the 2013 National Survey on Drug Use and Mental Health: Mental Health Detailed Tables*, Rockville, Md., 2016. As of May 9, 2017:

<https://www.samhsa.gov/data/sites/default/files/2013MHDetTabs/NSDUH-MHDetTabs2013.pdf>

Swanson, Jeffrey W., “Mental Disorder, Substance Abuse, and Community Violence: An Epidemiological Approach,” in J. Monahan and H. Steadman, eds., *Violence and Mental Disorder*, Chicago, Ill.: University of Chicago Press, 1994, pp. 101–136.

Swanson, Jeffrey W., Michele M. Easter, Allison G. Robertson, Marvin S. Swartz, Kelly Alanis-Hirsch, Daniel Moseley, Charles Dion, and John Petrila, “Gun Violence, Mental Illness, and Laws That Prohibit Gun Possession: Evidence from Two Florida Counties,” *Health Affairs*, Vol. 35, No. 6, 2016, pp. 1067–1075.

Swanson, J. W., E. E. McGinty, S. Fazel, and V. M. Mays, “Mental Illness and Reduction of Gun Violence and Suicide: Bringing Epidemiologic Research to Policy,” *Annals of Epidemiology*, Vol. 25, No. 5, 2015, pp. 366–376.

Teplin, L. A., G. M. McClelland, K. M. Abram, and D. A. Weiner, “Crime Victimization in Adults with Severe Mental Illness: Comparison with the National Crime Victimization Survey,” *Archives of General Psychiatry*, Vol. 62, No. 8, 2005, pp. 911–921.

United States Code, Title 18, Section 922, Unlawful Acts.

CHAPTER SEVEN

Lost or Stolen Firearm Reporting Requirements

Federal law requires licensed firearm dealers to report lost or stolen guns to local authorities or the U.S. Attorney General within 48 hours (18 U.S.C. 923). There is no federal law requiring individuals to report lost or stolen firearms.

In 2015, federally licensed firearm dealers reported 14,800 firearms as lost or stolen (Bureau of Alcohol, Tobacco, Firearms and Explosives [ATF], 2016a). Quantifying the number of firearms lost or stolen from private citizens is more challenging, but based on data from ATF, 173,675 firearms were reported lost or stolen from non-federal firearm licensee entities and private citizens in 2012 (ATF, 2013). Using an alternative data source, another study estimated that about 233,000 guns were stolen annually during household property crimes between 2005 and 2010, and about four out of five firearms stolen were not recovered (Langton, 2012). Data from police departments in 14 American cities suggest that the number of guns reported lost or stolen in 2014 varies from 17 in San Francisco to 364 in Las Vegas (Everytown for Gun Safety Support Fund, 2016). A recent national survey (Hemenway, Azrael, and Miller, 2017) estimates that 2.4 percent of American gun owners had at least one gun stolen in the past five years and that the average number of guns stolen per person was 1.5. The authors use these data to estimate that 380,000 guns were stolen per year.

Laws requiring gun owners to report lost or stolen firearms are intended to help prevent gun trafficking and straw purchases (in which a lawful buyer makes the purchase on the behalf of a prohibited buyer) and to help ensure that prohibited possessors are disarmed. Data collected from ATF trafficking investigations covering 1999 to 2002 showed that 6.6 percent (7,758 of 117,138) of diverted firearms were stolen from a residence or vehicle (Braga et al., 2012).

There are several plausible mechanisms through which these policies might reduce criminal use or trafficking of firearms. First, reporting requirements might encourage private gun owners to take steps that decrease the ease with which their firearms might be lost or stolen. Second, reporting requirements could deter some straw purchasers who are reluctant to report as stolen the guns they have diverted to prohibited possessors but who also fear that failure to report transferred guns as stolen could leave them accountable for explaining how their guns later turned up at crime scenes. Third, timelier reporting of gun losses or thefts may aid law enforce-

ment gun-tracing efforts and increase criminal prosecutions of illegal users or traffickers of stolen firearms, potentially reducing the stock of firearms among prohibited possessors. However, required reporting policies could have the unintended effect of discouraging individuals from reporting lost or stolen weapons in order to avoid legal penalties from failing to report loss or theft within a certain number of days. Thus, to estimate how requirements for reporting lost or stolen firearms affect such outcomes as violent crime, we might first examine to what extent such policies affect gun owners' reporting and storage behavior.

To assess whether required reporting of lost or stolen guns reduces violent crime by disrupting illegal firearm trafficking, causal inference could be strengthened by examining crime gun trace data,¹ as well as changes in homicide or violent crime rates. Specifically, if these laws restrict trafficking operations from in-state sources, one should observe a larger share of crime guns originating from out-of-state sources after law passage, as well as a reduction in guns with a short time-to-crime (Webster and Wintemute, 2015; Braga et al., 2012).² However, a series of provisions attached to ATF appropriations (commonly known as the Tiahrt Amendments) has denied most researchers access to firearm trace data since 2003, making it currently infeasible to conduct this type of analysis (Krouse, 2009).

Requiring gun owners to report lost or stolen firearms is unlikely to have measurable effects on such outcomes as suicide, unintentional injuries and death, defensive gun use, or hunting and recreation. If the requirements successfully discouraged straw purchases, it could have a small effect on firearm sales.

State Implementation of Lost or Stolen Firearm Reporting Requirements

A minority of states require firearm owners to report to law enforcement when their weapons are lost or stolen. California,³ Connecticut,⁴ Delaware,⁵ Illinois,⁶

¹ The Bureau of Alcohol, Tobacco, and Firearms (2002, p. A-3) defined *crime gun* as “any firearm that is illegally possessed, used in a crime, or suspected to have been used in a crime. An abandoned firearm may also be categorized as a crime gun if it is suspected it was used in a crime or illegally possessed.”

² Per Webster and Wintemute (2015), the metric known as *time-to-crime* is the “unusually short interval—ranging from less than 1 year to less than 3 years—between a gun’s retail sale and its subsequent recovery by police from criminal suspects or crime scenes A short [time-to-crime] is considered an indicator of diversion, especially when the criminal possessor is someone different from the purchaser of record.”

³ Calif. Penal Code § 25250 (within five days).

⁴ Conn. Gen. Stat. § 53-202g (report within 72 hours).

⁵ Del. Code tit. 11 § 1461 (report within seven days).

⁶ 720 Ill. Comp. Stat. 5/24-4.1 (report within 72 hours).

Massachusetts,⁷ New Jersey,⁸ New York,⁹ Ohio,¹⁰ Rhode Island,¹¹ and the District of Columbia¹² require individuals to report the loss or theft of all firearms. Maryland requires the reporting of loss or theft of handguns and assault weapons,¹³ and Michigan requires the reporting of thefts, but not loss, of all firearms.¹⁴

Outcomes Without Studies Examining the Effects of Lost or Stolen Firearm Reporting Requirements

Neither the National Research Council (2004) nor Hahn et al. (2005) identified any research examining the relationship between required reporting of lost or stolen firearms and the following outcomes, and we identified no such studies that met our inclusion criteria:

- suicide
- violent crimes
- unintentional injuries and deaths
- mass shootings
- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

⁷ Mass. Gen. Laws Ch. 140 § 129C.

⁸ N.J. Stat. Ann. § 2C:58-19 (within 36 hours).

⁹ N.Y. Penal Law § 400.10 (within 24 hours).

¹⁰ Ohio Rev. Code § 923.20.

¹¹ R.I. Gen. Laws § 11-47-48.1 (within 24 hours).

¹² D.C. Code Ann. § 7-2502.08.

¹³ Md. Ann. Code § 5-146 (within 72 hours).

¹⁴ Mich. Comp. Laws § 28.430 (within five days).

Chapter Seven References

ATF—See Bureau of Alcohol, Tobacco, Firearms and Explosives.

Braga, Anthony A., Garen J. Wintemute, Glenn L. Pierce, Philip J. Cook, and Greg Ridgeway, “Interpreting the Empirical Evidence on Illegal Gun Market Dynamics,” *Journal of Urban Health*, Vol. 89, No. 5, 2012, pp. 779–793.

Bureau of Alcohol, Tobacco, and Firearms, *Crime Gun Trace Reports (2000): Memphis, Tennessee*, Washington, D.C.: U.S. Department of the Treasury, July 2002.

Bureau of Alcohol, Tobacco, Firearms and Explosives, *2012 Summary: Firearms Reported Lost and Stolen*, Washington, D.C.: U.S. Department of Justice, 2013. As of May 9, 2017:

<https://www.atf.gov/resource-center/docs/2012-firearms-reported-lost-and-stolenpdf-1/download>

———, *FFL Thefts/Losses: January 1, 2015–December 31, 2015*, Washington, D.C.: U.S. Department of Justice, 2016a. As of May 9, 2017:

<https://www.atf.gov/firearms/docs/report/2015-summary-firearms-reported-lost-and-stolen/download>

Everytown for Gun Safety Support Fund, *Strategies for Reducing Gun Violence in American Cities*, June 2016. As of May 3, 2017:

<https://everytownresearch.org/documents/2016/06/strategies-reducing-gun-violence-american-cities.pdf>

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, “Firearms Laws and the Reduction of Violence: A Systematic Review,” *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Hemenway, David, Deborah Azrael, and Matthew Miller, “Whose Guns Are Stolen? The Epidemiology of Gun Theft Victims,” *Injury Epidemiology*, Vol. 4, No. 1, 2017, p. 11.

Krouse, W. J., *Gun Control: Statutory Disclosure Limitations on ATF Firearms Trace Data and Multiple Handgun Sales Reports*, Washington, D.C.: Congressional Research Service, 7-5700, 2009.

Langton, L., *Firearms Stolen During Household Burglaries and Other Property Crimes, 2005–2010*, Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics, NCJ 239436, 2012.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

United States Code, Title 18, Section 923, Licensing.

Webster, D. W., and G. J. Wintemute, “Effects of Policies Designed to Keep Firearms from High-Risk Individuals,” *Annual Review of Public Health*, Vol. 36, 2015, pp. 21–37.

CHAPTER EIGHT

Licensing and Permitting Requirements

Federal law does not require individuals to obtain a license or permit to purchase a firearm. Several states, however, have permit-to-purchase laws that function similarly to universal background check laws. Both seek to ensure that individuals who acquire firearms through private transfers meet the same requirements as those who purchase firearms from federally licensed dealers. State policies that require permits or licenses to be renewed create a mechanism whereby law enforcement routinely confirms that a firearm owner remains eligible to possess or purchase a firearm, and the policies could facilitate firearm removal from owners who become ineligible. Requiring permits to purchase ammunition makes it more difficult for prohibited possessors to use their illicit firearms. Where no such checks occur, prohibited possessors may represent a considerable share of the market for ammunition. For instance, in a two-month period in the City of Los Angeles, prohibited possessors purchased at least 10,500 rounds of ammunition, accounting for about 2.6 percent of all such sales (Tita et al., 2006). The effects of these policies on violent crime and suicide will depend on whether they better identify disqualified firearm purchasers or possessors compared with the status quo, and whether these disqualifications correctly target individuals who are at greater risk of inflicting harm to themselves or others.

As with more-comprehensive background check laws, by restricting access to firearms for individuals presumed to present greater risk of misusing those firearms, licensing and permitting requirements are intended to reduce gun violence. Different designations for the types of conditions that disqualify an individual may generate differential impacts on such outcomes as homicide or mass shootings compared with suicides. Although compliance is likely to be imperfect, licensing and permitting laws may still reduce gun-related homicides or suicides by deterring prohibited possessors from attempting to acquire firearms. The magnitude of these effects will be influenced, in part, by the level of enforcement, the availability of firearms or ammunition through unregulated markets, and the likelihood that an individual who would be disqualified through the permitting process will seek to obtain a firearm through alternative markets.

Unlike background check laws, licensing and permitting regulations often require individuals seeking to purchase or possess a firearm to submit their applications in person at a law enforcement agency and to submit to fingerprinting. There is some

evidence that even licensed dealers sometimes fail to require valid identification cards (U.S. General Accounting Office, 2001); thus, these additional procedural requirements may be more effective in limiting prohibited possessors from accessing firearms by preventing fraud or identification inaccuracies. However, licensing systems requiring substantial coordination between local, state, and federal databases and institutions may pose technical and regulatory challenges, and it is unknown how much the additional administrative requirements of licensing and permitting laws will reduce firearm access by prohibited individuals.

State laws that additionally require an individual to pass a safety course or exam to qualify for a license or permit could reduce unintended injuries and deaths, although these effects will depend on whether passing a safety course or exam affects the storage or handling behavior of firearm owners. One 1995 survey found that gun owners who received formal firearm training (where 80 percent of training courses covered proper gun storage) were significantly more likely to store their firearms loaded and unlocked compared with gun owners who had not received formal training; however, the most common source of training for this sample was through the military, which may not produce the same effects as the training available to civilians (Hemenway, Solnick, and Azrael, 1995).

These laws could also plausibly affect defensive or recreational gun use by increasing the costs of obtaining or continuing to possess a firearm. While the monetary costs of acquiring a license or permit typically range between \$10 and \$100,¹ the total time and energy costs, in addition to concerns about privacy, may dissuade some legal firearm purchasers, in which case the laws could affect sales of new firearms.

To evaluate whether the effects of licensing or permitting requirements on violent crime or suicides operate through more-effective identification of prohibited possessors (as applied to purchase, possession, or both), the ideal analyses would estimate effects on outcomes specifically for those populations that would be prevented from legally acquiring or owning a firearm under the licensing law. For outcome data in which the type of weapon used can be identified, analyses also could exploit state-level variation in the types of guns that require licenses or permits and could estimate effects stratified by the type of weapon used in a violent crime, mass shooting, or suicide.

To assess whether licensing or permitting laws reduce violent crime through disrupting illegal firearm trafficking, causal inference could be strengthened by examining crime gun trace data and changes in homicide rates.² Specifically, if permit-to-purchase laws restrict trafficking operations from in-state retailers, one should observe a larger share of crime guns originating from out-of-state sources after law passage

¹ New York City's license for handgun purchase and possession (which lasts three years) is the most expensive, at \$340, not including an additional fingerprint fee (Csere, 2013).

² The Bureau of Alcohol, Tobacco, and Firearms (2002, p. A-3) defined *crime gun* as "any firearm that is illegally possessed, used in a crime, or suspected to have been used in a crime. An abandoned firearm may also be categorized as a crime gun if it is suspected it was used in a crime or illegally possessed."

and/or a reduction in guns with a short time-to-crime (Webster and Wintemute, 2015; Braga et al., 2012).³ However, a series of provisions attached to Bureau of Alcohol, Tobacco, Firearms and Explosives appropriations (commonly known as the Tiahrt Amendments) has denied most researchers access to firearm trace data since 2003; therefore, while law enforcement agencies may analyze such data, the information generally has not been available for research purposes (Krouse, 2009).

State Implementation of Licensing and Permitting Requirements

Nine states have implemented permit-to-purchase regimes for firearms.⁴ All such laws require these licenses for most private transactions. Of the nine states, four require permits for all firearms,⁵ and five require them for the purchase of handguns only.⁶ New York requires a license to own a firearm.⁷ Michigan, Massachusetts, and Illinois require both a permit to purchase and a license to own a firearm.⁸ Michigan's law, however, applies only to handguns, and it has a broad exemption for individuals who purchase handguns from licensed dealers following a background check.⁹ The District of Columbia also requires that individuals obtain a registration certificate to purchase and possess a firearm.¹⁰

In terms of the requirements that must be met to receive a license to own or permit to purchase a firearm, some states require that applicants pass a safety course or exam,¹¹ while others do not. Another distinction between states' laws is the duration of

³ Per Webster and Wintemute (2015), the metric known as *time-to-crime* is the “unusually short interval—ranging from less than 1 year to less than 3 years—between a gun’s retail sale and its subsequent recovery by police from criminal suspects or crime scenes A short [time-to-crime] is considered an indicator of diversion, especially when the criminal possessor is someone different from the purchaser of record.”

⁴ California, Connecticut, Hawaii, Iowa, Maryland, Nebraska, New Jersey, North Carolina, and Rhode Island. Calif. Penal Code § 31610; Conn. Gen. Stat. §§ 29-33, 29-37a; Hawaii Rev. Stat. § 134-2; Iowa Code § 724.15; Md. Public Safety Code § 5-117.1; Neb. Rev. Stat. Ann. § 69-2404; N.J. Stat. Ann. § 2C:58-3; N.C. Gen. Stat. § 14-402; R.I. Gen. Laws § 11-47-35.

⁵ Calif. Penal Code § 31615; Conn. Gen. Stat. §§ 29-33, 29-37a; Hawaii Rev. Stat. § 134-2; N.J. Stat. Ann. § 2C:58-3.

⁶ Iowa Code § 724.15; Md. Public Safety Code § 5-117.1; Neb. Rev. Stat. Ann. § 69-2404; N.C. Gen. Stat. § 14-402; R.I. Gen. Laws § 11-47-35.

⁷ N.Y. Penal Law § 400.00.

⁸ Mich. Comp. Laws § 28.422; 430 Ill. Comp. Stat. 65/2; Mass. Gen. Laws Ch. 140 § 129B, 131A, 131E.

⁹ Mich. Comp. Laws § 28.422.

¹⁰ D.C. Code Ann. § 7-2502.01.

¹¹ Calif. Penal Code §§ 31610, 31640; Conn. Gen. Stat. §§ 29-36f, 29-37p; Hawaii Rev. Stat. § 134-2; Md. Public Safety Code § 5-117.1; Mass. Gen. Laws Ch. 140 § 131P; R.I. Gen. Laws § 11-47-35; D.C. Code Ann. § 7-2502.03. The laws in Hawaii, Maryland, and Rhode Island apply to handguns only.

the licenses or permits. A handful of states issue permits to purchase that are valid for a few days or months only.¹² Other states issue permits or licenses that may last years.¹³ In New Jersey, firearm identification cards are required for rifles and shotguns and remain valid indefinitely, unless the issuing or other law enforcement agency identifies specific behavior and character disqualifiers—such as being convicted of a crime, being subject to a restraining order, or having a drug dependency; for handguns, purchasers must obtain a permit to purchase, which lasts 90 days.¹⁴ Rhode Island’s law does not specify the duration of the permit to purchase.¹⁵

Another feature that differs among the state permit-to-purchase regimes is whether the permit covers multiple purchases. The laws in Hawaii, New Jersey, and North Carolina require separate permits for each purchase, though with some differences.¹⁶ For example, Hawaii requires a permit for each handgun purchase but allows multiple long-gun purchases under a single permit.

Some of the aforementioned states have also extended their permitting systems to the purchase or ownership of ammunition.¹⁷

Effects on Suicide

Research Synthesis Findings

When the National Research Council (NRC) completed its review in 2004, there was no evidence from quasi-experimental studies on requiring a license or permit to purchase firearms. Similarly, Hahn et al. (2005) concluded that the evidence for how licensing or registration affects any violence outcomes was inconclusive, based on the five cross-sectional studies they examined that would not meet our inclusion criteria.

We identified two U.S.-based longitudinal studies examining the effect of firearm licensing or permitting requirements on suicide. Examining the effects of firearm

¹² Hawaii Rev. Stat. § 134-2 (ten days for handguns); Mich. Comp. Laws § 28.422 (30 days for handguns), Mass. Gen. Laws Ch. 140 § 131A (ten days for permit to purchase); N.J. Stat. Ann. § 2C:58-3 (90 days for handguns, may be renewed for another 90 days with good cause).

¹³ Mass. Gen. Laws Ch. 140 § 129B (six years for license to own); Calif. Penal Code § 31655 (five years); Conn. Gen. Stat. §§ 29-36h, 29-37r (five years); Hawaii Rev. Stat. § 134-2 (one year for long guns); 430 Ill. Comp. Stat. 65/7 (ten years); Md. Public Safety Code § 5-117.1 (ten years for handguns); Neb. Rev. Stat. Ann. § 69-2407 (three years for handguns); N.Y. Penal Law § 400.00 (five years for handguns); N.C. Gen. Stat. § 14-403 (five years for handguns); D.C. Code Ann. § 7-2502.07a (three years).

¹⁴ N.J. Stat. Ann. § 2C:58-3.

¹⁵ R.I. Gen. Laws § 11-47-35.

¹⁶ Hawaii Rev. Stat. § 134-2; N.J. Stat. Ann. § 2C:58-3; N.C. Gen. Stat. § 14-403 (handguns only).

¹⁷ Connecticut, Illinois, Massachusetts, New Jersey, and the District of Columbia. Conn. Gen. Stat. §§ 29-38n; 430 Ill. Comp. Stat. 65/2; Mass. Gen. Laws Ch. 140 § 129C; N.J. Stat. Ann. § 2C:58-3.3; D.C. Code Ann. § 7-2502.02.

policies on suicides among teens (aged 14–17) and young adults (aged 18–20) between 1976 and 2001, Webster et al. (2004) included an indicator variable for the presence of state permit-to-purchase laws. They used negative binomial models that employed generalized estimating equations and included state-level fixed effects, controls for other firearm policies, and time-varying covariates (including the proportion of suicides by firearm as a proxy of gun prevalence). Using these methods, the authors found a significant effect of permit-to-purchase laws increasing the total suicide rate by 17.7 percent among those aged 18–20, driven by an estimated 22-percent increase in firearm suicides, with an uncertain change in nonfirearm suicides. The authors also found permit-to-purchase laws to be associated with a statistically significant 27-percent increase in *nonfirearm* suicides among those aged 14–17 but to have uncertain associations with firearm or total suicides among this age group. As the authors suggested, this perplexing set of results may be partially attributable to the fact that the effect estimate was based on changes to only three state laws during the study time frame. Therefore, the effect of permit-to-purchase laws is not well identified, and apparent effects may be attributable to other concurrent changes affecting suicide rates.

Using a synthetic control approach, Crifasi et al. (2015) estimated the percentage change in total suicide and firearm suicide in Connecticut before and after the state established a permit-to-purchase law in 1995, as well as before and after the repeal of Missouri's permit-to-purchase law in 2007. This approach enabled the researchers to estimate the likely outcomes had Connecticut and Missouri not enacted these laws, drawing on data from states that looked most similar in the pre-law period but that did not have or enact such policies (for Connecticut) or that had such policies and did not repeal them (for Missouri) during the study period.

Crifasi et al. (2015) found evidence that there was a reduction in firearm suicide rates in Connecticut and its synthetic comparison group after the law, but the reduction was greater in Connecticut. Specifically, Connecticut's firearm suicide rate was 15.4 percent lower than that of its synthetic control during the ten-year post-law period, decreasing from roughly four firearm suicides per 100,000 people the year the law was enacted to around three per 100,000 in the post-law period. The nonfirearm suicide rate remained constant in Connecticut but increased in its synthetic comparison group after the law. However, these findings were tempered by alternative regression model specifications in which Connecticut experienced a statistically significant *increase* in nonfirearm suicides after passage of the law and an uncertain effect on overall suicides.

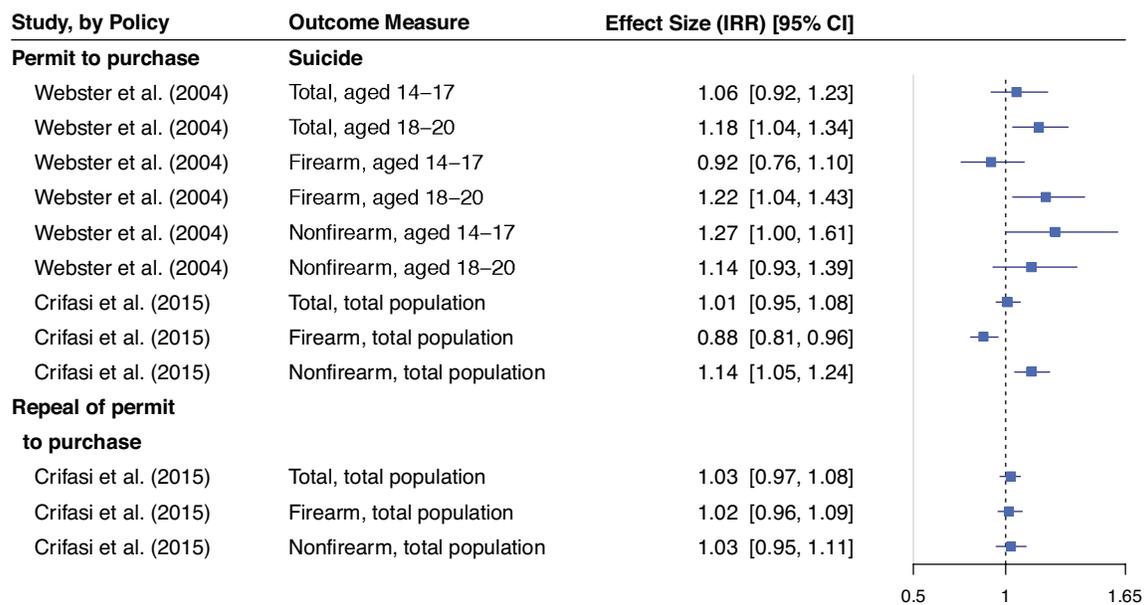
Missouri's firearm suicide rate was consistently higher than that of its synthetic control, and rates in both the state and its synthetic control increased after the repeal of the law, although Missouri's rate grew more rapidly over the subsequent five years. In the five-year post-repeal period, the suicide rate in Missouri was 16.1 percent higher than in the synthetic control group, increasing from 7.5 firearm suicides per 100,000 people the year the law was repealed to 9.0 per 100,000. Little difference was

observed between Missouri's nonfirearm suicide rate and that of its synthetic control over the study period.

Because both the Connecticut and Missouri analyses examined only a single state's experience with either adoption or repeal of the law, the study offers limited evidence that noted differences are due to the change in the law rather than to other contemporaneous influences over each state's suicide rate around the time the law was changed. For instance, in Connecticut, the permit-to-purchase law was implemented along with other rule changes, such as raising the minimum age to purchase handguns and requiring completion of eight hours of gun-safety training. Similarly, Missouri's repeal occurred at the same time it implemented a stand-your-ground law. The study design cannot rule out that these other factors, rather than the permit-to-purchase requirement, were the cause of observed changes. Therefore, the estimates reported in Crifasi et al. (2015) may not be reliable indicators of the direction or magnitude of the true effects of permit-to-purchase laws on suicide.

Figure 8.1 displays the incidence rate ratios (IRRs) and confidence intervals (CIs) associated with the licensing and permitting policies examined in these studies. Because the synthetic control model estimates for nonfirearm suicides in Crifasi et al. (2015) have no CIs, we plot the alternative regression model estimates.

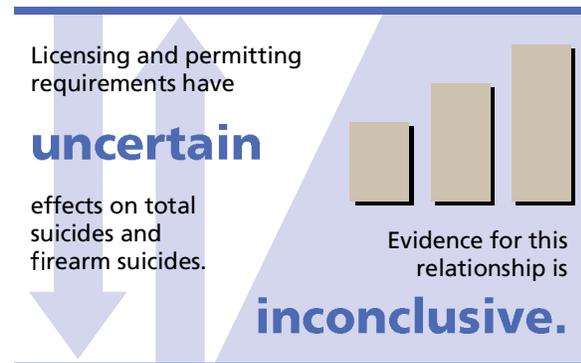
Figure 8.1
Incidence Rate Ratios Associated with the Effect of Licensing and Permitting Requirements on Suicide



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified two qualifying studies examining the effects of permit-to-purchase laws on total and firearm suicides. Webster et al. (2004) identified an uncertain effect of these laws on total suicide and firearm suicide rates, as well as a suggestive effect consistent with an increase in nonfirearm suicides, among children aged 14–17. They also identified a significant increase in suicides and firearm suicides among those aged 18–20. Crifasi et al. (2015) identified the effect of implementing a permit-to-purchase law in Connecticut and a separate effect of repealing such a law in Missouri. Both sets of effects suggested that these changes in law had uncertain effects on total suicides. However, implementation of the law significantly reduced firearm suicides in Connecticut, whereas repeal of the law in Missouri had only uncertain effects on firearm suicides.



Based on these studies, we find *inconclusive evidence for the effect of licensing and permitting requirements on total suicides and firearm suicides.*

Effects on Violent Crime

Research Synthesis Findings

Hahn et al. (2005) found insufficient evidence for determining the effectiveness of firearm registration and licensing on violent crime. NRC (2004) concluded, “There is not much empirical evidence that assesses whether attempts to reduce criminal access to firearms will reduce gun availability or gun crime.”

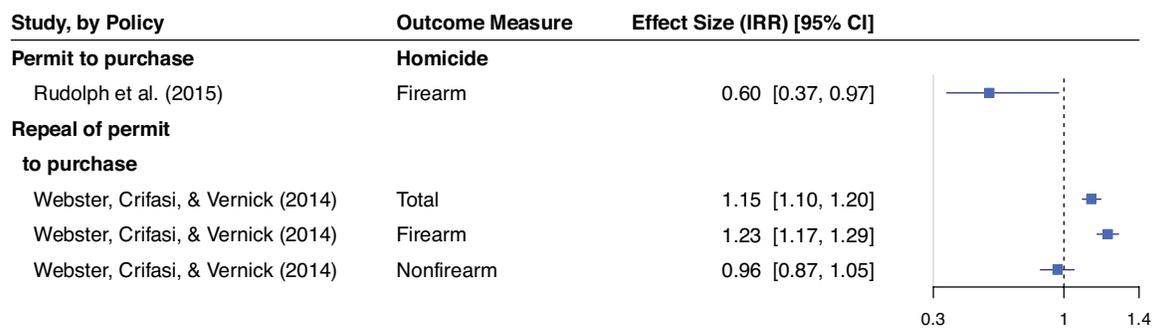
Our synthesis identified two studies that examined permit-to-purchase laws in specific states. Webster, Crifasi, and Vernick (2014) used state-level data from 1999 to 2010 to analyze the effect of Missouri’s repeal of a permit-to-purchase law that included a background check requirement even for private sellers and a requirement that background checks be requested at the local sheriff’s office. They found a significant increase in total homicides and firearm homicides from the repeal of the law and an uncertain effect on nonfirearm homicides. Specifically, after the repeal, the total homicide rate was 115 percent of the rate expected had the law not been repealed, and the firearm homicide rate was 125 percent of the expected rate (see Figure 8.2). However, because the focus of this study was a single state, the effects associated with the law may be confounded with other changes in the state that affected homicide rates around the same time the law was passed. The statistical model used to arrive at these

results used a large number of estimated parameters relative to observations (a ratio of about one to eight), meaning the model may have been overfit, and thus its estimates of the laws' effects and their apparent statistical significance could provide little generalizable information about the true causal effects of the permit-to-purchase law.

Using a synthetic control approach, Rudolph et al. (2015) found a decrease in firearm homicides (and no statistically significant effect on nonfirearm homicides) from the implementation of a permit-to-purchase law in Connecticut that strengthened background check requirements for handguns sold by private sellers and licensed dealers by requiring purchasers to obtain an eligibility certificate in person from the local police department, increasing the minimum age of purchase from 18 to 21, and requiring individuals to complete eight hours of gun-safety training. After these policy changes, the firearm homicide rate was 63 percent of what was expected without such changes. Because only a single state experienced the law in this study, it is not possible to conclude that the changes were a result of the permit-to-purchase portion of the law as opposed to other factors influencing homicides in the state around the same time.

Figure 8.2 displays the IRRs and CIs associated with the licensing and permitting policies examined in these studies.

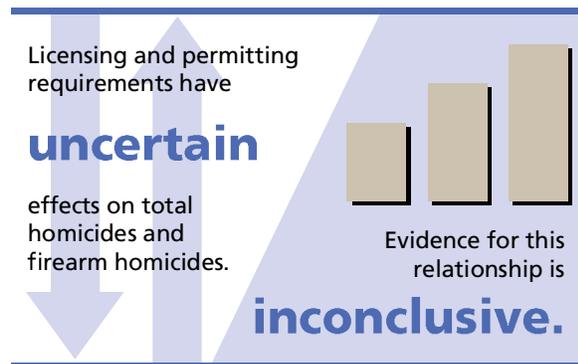
Figure 8.2
Incidence Rate Ratios Associated with the Effect of Licensing and Permitting Requirements on Violent Crime



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified two qualifying studies examining the effects of permit-to-purchase laws on total and firearm homicides. Webster, Crifasi, and Vernick (2014) found that Missouri's repeal of its law resulted in increased total and firearm suicide rates. Rudolph et al. (2015) reported a significant effect consistent with these laws reducing firearm homicide rates, but because a law establishing a minimum age for purchase was passed concurrently in the one state evaluated, they could not attribute this effect solely to permit-to-purchase laws. Based on this evidence and an evaluation of the studies' strengths, we find *inconclusive evidence for the effect of licensing and permitting requirements on total homicides and firearm homicides*.



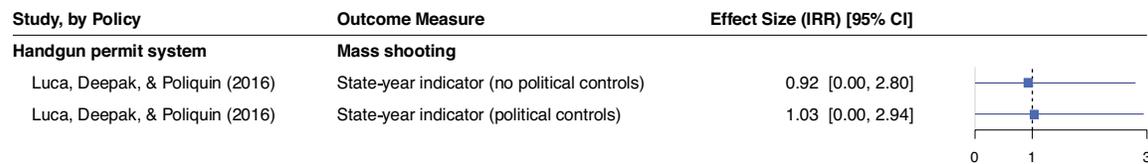
Effects on Mass Shootings

Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified research examining the effects of licensing and permitting requirements on mass shootings in the United States. Our search yielded one such study that met our inclusion criteria. Using a two-way fixed-effects linear probability model, Luca, Deepak, and Poliquin (2016) estimated the effects of state laws requiring permits to purchase a handgun on a binary indicator for whether a mass shooting occurred in a given state-year. The authors' regression analysis covered 1989–2014 and included controls for time-invariant state characteristics; national trends; a host of other state-level gun policies; and time-varying state-level demographic, socioeconomic, and political characteristics. They found uncertain effects of handgun permitting requirements on the probability of a mass shooting event occurring. However, assessing the effects of gun policies on mass shootings was not the primary focus of Luca, Deepak, and Poliquin (2016), and the authors intended the estimates to serve solely as a robustness check for their main specification (the effects of mass shootings on gun policy). Although the paper provided limited information to use in evaluating the reported statistical models (e.g., on how these policies were coded), it is clear that the analysis used a linear model to predict a dichotomous outcome. Therefore, model assumptions were violated, making CIs unreliable.

Figure 8.3 displays the IRRs and CIs associated with the licensing and permitting policies examined in Luca, Deepak, and Poliquin (2016).

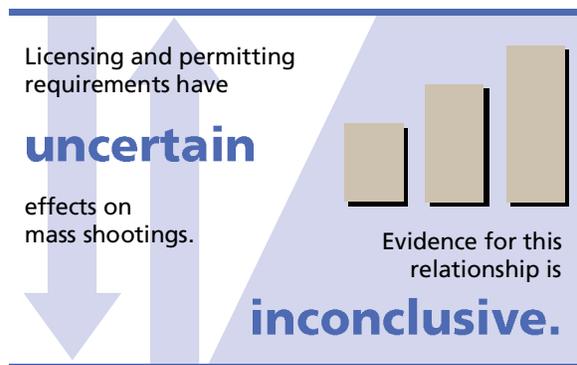
Figure 8.3
Incidence Rate Ratios Associated with the Effect of Licensing and Permitting Requirements on Mass Shootings



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified one qualifying study that estimated the effects of licensing and permitting laws on mass shootings (Luca, Deepak, and Poliquin, 2016). This study found uncertain effects of these laws on whether at least one mass shooting occurred in a state. Therefore, available studies provide *inconclusive evidence for the effect of licensing and permitting requirements on mass shootings*.



Luca, Deepak, and Poliquin, 2016). This study found uncertain effects of these laws on whether at least one mass shooting occurred in a state. Therefore, available studies provide *inconclusive evidence for the effect of licensing and permitting requirements on mass shootings*.

Outcomes Without Studies Examining the Effects of Licensing and Permitting Requirements

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of licensing and permitting requirements on the following outcomes, and we identified no such studies that met our inclusion criteria:

- unintentional injuries and deaths
- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

Chapter Eight References

Braga, Anthony A., Garen J. Wintemute, Glenn L. Pierce, Philip J. Cook, and Greg Ridgeway, "Interpreting the Empirical Evidence on Illegal Gun Market Dynamics," *Journal of Urban Health*, Vol. 89, No. 5, 2012, pp. 779–793.

Bureau of Alcohol, Tobacco, and Firearms, *Crime Gun Trace Reports (2000): Memphis, Tennessee*, Washington, D.C.: U.S. Department of the Treasury, July 2002.

Crifasi, C. K., J. S. Meyers, J. S. Vernick, and D. W. Webster, "Effects of Changes in Permit-to-Purchase Handgun Laws in Connecticut and Missouri on Suicide Rates," *Preventive Medicine*, Vol. 79, 2015, pp. 43–49.

Csere, M., *State Comparison of Gun Permit Fees*, Hartford, Conn.: Connecticut General Assembly, Office of Legislative Research, OLR Research Report 2013-R-0048, 2013. As of May 24, 2017: <https://www.cga.ct.gov/2013/rpt/2013-R-0048.htm>

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Hemenway, David, Sara J. Solnick, and Deborah R. Azrael, "Firearm Training and Storage," *JAMA*, Vol. 273, No. 1, 1995, pp. 46–50.

Krouse, W. J., *Gun Control: Statutory Disclosure Limitations on ATF Firearms Trace Data and Multiple Handgun Sales Reports*, Washington, D.C.: Congressional Research Service, 7-5700, 2009.

Luca, Michael, Lahotra Deepak, and Christopher Poliquin, *The Impact of Mass Shootings on Gun Policy*, working paper, Boston, Mass.: Harvard Business School, 2016.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Rudolph, K. E., E. A. Stuart, J. S. Vernick, and D. W. Webster, "Association Between Connecticut's Permit-to-Purchase Handgun Law and Homicides," *American Journal of Public Health*, Vol. 105, No. 8, 2015, pp. E49–E54.

Tita, G. E., A. A. Braga, G. Ridgeway, and G. L. Pierce, "The Criminal Purchase of Firearm Ammunition," *Injury Prevention*, Vol. 12, No. 5, 2006, pp. 308–311.

U.S. General Accounting Office, *Firearms Purchased from Federal Firearm Licensees Using Bogus Identification*, Washington, D.C., GAO-01-427NI, 2001.

Webster, D., C. K. Crifasi, and J. S. Vernick, "Effects of the Repeal of Missouri's Handgun Purchaser Licensing Law on Homicides," *Journal of Urban Health*, Vol. 91, No. 2, 2014, pp. 293–302.

Webster, D. W., J. S. Vernick, A. M. Zeoli, and J. A. Manganello, "Association Between Youth-Focused Firearm Laws and Youth Suicides," *JAMA*, Vol. 292, No. 5, 2004, pp. 594–601.

Webster, D. W., and G. J. Wintemute, "Effects of Policies Designed to Keep Firearms from High-Risk Individuals," *Annual Review of Public Health*, Vol. 36, 2015, pp. 21–37.

CHAPTER NINE

Firearm Sales Reporting and Recording Requirements

Under federal law, licensed dealers must maintain records of firearm sales indefinitely (18 U.S.C. 923). Although licensed dealers must respond to specific Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) inquiries about sales of individual guns, federal law does not mandate that dealers report sales; indeed, federal authorities are explicitly prohibited by law from maintaining a database of firearm sales. In addition, there is no federal law requiring recording or reporting of firearm sales by private sellers (Giffords Law Center to Prevent Gun Violence, undated-d).

As with laws requiring the reporting of lost or stolen firearms, laws requiring the recording and reporting of gun sales are designed to facilitate law enforcement traces of weapons used in crimes. Without such laws, tracing crime guns typically identifies where a gun was first legally sold, and to whom.¹ However, secondary markets appear to be the leading source of guns used in crimes (Harlow, 2001). By requiring a record of each subsequent transfer or sale of a firearm after its initial sale by a licensed dealer, ATF and other law enforcement agencies would gain valuable investigative information. Presumably, requiring recordkeeping and reporting of private gun sales could also deter illegal sales.

Furthermore, law enforcement access to sales data could facilitate identification of firearm owners who have become prohibited possessors. For instance, California passed Proposition 63 in 2016, which, among other things, requires courts to search California's centralized records of firearm sales and transfers whenever an individual is convicted of an offense that makes him or her a prohibited possessor. When such individuals are found to have purchased firearms, they will be required to relinquish or dispose of them.²

Required recordkeeping and reporting may impose costs to sellers of maintaining compliance, and concerns about privacy may deter some individuals seeking to acquire a firearm for self-protection or recreational gun use, with consequences for gun sales.

¹ The Bureau of Alcohol, Tobacco, and Firearms (2002, p. A-3) defined *crime gun* as "any firearm that is illegally possessed, used in a crime, or suspected to have been used in a crime. An abandoned firearm may also be categorized as a crime gun if it is suspected it was used in a crime or illegally possessed."

² Calif. Penal Code, Sec. 29810.

Because the principal intended benefit of laws requiring firearm sales to be reported concerns crime investigation, the data most relevant to understanding the effects of such laws would include *firearm crime clearance rates*, or the rates at which law enforcement is successful in identifying suspects in firearm-related crimes, including violent and property crimes, and firearm trafficking crimes. In California and other states that use these records to identify prohibited possessors with weapons, data on firearm-involved crime and violence perpetrated by prohibited possessors would be valuable, but such data are not generally available.

State Implementation of Firearm Sales Reporting and Recording Requirements

Several states have laws that require firearm sellers (dealers, private sellers, or both) to maintain records of all gun sales, and some have laws that require sellers to report sales information to law enforcement. Twenty jurisdictions require firearm sellers to keep records of at least some firearm sales. Eleven states and the District of Columbia require licensed dealers to maintain records of all firearm sales,³ and seven states and the District of Columbia require private sellers to do so.⁴ Some states require record-keeping for handgun sales only: Six states have such laws for dealers,⁵ and four have them for private sellers.⁶ Overall, five jurisdictions require all sellers to record all firearm sales,⁷ while the other 15 states with such laws have some lesser combinations of recordkeeping requirements. In terms of recordkeeping by private sellers, some states

³ California, Connecticut, Delaware, Illinois, Maine, Massachusetts, Michigan, New Jersey, Oregon, Pennsylvania, Rhode Island, and the District of Columbia. See Calif. Penal Code § 28100; Conn. Gen. Stat. Ann. § 29-31; Del. Code Ann. tit. 24 § 904; 40 Ill. Comp. 65/3, 720 Ill. Comp. 5/24-4; Me. Rev. Stat. Ann. tit. 15 § 455; Mass. Gen. Laws Ch. 140 § 123; Mich. Comp. Laws §§ 28.422, 28.422a, 750.232; N.J. Stat. Ann. §2C: 58-2, N.J. Admin. Code § 13:54-3.14; Oreg. Rev. Stat. §§ 166.412, 166.434; 18 Pa. Cons. Stat. §§ 6111, 6102; R.I. Gen. Laws §§ 11-47-35, 11-47-35.2; D.C. Code Ann. § 7-2504.

⁴ California, Colorado, Connecticut, Delaware, Illinois, New York, Rhode Island, and the District of Columbia. See Calif. Penal Code § 28210; Colo. Rev. Stat. § 18-12-112; Conn. Gen. Stat. Ann. § 29-31; Del. Code Ann. tit. 11 § 1448B, tit. 24 § 904; 40 Ill. Comp. 65/3, 720 Ill. Comp. 5/24-4; N.Y. Gen. Bus. Law § 898; R.I. Gen. Laws §§ 11-47-35, 11-47-35.2, D.C. Code Ann. §§ 7-2505.02, 7-2504.04.

⁵ Colorado, Maryland, New York, North Carolina, Vermont, and Washington. See Colo. Rev. Stat. § 12-26-102; Md. Ann. Code §§ 5-120, 5-145; N.Y. Penal Law §§ 265.00, 400.00; N.C. Gen. Stat. § 14-402; Vt. Stat. Ann. tit. 13 § 4006; Wash. Rev. Code § 9.41.110.

⁶ Maryland, New Jersey, Michigan, and Pennsylvania. See Md. Ann. Code § 5-120 (private sellers are required to maintain copies of the application, not a sales record); N.J. Stat. Ann. § 2C: 58-3 (private sellers are required to maintain copies of the permit); Mich. Comp. Laws Ann. §§ 28.422, 28.422a, 750.232; 37 Pa. Cons. Stat. § 33.111.

⁷ California, Delaware, Illinois, Rhode Island, and the District of Columbia.

require the sellers to maintain the records,⁸ and others require licensed dealers to maintain records for private sales.⁹

States differ on how long sales records must be maintained. Some do not specify the required duration,¹⁰ and some require the records be kept for a set number of years or permanently.¹¹

Some states recently abolished their recordkeeping requirements. In 2015, for example, Alabama repealed the section of law requiring dealers to maintain detailed handgun sales records. In fact, the state enacted a section stating that, within 180 days of the new law's passage, dealers and law enforcement must destroy any records they created to comply with the repealed law,¹² although gun sellers' federal recordkeeping requirements would remain.

In addition to recordkeeping requirements, 11 states require that sales records be transmitted to a law enforcement agency. Four of the states require records of all sales to be transmitted, including those by licensed dealers and private sellers.¹³ Similarly, the District of Columbia's registration requirement gives law enforcement access to all sales records.¹⁴ Five states require dealers and private sellers to report only handgun sales to law enforcement.¹⁵ Washington requires dealers to report only handgun sales.¹⁶

⁸ Connecticut, Illinois, Maryland, Michigan, Pennsylvania, and Rhode Island. See Conn. Gen. Stat. Ann. § 29-31; 40 Ill. Comp. 65/3, 720 Ill. Comp. 5/24-4; Md. Ann. Code § 5-120; Mich. Comp. Laws Ann. §§ 28.422, 28.422a, 750.232; 37 Pa. Cons. Stat. § 33.111; R.I. Gen. Laws §§ 11-47-35, 11-47-35.2.

⁹ California, Colorado, New York, and the District of Columbia. See Calif. Penal Code § 28210; Colo. Rev. Stat. § 18-12-112; N.Y. Gen. Bus. Law § 898; D.C. Code Ann. §§ 7-2505.02, 7-2504.04.

¹⁰ For example, Massachusetts, Michigan, New York, and the District of Columbia. See Mass. Gen. Laws Ch. 140 § 123; Mich. Comp. Laws §§ 28.422, 28.422a, 750.232; N.Y. Gen. Bus. Law § 898; D.C. Code Ann. § 7-2504.

¹¹ For example, three years in Maryland for handguns (Md. Ann. Code § 5-120), five years in Oregon (Oreg. Rev. Stat. § 166.412), six years in Rhode Island (R.I. Gen. Laws §§ 11-47-35, 11-47-35.2), ten years in Illinois (40 Ill. Comp. 65/3), and 20 years in Connecticut and Pennsylvania (Conn. Gen. Stat. Ann. §§ 29-33, 29-37a; 18 Pa. Cons. Stat. § 6111). New Jersey requires records be kept permanently (N.J. Stat. Ann. § 2C: 58-3, N.J. Admin. Code § 13:54-3.14).

¹² 2015 Ala. H.B. 47, amending Ala. Code § 13A-11-79.

¹³ California, Connecticut, Hawaii, and Massachusetts. See Calif. Penal Code §§ 1106, 27545 (private sales must be conducted through licensed dealers, who in turn must report); Conn. Gen. Stat. §§ 29-33, 29-37; Hawaii Rev. Stat. § 134-2; Mass. Gen. Laws Ch. 140 §§ 123, 128A.

¹⁴ D.C. Code Ann. §§ 7-2502.08, 22-4510.

¹⁵ Maryland, Michigan, New Jersey, New York, and Pennsylvania. See Md. Ann. Code §§ 5-120, 5-124 (firearm applications for private sales must be reported); Mich. Comp. Laws §§ 28.422, 28.422a; N.J. Stat. Ann. § 2C:58-2; N.Y. Penal Law § 400.00; 18 Pa. Cons. Stat. § 6111.

¹⁶ Wash. Rev. Code Ann. §§ 9.41.110.

Outcomes Without Studies Examining the Effects of Firearm Sales Reporting and Recording Requirements

Neither the National Research Council (2004) nor Hahn et al. (2005) identified any research examining the relationship between firearm sales reporting and recording requirements and the following outcomes, and we identified no such studies that met our inclusion criteria:

- suicide
- violent crime
- unintentional injuries and deaths
- mass shootings
- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

Chapter Nine References

Bureau of Alcohol, Tobacco, and Firearms, *Crime Gun Trace Reports (2000): Memphis, Tennessee*, Washington, D.C.: U.S. Department of the Treasury, July 2002.

Giffords Law Center to Prevent Gun Violence, “Maintaining Records of Gun Sales,” web page, undated-d. As of October 18, 2017:
<http://lawcenter.giffords.org/gun-laws/policy-areas/gun-sales/maintaining-records-of-gun-sales/>

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, “Firearms Laws and the Reduction of Violence: A Systematic Review,” *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Harlow, Caroline Wolf, *Survey of Inmates in State and Federal Correctional Facilities: Firearm Use by Offenders*, Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics, NCJ 189369, November 2001.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

United States Code, Title 18, Section 923, Licensing.

CHAPTER TEN

Child-Access Prevention Laws

Child-access prevention (CAP) laws allow prosecutors to bring charges against adults who intentionally or carelessly allow children to have unsupervised access to firearms. CAP laws aim to reduce unintentional firearm injuries and deaths, suicides, and violent crime among youths chiefly by reducing children's access to stored guns, although weaker laws targeting only reckless provision of firearms to children are sometimes considered alongside CAP laws.

In 2015, 1,458 children under age 18 were killed by firearms, and of these deaths, 566 (38.8 percent) classified as suicide and 77 (5.3 percent) classified as unintentional (calculated using data from Centers for Disease Control and Prevention [CDC], 2015). Nonfatal gun injuries are considerably more common among this age group, with 7,537 nonfatal firearm injuries reported for children under age 18 in 2014 (calculated using data from CDC, 2013). In 2014, juvenile offenders were known to have been involved in approximately 650 murders nationwide, two-thirds of which involved a firearm (Office of Juvenile Justice and Delinquency Prevention, 2016). Youth between ages 18 and 21 have among the highest rates of violent offending of any age group (Loeber and Stallings, 2011).

While current statistics on the type of firearm or circumstances surrounding these incidents are not readily available, an earlier study examining a subset of states from 2001 to 2002 found that about half of firearm-related suicides among this age group involved a handgun, with the remainder involving a rifle or shotgun (Johnson et al., 2010). Among those suicide decedents in which the method of acquisition of the firearm was recorded, 82 percent used a firearm belonging to a family member, and 64 percent of those guns were stored unlocked. Surveys have found that, among juveniles who have been incarcerated or arrested, the youth offenders acquired their firearms through similar sources as adult offenders, with more than 80 percent citing a friend, family member, or the black market as the source of the weapon (Webster et al., 2002; LaFree and Birbeck, 1998).

Conceptually, the effects of CAP laws may extend beyond those age groups that are directly targeted by the policies. In households where owners abide by CAP laws, because either underage children reside in the household or there are underage visitors,

gun locks or gun safes could also serve to restrict access to guns by older members of the household. This limited availability could, in turn, influence suicides, unintentional injuries and deaths, and violent crime among the adult population.

Studies of adolescent and adult suicides have generally found that, relative to comparison groups of individuals who died other ways or living community members, those who died by firearm suicide lived in homes where guns were less securely stored (Conwell et al., 2002; Shenassa et al., 2004; Grossman et al., 2005). These studies suggest to one set of researchers a “dose-response” relationship between firearm accessibility and risk for suicide (Azrael and Miller, 2016). However, the relationship is not seen in all studies. Brent et al. (1991, 1993b) found no differences in storage practices in homes with adolescents who died by suicide and a comparison group of adolescents living in the community. Dahlberg, Ikeda, and Kresnow (2004) found no association between storage practices and firearm suicide (versus suicide by other means).

Studies have generally found no difference in storage practices between adults who have thought about or attempted suicide versus those who have not (Smith, Currier, and Drescher, 2015; Ilgen et al., 2008; Betz et al., 2016; Oslin et al., 2004). This finding, along with the finding that those who die by firearm suicide typically live in homes with less-secure storage of firearms, could suggest that the difference between those who successfully kill themselves with a firearm and those who do not is related more to firearm storage differences than to differences in suicidality (Azrael and Miller, 2016). In the absence of strong causal models, however, alternative explanations remain plausible. If, for instance, those most determined to kill themselves leave weapons unsecured so that they will be available for use when the person is ready to die, it could be that suicide risk determines storage practices rather than that storage practices determine suicide risk.

Since 2003, only one individual-level study provided information on the association between firearm storage practices and unintentional injuries. Grossman et al. (2005) found that cases of unintentional firearm-related injury or death were less likely to occur in households where guns were stored unloaded or locked or where guns and ammunition were stored separately.

CAP laws could decrease gun crime rates by making theft of firearms more difficult. Alternatively, the laws could increase rates of crime victimization and decrease opportunities for legal defensive gun use by delaying gun owners’ access to their firearms. Similarly, if firearms in the home deter such crimes as burglaries, safe storage requirements could reduce their deterrent value.

Data on suicides and self-inflicted nonfatal injury stratified by age are readily available, so analyses can directly test whether effects of CAP laws on these outcomes are driven by the relevant age group affected by the policy. For outcomes of violent crime and non-self-inflicted injury, causal analyses could be improved with data that report the age of the shooter. However, as most data sources report only the age of the

victim,¹ none of the studies we identified that met our inclusion criteria for this policy used this type of data. In estimating potential spillover effects for other age groups, one would ideally know whether different outcomes are observed after implementation of CAP laws among those households most directly affected by the laws (such as households with children under age 18 or 21) and households less directly affected by the safe storage policies.

For any analysis, estimates of causal effects would be strengthened with data showing how CAP laws actually affected gun storage behaviors, but national longitudinal data on firearm storage patterns do not currently exist.

State Implementation of Child-Access Prevention Laws

Although there is no comparable federal law, a narrow majority of U.S. jurisdictions have imposed some sort of CAP law. Fourteen states and the District of Columbia have implemented laws concerning negligent storage, across which there is some variation. The strictest laws impose criminal penalties for negligent storage regardless of whether a child accesses any guns. Massachusetts, for instance, imposes criminal liability if a gun is stored where a minor “may have access.”² Three other jurisdictions hold owners liable when they know or reasonably should know that access is “likely.”³ Four additional states impose criminal liability for negligent storage only where a child gains access to a gun, regardless of whether he or she uses it.⁴ Some of these jurisdictions impose liability even when the gun is not loaded.⁵

Seven states impose liability for negligent storage if children publicly carry or use improperly stored firearms, although three of these states hold adults liable only if children’s access results in death or serious injury.⁶

¹ Exceptions include the Federal Bureau of Investigation’s Supplementary Homicide Reports, which contain age of victim and age of offender for murders when such information is known, and the National Violent Death Reporting System, which contains information on the age of the shooter for non-self-inflicted fatal injuries when such information is known for a subset of states.

² Mass. Gen. Laws Ch. 140, § 131L.

³ California, Minnesota, and the District of Columbia. See Calif. Penal Code. § 25100; Minn. Stat. Ann. § 609.666; D.C. Code Ann. § 7-2507.02.

⁴ Hawaii, Maryland, New Jersey, and Texas. See Hawaii Rev. Stat. § 707-714.5; Md. Code Ann., Crim. Law § 4-104; N.J. Stat. Ann. 2C: 58-15; Tex. Penal Code Ann. § 46.13.

⁵ California, Hawaii, Massachusetts, and the District of Columbia. Calif. Penal Code § 25200 (the child must carry the unloaded gun off the premises for liability to attach); Hawaii Rev. Stat. §§ 707-714; 134-10.5; Mass. Gen. Laws Ch. 140, § 131L; D.C. Code Ann. § 7-2507.02.

⁶ The states that require the gun to be used but not necessarily to cause injury or death are Florida, Iowa, New Hampshire, and North Carolina. See Fla. Stat. Ann. § 790.174; Iowa Code Ann. § 724.22; Rev. Stat. Ann. N.H. § 650-C:1; N.C. Gen. Stat. Ann. § 14-315.1. The states that require injury or death are Connecticut, Illinois, and

Many of the states imposing criminal liability for negligent storage allow for exceptions or defenses.⁷ The most common is when the gun has been stored in a locked container.⁸ Other exceptions or defenses include that the firearm had been rendered inoperable,⁹ the person carried the firearm or it was close enough to be easily retrieved,¹⁰ or there was a reasonable expectation that children would not be present where the gun was stored.¹¹ In addition, some states consider it an exception or defense when children enter a storage area illegally¹² or use the firearm for self-defense.¹³ Some states have added other defenses too, such as those that apply to children who have a legal right to use firearms for hunting.¹⁴

Some states impose criminal liability for intentional, knowing, or reckless provision of firearms to children. These laws are weaker than negligent storage laws. Recklessness requires that the actor was aware of the risks involved in their actions, while negligence only requires that they should have been aware (American Law Institute, 1985). Five states impose penalties under the weaker standard for all firearms,¹⁵

Rhode Island. See Conn. Gen. Stat. Ann. §§ 29-37i, 53-217a; 720 Ill. Comp. Stat. 5/24-9; R.I. Gen. Laws Ann. § 11-47-60.1.

⁷ In some laws, certain actions are not excluded from the definition of the law, while in other states, they are affirmative defenses.

⁸ Calif. Penal Code § 25105; Conn. Gen. Stat. Ann. § 29-37i; Fla. Stat. Ann. § 790.174; Hawaii Rev. Stat. § 134-10.5; Iowa Code Ann. § 724.22; N.H. Rev. Stat. Ann. § 650-C:1; N.J. Stat. Ann. 2C: 58-15; R.I. Gen. Laws Ann. § 11-47-60.1; Tex. Penal Code Ann. § 46.13; D.C. Code Ann. § 7-2507.02.

⁹ Calif. Penal Code § 25105; Fla. Stat. Ann. § 790.174; Iowa Code Ann. § 724.22; N.J. Stat. Ann. 2C: 58-15; N.C. Gen. Stat. Ann. § 14-315.1; R.I. Gen. Laws Ann. § 11-47-60.1; Tex. Penal Code Ann. § 46.13.

¹⁰ Calif. Penal Code § 25105; Conn. Gen. Stat. Ann. § 29-37i; Hawaii Rev. Stat. § 134-10.5; N.H. Rev. Stat. Ann. § 650-C:1; R.I. Gen. Laws Ann. § 11-47-60.1; D.C. Code Ann. § 7-2507.02.

¹¹ Calif. Penal Code § 25105; N.H. Rev. Stat. Ann. § 650-C:1; R.I. Gen. Laws Ann. § 11-47-60.1.

¹² Calif. Penal Code § 25105; Fla. Stat. Ann. § 790.174; Iowa Code Ann. § 724.22; Hawaii Rev. Stat. § 707-714.5; Minn. Stat Ann. § 609.666; Md. Code Ann., Crim. Law § 4-104; N.H. Rev. Stat. Ann. § 650-C:1; N.J. Stat. Ann. 2C: 58-15; N.C. Gen. Stat. Ann. § 14-315.1; R.I. Gen. Laws Ann. § 11-47-60.1; Tex. Penal Code Ann. § 46.13; D.C. Code Ann. § 7-2507.02.

¹³ Calif. Penal Code § 25105; R.I. Gen. Laws Ann. § 11-47-60.1; Tex. Penal Code Ann. § 46.13.

¹⁴ For example, Maryland's law does not apply if the child has a hunting or firearm certificate (Md. Code Ann., Crim. Law § 4-104). In Texas, it is a defense if the child "was supervised by a person older than 18 years of age and was for hunting, sporting, or other lawful purposes" or is "engaged in an agricultural enterprise" (Tex. Penal Code Ann. § 46.13). In New Hampshire, the law does not apply if the child has completed a firearm safety or hunter safety course (N.H. Rev. Stat. Ann. § 650-C:1).

¹⁵ Indiana, Missouri, Nevada, Oklahoma, and Utah. See Ind. Code Ann. § 35-47-10-6; Mo. Stat. Ann. § 571.060; Nev. Rev. Stat. Ann. § 202.300; Okla. Stat. Ann. § 1273; Utah Ann. Code § 76-10-509.6 (applies only to parents and guardians regarding minors who have been convicted or adjudicated of a violent felony).

three for loaded firearms,¹⁶ and five for handguns only.¹⁷ Some of the laws require the weapon to be used by the minor in some way.¹⁸ Exceptions and defenses for reckless provision of firearms to children are similar to those for negligent storage, such as that the firearm was in a locked container¹⁹ or had been rendered inoperable.²⁰ Other exceptions include that the individual carried the firearm or it was close enough to be easily retrieved,²¹ the defendant had no reasonable expectation that a child would have access to the premises,²² or the child accessed the firearm through unlawful entry.²³ Use of the firearm in hunting, hunter safety, and other sporting events²⁴ or in self-defense²⁵ are also exceptions.

In addition to the main distinctions among the CAP laws already discussed, another difference is how they define minors. In the majority of states, it is an offense to provide a firearm to an individual under age 18.²⁶ In Texas, the age is 17.²⁷ In seven states, the age is 16,²⁸ and in another four states, a minor is under age 14.²⁹

¹⁶ Delaware, Virginia, and Wisconsin. See Del. Code Ann. tit. 11 § 603 (applies to parents, guardians, and other people legally charged with care of the minor); Va. Code Ann. § 18.2-56.2; Wisc. Stat. Ann. § 948.55.

¹⁷ Colorado, Georgia, Kentucky, Mississippi, and Tennessee. See Colo. Rev. Stat § 18-12-108.7; Ga. Code Ann. § 16-11-101.1; Ky. Rev. Stats Ann. § 527.110; Miss. Ann. Code § 97-37-15 (parents, guardians, custodians); Tenn. Code Ann. § 39-17-1320.

¹⁸ Ga. Code Ann. § 16-11-101.1 (must be used in the commission of a felony offense); Tenn. Code Ann. § 39-17-1320 (for liability to attach to parents or guardians, the gun must be used in the commission of a felony).

¹⁹ Del. Code Ann. § 603; Nev. Rev. Stat. Ann. § 202.300; Wisc. Stat. Ann. § 948.55.

²⁰ Del. Code Ann. tit. 11 § 603; Wisc. Stat. Ann. § 948.55.

²¹ Wisc. Stat. Ann. § 948.55.

²² Wisc. Stat. Ann. § 948.55.

²³ Nev. Rev. Stat. Ann. § 202.300; Wisc. Stat. Ann. § 948.55.

²⁴ Ind. Ann. Code § 35-47-10-1; Miss. Ann. Code § 97-37-14; Nev. Rev. Stat. Ann. § 202.300 (if accompanied or under the charge of a parent or guardian); Okla. Stat. Ann. § 1273 (with permission of parent or guardian); Tenn. Code Ann. § 39-17-1319.

²⁵ Miss. Ann. Code § 97-37-14; Tenn. Code Ann. § 39-17-1319 (if given permission by a parent or guardian).

²⁶ California, Colorado, Delaware, Georgia, Indiana, Kentucky, Massachusetts, Minnesota, Mississippi, Missouri, Nevada, North Carolina, Oklahoma, Tennessee, Utah, and the District of Columbia. See Calif. Penal Code § 25000; Colo. Rev. Stat § 18-12-108.7; Del. Code Ann. tit. 11 § 603; Ga. Code Ann. § 16-11-101.1; Ind. Code Ann. § 35-47-10-1; Ky. Rev. Stats Ann. § 527.110; Mass. Gen. Laws Ch. 140, § 131L; Minn. Stat. Ann. § 609.666; Miss. Ann. Code § 97-37-15; Mo. Stat. Ann. § 571.060; Nev. Rev. Stat. Ann. § 202.300; N.C. Gen. Stat. Ann. § 14-315.1; Okla. Stat. Ann. § 1273; Tenn. Code Ann. § 39-17-1320; Utah Code Ann. § 76-10-509.6; D.C. Code Ann. § 7-2507.02.

²⁷ Tex. Penal Code Ann. § 46.13.

²⁸ Connecticut, Florida, Hawaii, Maryland, New Hampshire, New Jersey, and Rhode Island. See Conn. Gen. Stat. Ann. § 29-37i; Fla. Stat. Ann. § 790.174; Hawaii Rev. Stat. § 707-714.5; Md. Code Ann., Crim. Law § 4-104; N.H. Rev. Stat. Ann. § 650-C:1; N.J. Stat. Ann. § 2C:58-15; R.I. Gen. Laws Ann. § 11-47-60.1.

²⁹ Illinois, Iowa, Virginia, and Wisconsin. See 720 Ill. Comp. Stat. 5/24-9; Iowa Code Ann. § 724.22; Va. Code Ann. § 18.2-56.2; Wisc. Stat. Ann. § 948.55.

In eight states and the District of Columbia, the act of negligent storage of a firearm is a misdemeanor.³⁰ In Massachusetts, negligent storage is a felony. In nine states, some additional factor—such as the firearm being used to commit an act of violence, it being a second offense, or the child having committed a prior felony—is required for the act to be a misdemeanor.³¹ In eight states, such factors make the negligent storage a felony: In four such jurisdictions, these factors bump the crime from a misdemeanor to a felony,³² and in the other four, there is no misdemeanor offense, only these felonies.³³ Texas makes clear that regardless of what additional factors are included, the crime is always a misdemeanor offense. Among states with laws that prohibit recklessly or knowingly providing firearms to minors, Mississippi and Tennessee make it a misdemeanor, Missouri and Kentucky make it a felony, and Tennessee makes it a felony for a parent to recklessly or knowingly provide firearms to their children.

Effects on Suicide

Research Synthesis Findings

The National Research Council (NRC) (2004) and Hahn et al. (2005) reviewed two quasi-experimental studies providing insight into the impact of CAP laws on suicide. These studies, which applied different statistical models to nearly identical data sets, found somewhat conflicting evidence among those under age 15 (Cummings et al., 1997a; Lott and Whitley, 2001). The model specified by Cummings et al. (1997a) found suggestive effects consistent with a reduction in firearm suicides in a model with limited controls. On the other hand, Lott and Whitley (2001) found uncertain effects in models that employed both state and year fixed effects, states' "shall-issue" or "right-to-carry" laws (see Chapter Thirteen), "one-gun-a-month" purchase rules, states that border one-gun-a-month states, waiting periods, mandatory prison penalties for using guns in the commission of a crime, and more than 36 state-level demographic controls. Combined with the state fixed effects, year fixed effects, and law effects, this model had an unfavorable ratio of estimated parameters to observations (approximately one to eight), suggesting that the model may have been overfit, and thus the estimated effects of these laws and their statistical significance may be poor indicators of their true effects. In addition, the model did not adjust for clustered standard errors. Together, these shortcomings suggest that the model results may not accurately describe the true effects of CAP laws.

³⁰ California, Delaware, Hawaii, Maryland, Minnesota, Nevada, New Jersey, Virginia, and the District of Columbia.

³¹ Florida, Illinois, Iowa, New Hampshire, North Carolina, Oklahoma, Rhode Island, Utah, and Wisconsin.

³² California, Nevada, Utah, and the District of Columbia.

³³ Colorado, Connecticut, Georgia, and Indiana.

Published soon before the NRC report, Webster et al. (2004) examined the effect of CAP laws on suicides among teens (aged 14–17) and young adults (aged 18–20) between 1976 and 2001. In negative binomial models that employed generalized estimating equations and that included state-level fixed effects and other covariates (e.g., the proportion of suicides by firearm as a proxy for gun prevalence), the authors found a significant effect that CAP laws lowered the total suicide rate among those aged 14–17 by 8.3 percent, driven by an estimated 10.8-percent reduction in firearm suicides; in addition, they found uncertain effects on nonfirearm suicides. In this age group, the post-policy firearm suicide rate was 89 percent of the rate expected without the policy, and the total suicide rate was 92 percent of what was expected (see Figure 10.1). There was also an indication that the effect was strongest the first year after the CAP law went into effect. These findings were sensitive to the authors' choices about model specifications: An alternatively specified and worse-fitting model yielded uncertain effects.³⁴ The authors also found that CAP laws were associated with a reduction in total, firearm, and nonfirearm suicides among those aged 18–20. Relative to what would have been expected without the law, suicide rates in this age group were reduced to 89 percent, 91 percent, and 87 percent for total, firearm, and nonfirearm suicides, respectively. The authors questioned the validity of the causal effect detected for those aged 18–20, suggesting that the significant nonfirearm suicide effects “cast doubt on any causal connection between the laws and lower suicides rates among this group of older youth.” They did not, however, suggest that this skepticism should extend to the effects found for the lower age group, although the difference between the reductions in nonfirearm suicide detected for the two age groups was not significantly different. Therefore, for this review, we interpret both models as providing some evidence that CAP laws reduce total and firearm suicide.

Gius (2015b) examined data from 1981 to 2010 and found that CAP laws were associated with a reduction in firearm suicides among those aged 0–19, but he did not examine total or nonfirearm suicides. The author controlled for a variety of state-level sociodemographic characteristics, along with two other laws related to youth firearm access (state minimum age requirements for handgun possession and the federal minimum age requirement for handgun possession enacted in 1994). The effect he reports suggests that the post-policy firearm suicide rate was 89 percent of the rate expected if there were no such laws in place, which matches the estimate by Webster et al. (2004) for those aged 14–17 and is close to their estimate of 92 percent for those aged 18–20.

An additional study (DeSimone, Markowitz, and Xu, 2013) found evidence of an effect of CAP laws on nonfatal self-inflicted gun injuries recorded in the Nationwide Inpatient Sample (NIS). Self-inflicted gun injuries are not all suicide attempts; some

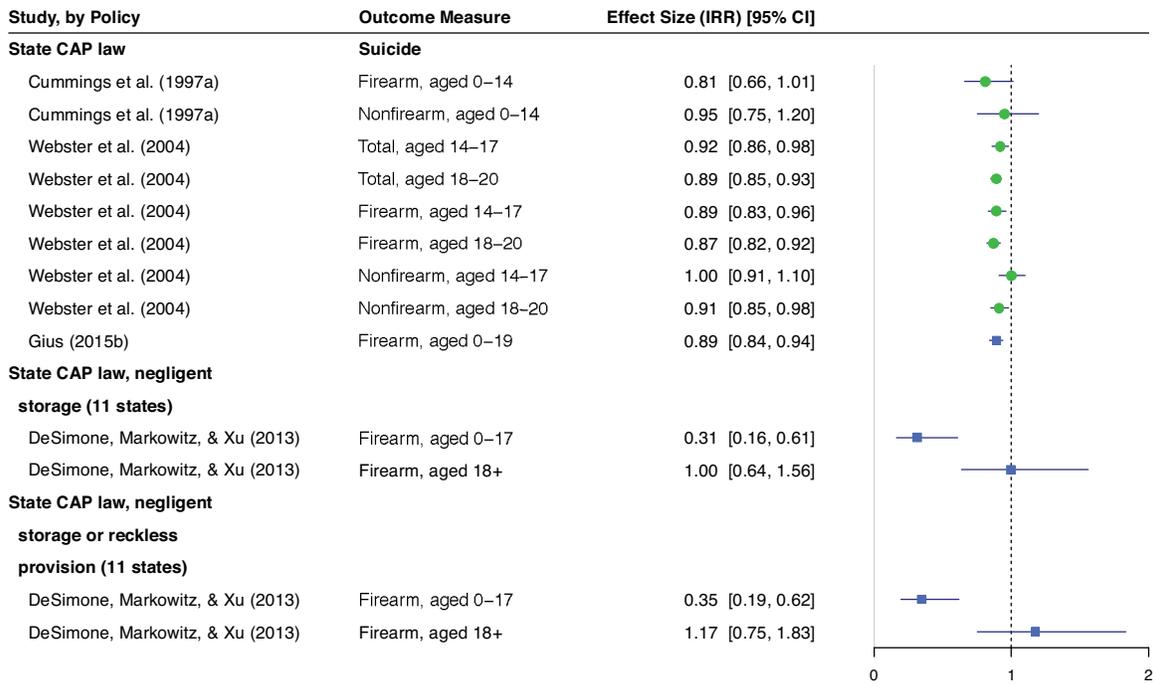
³⁴ Specifically, the primary model (which had better model fit based on Akaike information criterion statistics) included adjusting for national suicide rate trends using two linear trend parameters; the alternative model included year fixed effects.

are unintentional injuries. But case fatality rates for suicide attempts with a firearm are around 82.5 percent (Spicer and Miller, 2000), so a substantial number of self-inflicted firearm injuries are likely the result of suicide attempts. Therefore, DeSimone, Markowitz, and Xu (2013) should be understood to evaluate the effects of CAP laws on nonfatal firearm injuries resulting from a combination of suicide attempts and self-inflicted unintentional injuries. The authors looked at hospital discharges in 11 states between 1988 and 2003 and employed fixed effects for state and year in their statistical models (along with other state- and hospital-level covariates). They found that CAP laws based on negligent storage alone or on both negligent storage and reckless provision were associated with a reduction of 66–69 percent in self-inflicted firearm injuries among those under age 18, although estimates showed an uncertain effect on self-inflicted injuries for those 18 or older. These estimated effects were largely unchanged when considering whether the CAP laws were specified as those more-stringent policies that impose criminal penalties for negligent storage or were more broadly defined to include both negligent storage and reckless provision. This similarity in estimated effects is likely because only two states (Colorado and Wisconsin) in the NIS sample passed reckless provision laws during the study time frame; thus, identification in both specifications was largely driven by changes in state laws regarding negligent storage.

As DeSimone, Markowitz, and Xu (2013) note, however, the data set on which their estimates are made is not strictly longitudinal, and it is not possible to determine the extent to which CAP law effect estimates are estimated cross-sectionally or longitudinally. In addition, cases of firearm self-injury among young people were extremely sparse in the data, with just more than 200 such injuries reported in more than 9,000 hospital observations. Finally, the estimated effect sizes that we calculated from the parameter estimates provided in the paper are improbably large and inconsistent with the effect sizes the authors calculated from the same estimates. For these reasons, we are concerned that the parameter estimates and confidence intervals (CIs) reported in DeSimone, Markowitz, and Xu (2013) may not provide generalizable evidence about the effectiveness of CAP laws.

Figure 10.1 displays the incidence rate ratios (IRRs) and CIs associated with the CAP laws examined in these studies. Lott and Whitley (2001) did not provide sufficient data for us to calculate IRRs and CIs for the effect size of interest, so these are not displayed in figure.

Figure 10.1
Incidence Rate Ratios Associated with the Effect of Child-Access Prevention Laws on Suicide



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details.

Conclusions

Total suicides. We identified one qualifying study that estimated the effect of CAP laws on total suicides in two population groups, those aged 14–17 and those aged 18–20 (Webster et al., 2004). For both groups, significant effects were found consistent with CAP laws reducing total suicides.

We conclude that available research offers *limited evidence that child-access prevention laws reduce total suicides among youth aged 14–20.*



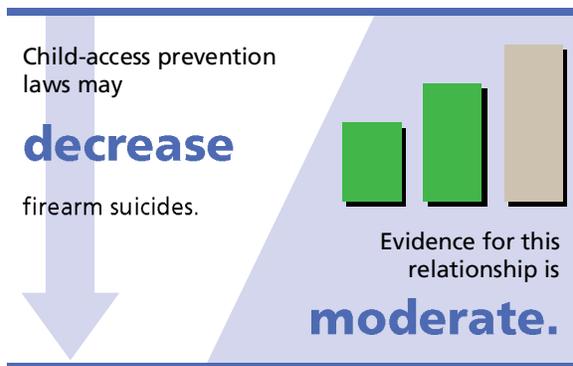
Firearm suicides and firearm self-injury. We identified five qualifying studies that estimated the effect of CAP laws on firearm suicide or firearm self-injury. Cummings et al. (1997a) identified a suggestive effect consistent with CAP laws reducing firearm suicides among children 14 or younger. Using a similar data series, Lott and Whitley



(2001) identified uncertain effects of CAP laws on those younger than age 15 and among those aged 15–17. Using a longer but overlapping data series, Webster et al. (2004) found significant effects suggesting that CAP laws reduce firearm suicide among those aged 14–17 and those aged 18–20. Gius (2015b) used a later, though partially overlapping, data series and similarly found a significant effect indicat-

ing that CAP laws reduce firearm suicides among those aged 19 or younger. Finally, using data on hospitalizations for self-inflicted firearm injuries, DeSimone, Markowitz, and Xu (2013) found significant effects suggesting that CAP laws reduce such injuries among those aged 17 or younger, but they found uncertain effects among adults aged 18 or older.

Based on these studies, our assessment of their relative strengths, and the fact



that effects are found across multiple data sets, we conclude that *there is supportive evidence that child-access prevention laws reduce all firearm self-injuries (including suicide attempts and self-injuries that were not the result of suicide attempts) among young people.* In addition, we find *moderate evidence that CAP laws reduce firearm suicides among this population.*

Effects on Violent Crime

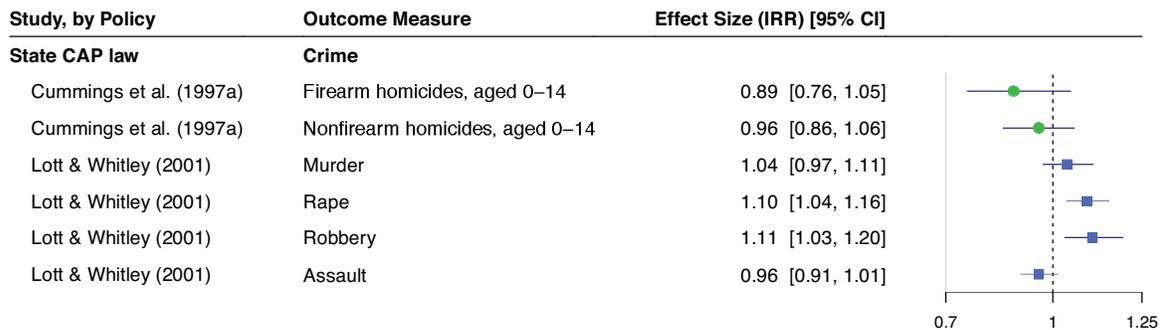
Research Synthesis Findings

Based on results from the same two quasi-experimental studies (Cummings et al., 1997a; Lott and Whitley, 2001), both NRC (2004) and Hahn et al. (2005) concluded that the evidence of the effects of CAP laws on violent crime was inconclusive. Using a limited set of controls and data spanning 1979 to 1994, Cummings et al. (1997a) found a suggestive relationship between CAP laws and firearm homicides for children

aged 15 or younger and uncertain effects for nonfirearm homicides. In contrast, examining an overlapping period from 1977 to 1996, Lott and Whitley (2001) found that CAP laws were significantly related to higher rates of rape (9-percent increase) and robbery (10-percent increase). In additional analyses, estimates showed a suggestive relationship between CAP laws and lower rates of assault, as well as uncertain effects of CAP laws on murder rates. However, the authors’ model had an unfavorable ratio of estimated parameters to observations (approximately one to eight), meaning the model may have been overfit, and thus parameter estimates and their CIs may have been invalid. Further, Lott and Whitley (2001) made no adjustment for clustering of standard errors at the state level, which threatens the validity of the significance values estimated from their model. In reviewing the more recent literature, we identified no new studies meeting our inclusion criteria that examined this relationship.

Figure 10.2 displays the IRRs and CIs associated with the CAP laws examined in these studies.

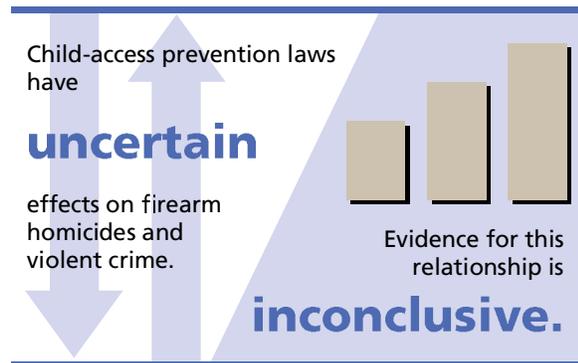
Figure 10.2
Incidence Rate Ratios Associated with the Effect of Child-Access Prevention Laws on Violent Crime



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details.

Conclusion

We identified two studies meeting our quality standards that evaluated the effect of CAP laws on any violent crime outcomes. Cummings et al. (1997a) reported a suggestive effect consistent with CAP laws reducing firearm homicide rates among children aged 14 or younger. Lott and Whitley (2001) found that these laws



significantly increased rates of robbery and rape. They also reported a suggestive effect consistent with the laws decreasing assault rates. The effect of CAP laws on murder rates was uncertain.

Considering the relative strengths of the two studies, we find *inconclusive evidence for the effect of child-access prevention laws on violent crimes generally and on specific violent crimes, including firearm homicides.*

Effects on Unintentional Injuries and Deaths

Research Synthesis Findings

In 2004, NRC reported that “the credibility of existing research [on CAP laws] cannot be assessed.” NRC made that conclusion based on three quasi-experimental studies that used overlapping data (Cummings et al., 1997a; Lott and Whitley, 2001; Webster and Starnes, 2000). Hahn et al. (2005) reached virtually the same conclusion after reviewing the same studies. With a limited set of controls, Cummings et al. (1997a) found that CAP laws were associated with a lower risk of unintentional firearm death in children aged 15 or younger (relative risk = 0.77; 95-percent CI: 0.63, 0.94) and suggestive evidence that the laws reduced such deaths in those aged 20–24 as well. In their re-analysis adding three more years of data and more states with CAP laws, Webster and Starnes (2000) also found that CAP laws were associated with a significant decrease in unintentional firearm deaths among those aged 14 or younger. In addition, they showed that this effect was not consistent across all states that have CAP laws. Significant reductions in such deaths were observed in states with felony CAP laws, and in states without felony laws, the effects were uncertain. Indeed, the authors noted that much of the observed effect of CAP laws was attributable to a single state, Florida, without which the overall effect of CAP laws still suggested that they reduce deaths, but the effect was uncertain. On the other hand, Lott and Whitley (2001) found only uncertain effects among youth aged 19 or younger, with some suggestive effects of an increase in unintentional injuries among children aged 5–9. Nevertheless, this model used an unfavorable ratio of estimated parameters to observations (approximately one to eight), meaning the model may have been overfit, and thus parameter estimates and CIs may be invalid; furthermore, no adjustment was made for clustered standard errors, so the standard errors and significance values reported in the paper were unreliable.

Since the NRC (2004) and Hahn et al. (2005) reports, three additional quasi-experimental studies provided new evidence on CAP laws, all of which used state and time fixed-effects models to examine the relationship between state CAP laws and firearm-related unintentional death or injury.

DeSimone, Markowitz, and Xu (2013) performed a fixed-effects analysis on unintentional non-self-inflicted gun injuries using hospital discharge data from the NIS spanning 1988 through 2003. They found that CAP laws based on negligent storage alone or on both negligent storage and reckless provision had uncertain effects

on unintentional firearm injuries in children aged 18 or younger in the 11 states that were part of the NIS, but they did find a statistically significant effect of these laws on unintentional firearm deaths among those 18 or older. Specifically, CAP laws that included negligent storage rules only were associated with a decline to 71 percent of the rates expected without implementing such laws; the policies that included both negligent storage and reckless provision rules were associated with a decline to 69 percent of the expected rate. This similarity in estimated effects is likely because only two states (Colorado and Wisconsin) in the NIS sample passed reckless provision laws during the study time frame; thus, identification in both specifications was largely driven by changes in state laws regarding negligent storage. The findings were generally confirmed in a second analysis adding more control states (states without a change in CAP laws over the period); however, in those analyses, safe storage and negligent provision laws were associated with a significant reduction in unintentional injuries for those aged 18 or younger.

As DeSimone, Markowitz, and Xu (2013) note, however, the data set on which their estimates are made is not strictly longitudinal, and it is not possible to determine the extent to which CAP law effect estimates are estimated cross-sectionally or longitudinally. In addition, the estimated effect sizes that we calculated from the parameter estimates provided in the paper are not consistent with the effect sizes the authors calculated from the same estimates. For these reasons, we are concerned that the parameter estimates and CIs reported in DeSimone, Markowitz, and Xu (2013) may not provide generalizable evidence about the effectiveness of CAP laws.

Hepburn et al. (2006) examined the relationship between CAP laws and unintentional firearm deaths from 1979 to 2000 among children aged 14 or younger compared with adults aged 55–74. In their state and time fixed-effects models, CAP laws were significantly associated with fewer unintentional deaths in children 14 or younger (but effects were uncertain among adults aged 55–74). For those 14 or younger, the estimate in Hepburn et al. (2006) suggests that the post-law firearm death rate was 78 percent of what would have been expected without the law. Like the analysis by Webster and Starnes (2000), the reduction was greatest in a model with the subset of states with felony CAP laws, in which rates after the laws were implemented were just 64 percent of the expected rate. In states with misdemeanor CAP laws, the effects were smaller and uncertain; in models excluding California or Florida, the effects were smaller and suggestive for those aged 14 or younger (see Figure 10.3). The authors controlled for firearm availability (using the proportion of suicides that were caused by a firearm as a proxy for availability) and for changes in the coding of causes of death between the ninth and tenth revisions of the International Statistical Classification of Diseases and Related Health Problems (ICD) in 1999. Demographic, social, and economic covariates were not included in this model, meaning that state variation in factors that may correspond with adoption of CAP laws cannot be ruled out as explaining the apparent CAP law effects.

Gius (2015b) also examined the relationship between unintentional firearm deaths among youth and state CAP laws, but in a wider age range (0–19 years) and between 1981 and 2010, which partially overlaps with the period studied by Hepburn et al. (2006). Unlike the earlier studies of similar data sets, this study found uncertain evidence of a reduction in youth unintentional deaths associated with CAP laws. Gius (2015b) controlled for a variety of state-level sociodemographic characteristics, along with two other laws related to youth firearm access (state minimum age requirements for handgun possession and the federal minimum age requirement for handgun possession enacted in 1994). The weighted least-squares statistical model used in this study may not be appropriate for the rate outcome, with low values or zero in many state-year observations. The model's lower bound at zero may result in violations of its assumptions and can yield biased and incorrect parameter estimates and CIs (Freedman, 2006).

Figure 10.3 displays the IRRs and CIs associated with the CAP laws examined in these studies. Lott and Whitley (2001) did not provide enough information for us to calculate IRRs and CIs for the effect size of interest, so we do not include these in the figure.

Conclusions

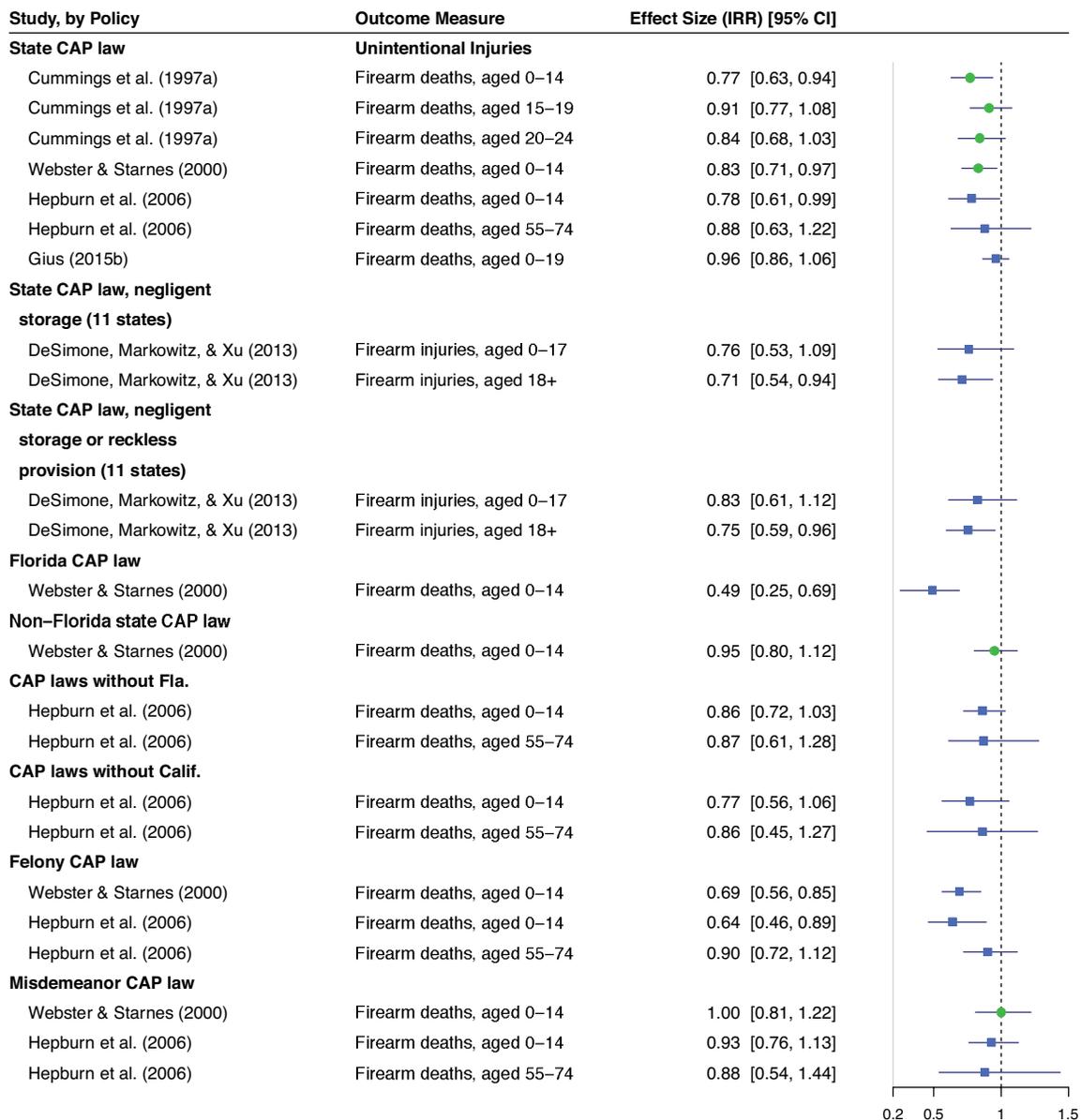
We identified six qualifying studies of the effect of CAP laws on unintentional firearm injuries or deaths. Cummings et al. (1997a) found a significant effect consistent with these laws reducing unintentional firearm deaths among children aged 14 or younger, uncertain effects on unintentional injuries for those aged 15–19, and a suggestive effect consistent with CAP laws reducing unintentional firearm injuries among those aged 20–24. Across four age groups, Lott and Whitley (2001) used an overlapping data set but found three uncertain effects and one suggestive effect consistent with CAP laws increasing unintentional firearm deaths among children aged 5–9.

Using a data set that was extended by one year beyond Lott and Whitley's, Webster and Starnes (2000) found a significant effect suggesting that CAP laws reduce such deaths in children aged 14 or younger. In subgroup analyses, they found that this effect

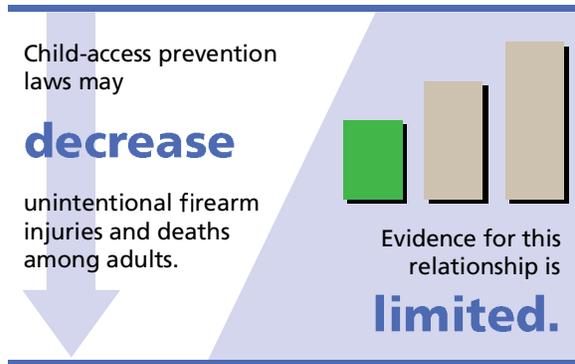
remains strong when examining just those states with felony CAP laws, but the effect was uncertain in states with misdemeanor CAP laws. Hepburn et al. (2006) used a similar data set extended by three years and produced a pattern of findings identical to those of Webster and Starnes (2000). Finally, Gius (2015b) added a decade of data to that studied by Hepburn et al. (2006)



Figure 10.3
Incidence Rate Ratios Associated with the Effect of Child-Access Prevention Laws on Unintentional Firearm Injuries and Deaths



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details.



and found uncertain effects of CAP laws on unintentional firearm injuries among those aged 19 or younger.

Using a separate data series, DeSimone, Markowitz, and Xu (2013) found that CAP laws significantly reduced unintentional firearm injuries among those aged 17 or younger and among those 18 or older.

Considering the relative strengths of these studies and the two distinct data sets used in them, we conclude that there is *supportive evidence that child-access prevention laws reduce unintentional firearm injuries and deaths among children*. Although much more limited in number, the studies that have examined effects on young adults or adults provide *limited evidence that these laws may reduce unintentional firearm injuries and deaths among adults as well*.

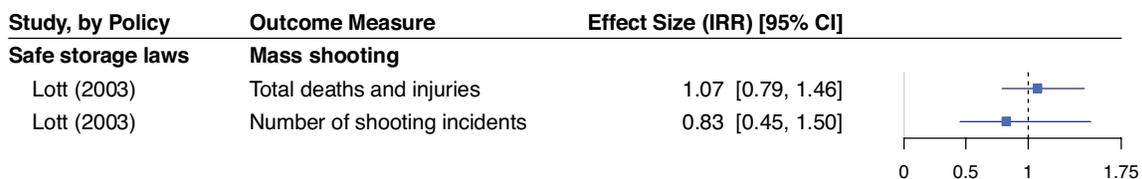
Effects on Mass Shootings

Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified research examining the effects of CAP laws on mass shootings in the United States. Our search yielded one such study that met our inclusion criteria. Using a Poisson specification, Lott (2003) estimated how state laws requiring that guns be safely stored affect fatalities, injuries, and the incidence of *multiple-victim public shootings*, which the author defined as events unrelated to other criminal activity in which two or more people were killed or wounded in a public location. The analysis covered 1977 to 1997, and regression models included controls for state and year fixed effects, other state firearm policies, and a broad range of state-level socioeconomic and demographic characteristics. The findings showed uncertain effects of safe storage laws on total casualties from multiple-victim public shootings and on total number of multiple-victim public shooting incidents. However, these models had an unfavorable ratio of estimated parameters to observations (approximately one to eight), suggesting that the model may have been overfit, and thus the estimated effects of these laws may be poor indicators of their true effects. In addition, the model did not adjust for clustered standard errors. Together, these shortcomings suggest that the model results may not accurately describe the true effects of safe storage laws.

Figure 10.4 displays the IRRs and CIs associated with the CAP laws examined in these studies.

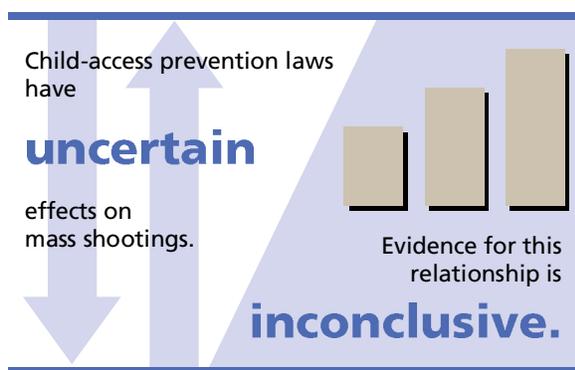
Figure 10.4
Incidence Rate Ratios Associated with the Effect of Child-Access Prevention Laws on Mass Shootings



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified one qualifying study of the effect of CAP laws on mass shootings. Lott (2003) found uncertain effects for these laws on mass shooting casualties and mass shooting incidents. Therefore, we find *inconclusive evidence for the effect of child-access prevention laws on mass shootings.*



Outcomes Without Studies Examining the Effects of Child-Access Prevention Laws

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the relationship between CAP laws and the following outcomes, and we identified no such studies that met our inclusion criteria:

- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

Chapter Ten References

American Law Institute, Model Penal Code, Section 2.02 cmt.at 238, 1985.

Azrael, Deborah, and Matthew Miller, “Reducing Suicide Without Affecting Underlying Mental Health: Theoretical Underpinnings and a Review of the Evidence Base Lining the Availability of Lethal Means and Suicide,” in Rory C. O’Connor and Jane Pirkis, eds., *The International Handbook of Suicide Prevention*, 2nd ed., Hoboken, N.J.: John Wiley and Sons, 2016.

Betz, M. E., M. Miller, C. Barber, B. Beaty, I. Miller, C. A. Camargo, Jr., and E. D. Boudreaux, “Lethal Means Access and Assessment Among Suicidal Emergency Department Patients,” *Depression and Anxiety*, Vol. 33, No. 6, 2016, pp. 502–511.

Brent, D. A., J. A. Perper, C. J. Allman, G. M. Moritz, M. E. Wartella, and J. P. Zelenak, “The Presence and Accessibility of Firearms in the Homes of Adolescent Suicides: A Case-Control Study,” *JAMA*, Vol. 266, No. 21, 1991, pp. 2989–2995.

Brent, D. A., J. A. Perper, G. Moritz, M. Baugher, J. Schweers, and C. Roth, “Firearms and Adolescent Suicide—A Community Case-Control Study,” *American Journal of Diseases of Children*, Vol. 147, No. 10, 1993b, pp. 1066–1071.

CDC—See Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention, “Nonfatal Injury Reports, 2001–2014,” WISQARS database, Atlanta, Ga., March 28, 2013. As of March 9, 2017: <https://webappa.cdc.gov/sasweb/ncipc/nfirates2001.html>

———, “Fatal Injury Reports, National and Regional, 1999–2015,” WISQARS database, Atlanta, Ga., June 24, 2015. As of March 23, 2017: https://webappa.cdc.gov/sasweb/ncipc/mortrate10_us.html

Conwell, Y., P. R. Duberstein, K. Connor, S. Eberly, C. Cox, and E. D. Caine, “Access to Firearms and Risk for Suicide in Middle-Aged and Older Adults,” *American Journal of Geriatric Psychiatry*, Vol. 10, No. 4, 2002, pp. 407–416.

Cummings, P., D. C. Grossman, F. P. Rivara, and T. D. Koepsell, “State Gun Safe Storage Laws and Child Mortality Due to Firearms,” *JAMA*, Vol. 278, No. 13, 1997a, pp. 1084–1086.

Dahlberg, L. L., R. M. Ikeda, and M. J. Kresnow, “Guns in the Home and Risk of a Violent Death in the Home: Findings from a National Study,” *American Journal of Epidemiology*, Vol. 160, No. 10, 2004, pp. 929–936.

DeSimone, J., S. Markowitz, and J. Xu, “Child Access Prevention Laws and Nonfatal Gun Injuries,” *Southern Economic Journal*, Vol. 80, No. 1, 2013, pp. 5–25.

Freedman, David A., “On the So-Called ‘Huber Sandwich Estimator’ and ‘Robust Standard Errors,’” *American Statistician*, Vol. 60, No. 4, 2006, pp. 299–302.

Gius, Mark, “The Impact of Minimum Age and Child Access Prevention Laws on Firearm-Related Youth Suicides and Unintentional Deaths,” *Social Science Journal*, Vol. 52, No. 2, 2015b, pp. 168–175.

Grossman, D. C., B. A. Mueller, C. Riedy, M. D. Dowd, A. Villaveces, J. Prodzinski, J. Nakagawara, J. Howard, N. Thiersch, and R. Harruff, “Gun Storage Practices and Risk of Youth Suicide and Unintentional Firearm Injuries,” *JAMA*, Vol. 293, No. 6, 2005, pp. 707–714.

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, “Firearms Laws and the Reduction of Violence: A Systematic Review,” *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Hepburn, L., D. Azrael, M. Miller, and D. Hemenway, “The Effect of Child Access Prevention Laws on Unintentional Child Firearm Fatalities, 1979–2000,” *Journal of Trauma-Injury Infection and Critical Care*, Vol. 61, No. 2, 2006, pp. 423–428.

Ilgen, M. A., K. Zivin, R. J. McCammon, and M. Valenstein, "Mental Illness, Previous Suicidality, and Access to Guns in the United States," *Psychiatric Services*, Vol. 59, No. 2, 2008, pp. 198–200.

Johnson, R. M., C. Barber, D. Azrael, D. E. Clark, and D. Hemenway, "Who Are the Owners of Firearms Used in Adolescent Suicides?" *Suicide and Life-Threatening Behavior*, Vol. 40, No. 6, 2010, pp. 609–611.

LaFree, G., and C. Birbeck, *Controlling New Mexico Juveniles' Possession of Firearms*, Albuquerque, N.M.: New Mexico Criminal Justice Statistical Analysis Center, Working Paper 27, 1998. As of May 9, 2017:
<http://nmsc.unm.edu/reports/1998/JuvFirearmPossession.pdf>

Loeber, R., and R. Stallings, "Modeling the Impact of Interventions on Local Indicators of Offending, Victimization, and Incarceration," in R. Loeber and D. P. Farrington, eds., *Young Homicide Offenders and Victims: Risk Factors, Prediction, and Prevention from Childhood*, New York: Springer, 2011, pp. 137–152.

Lott, John R., Jr., *The Bias Against Guns: Why Almost Everything You've Heard About Gun Control Is Wrong*, Washington, D.C.: Regnery Publishing, Inc., 2003.

Lott, John R., Jr., and John E. Whitley, "Safe-Storage Gun Laws: Accidental Deaths, Suicides, and Crime," *Journal of Law and Economics*, Vol. 44, No. 2, 2001, pp. 659–689.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Office of Juvenile Justice and Delinquency Prevention, *OJJDP Statistical Briefing Book*, Washington, D.C.: U.S. Department of Justice, May 25, 2016. As of May 9, 2017:
<https://www.ojjdp.gov/ojstatbb/>

Oslin, D. W., C. Zubritsky, G. Brown, M. Mullahy, A. Puliafico, and T. Ten Have, "Managing Suicide Risk in Late Life: Access to Firearms as a Public Health Risk," *American Journal of Geriatric Psychiatry*, Vol. 12, No. 1, 2004, pp. 30–36.

Shenassa, E. D., M. L. Rogers, K. L. Spalding, and M. B. Roberts, "Safer Storage of Firearms at Home and Risk of Suicide: A Study of Protective Factors in a Nationally Representative Sample," *Journal of Epidemiology and Community Health*, Vol. 58, No. 10, 2004, pp. 841–848.

Smith, P. N., J. Currier, and K. Drescher, "Firearm Ownership in Veterans Entering Residential PTSD Treatment: Associations with Suicide Ideation, Attempts, and Combat Exposure," *Psychiatry Research*, Vol. 229, No. 1–2, 2015, pp. 220–224.

Spicer, R. S., and T. R. Miller, "Suicide Acts in 8 States: Incidence and Case Fatality Rates by Demographics and Method," *American Journal of Public Health*, Vol. 90, No. 12, 2000, pp. 1885–1891.

Webster, D. W., L. H. Freed, S. Frattaroli, and M. H. Wilson, "How Delinquent Youths Acquire Guns: Initial Versus Most Recent Gun Acquisitions," *Journal of Urban Health*, Vol. 79, No. 1, 2002, pp. 60–69.

Webster, Daniel W., and Marc Starnes, "Reexamining the Association Between Child Access Prevention Gun Laws and Unintentional Shooting Deaths of Children," *Pediatrics*, Vol. 106, No. 6, 2000, pp. 1466–1469.

Webster, D. W., J. S. Vernick, A. M. Zeoli, and J. A. Manganello, "Association Between Youth-Focused Firearm Laws and Youth Suicides," *JAMA*, Vol. 292, No. 5, 2004, pp. 594–601.

CHAPTER ELEVEN

Surrender of Firearms by Prohibited Possessors

Federal law bans the sale of firearms to prohibited possessors, which include minors, illegal immigrants, convicted felons, fugitives from justice, users of controlled substances, those with adjudicated mental illnesses or involuntarily committed to mental institutions, those who have been dishonorably discharged from the military, those who have renounced their U.S. citizenship, those subject to restraining orders, and those convicted of domestic violence offenses (18 U.S.C. 922). However, there is no procedure under federal law for the *removal* of firearms from these same classes of prohibited possessors or for checking to see whether they have firearms at the time they become prohibited possessors.

While background checks and permit-to-purchase laws aim to prevent the purchase of firearms by prohibited individuals, laws requiring certain prohibited possessors to surrender firearms are designed to ensure that firearm owners relinquish their weapons once they are identified as belonging to a class of prohibited possessors. Through this mechanism, these laws should reduce rates of suicide or gun violence in this population, which is assumed to be at elevated risk. For instance, as discussed in Chapter Twenty-One, there is evidence that domestic violence offenders present an especially elevated risk of violence to their partners. For this reason, many state firearm-surrender laws focus on domestic violence offenders at the time they are convicted of such crimes.

To assess the impact of these policies, the ideal analyses would estimate effects on outcomes specifically for those populations required to surrender their firearms under the regulations. For instance, to study the impact on gun violence of laws requiring the removal or surrender of firearms by persons convicted of a domestic violence misdemeanor, one would like to estimate how violent crime rates changed after the law for this subgroup of the population relative to others not directly affected by the law. Further, because these laws will be effective only to the extent that they are enforced, causal inference could be strengthened with information on the number of firearms that were surrendered or the proportion of prohibited possessors that have been disarmed.

State Implementation of Firearm-Surrender Laws

Although most state laws allow law enforcement to remove the guns they discover in the possession of a prohibited person, fewer have laws that specify any mechanism for such individuals to surrender their firearms on their own (Giffords Law Center to Prevent Gun Violence, undated-b).

Eight states have laws requiring the surrender of firearms by certain prohibited possessors.¹ These states define a range of procedures for prohibited possessors to dispose of their firearms and time frames for doing so, and, in some cases, the laws stipulate roles for judicial officers or law enforcement to ensure that firearms are surrendered or confiscated. In addition, 13 states require the surrender of firearms pursuant to orders of protection to last for the duration of the order.²

¹ California, Connecticut, Hawaii, Illinois, Massachusetts, New York, Pennsylvania, and Wisconsin. See

- Calif. Penal Code § 29810. The court shall provide the notifying defendant of prohibition against firearm possession and provide a form for facilitating the transfer of firearms. The form, which notes that the prohibition is effective immediately, allows the individual to designate another to have power of attorney for the purpose of disposing of or transferring the firearms (California Department of Justice, 2015). The power of attorney lasts for 30 days. The individual may also transfer possession to a licensed dealer for storage. See also Calif. Fam. Code § 6389. The individual shall surrender firearms for the period of the protective order.
- Conn. Gen. Stat. Ann. § 29036k. The individual has two business days to surrender firearms to the state or transfer them to an eligible individual. If surrendered, the individual has one year to transfer firearms to an eligible individual.
- Hawaii Rev. Stat. Ann. § 134-7.3. The individual has 30 days to dispose of or surrender firearms to law enforcement. If not surrendered, law enforcement may seize the firearms. See also Hawaii Rev. Stat. Ann. § 134-7(f). The individual must surrender firearms following any restraining order issued by a court.
- 430 Ill. Comp. Stat. 65/9.5. The individual must surrender his or her firearm owner's identification card; submit a firearm disposition record; and, within 48 hours, place firearms in the location of or with the person reported on the disposition record.
- Mass. Gen. Laws Ch. 140 § 129B, 129D. Upon revocation of firearm identification card, the individual must surrender all firearms "without delay." The individual then has one year to transfer firearms to a licensed dealer or permitted possessor.
- N.Y. Crim. Proc. Law §§ 330.20; 380.96 N.Y. Penal Law § 400.05. A judge shall order revocation of an individual's firearm license and demand the surrender of firearms. The individual has one year to transfer or sell firearms to a licensed dealer or to himself or herself (pursuant to obtaining a valid license).
- 18 Pa. Cons. Stat. Ann. § 6105. The individual has 60 days to sell or transfer firearms to an eligible individual outside his or her household.
- Wisc. Stat. Ann. §§ 51.20, 51.45, 54.10, 55.12. If the court determines that an individual is a prohibited possessor under federal law, the court shall order the seizure of his or her firearms. See also Wisc. Stat. Ann. § 813.12. The individual must surrender firearms following a court-issued injunction after domestic abuse.

² California, Colorado, Hawaii, Iowa, Maryland, Massachusetts, Minnesota, New Hampshire, New York, North Carolina, Pennsylvania, Tennessee, and Washington. See Calif. Fam. Code § 6389; Colo. Rev. Stat. § 13-14-105.5; Hawaii Rev. Stat. Ann. § 134-7(f); Iowa Code § 724.26(4); Md. Code, Fam. Law § 4-506; Mass. Gen. Laws Ch. 209A §3B; Minn. Stat. § 518B.01, subd. 6(g); N.H. Rev. Stat. Ann. § 173-B:5; N.Y. Fam. Ct. Act § 842-a; N.C. Gen. Stat. Ann. § 50B-3.1; 23 Pa. Cons. Stat. Ann. § 6108; Tenn. Code Ann. § 36-3-625(a); Rev. Code. Wash. Ann. § 9.410.800.

In addition to the states that require surrender by every prohibited possessor, four states require individuals convicted of domestic violence misdemeanors to surrender their firearms.³

Effects on Violent Crime

Research Synthesis Findings

Neither the National Research Council (NRC) (2004) nor Hahn et al. (2005) reports specifically reviewed policies that provide a mechanism for removing firearms from prohibited possessors. The NRC panel did conclude, “There is not much empirical evidence that assesses whether attempts to reduce criminal access to firearms will reduce gun availability or gun crime.” However, three studies published since then provide some evidence on the effects of these laws. Vigdor and Mercy (2006) examined how intimate partner homicide is affected by laws that allow law enforcement officers to confiscate firearms at the scene of alleged domestic violence incidents. (The authors also analyzed the effects of laws that prohibit people under a domestic violence restraining order from purchasing or possessing a gun and that prohibit people who have been convicted of a misdemeanor domestic violence offense from possessing a gun.) Their state-level analysis of intimate partner homicide rates from 1982 to 2002 found no overall effect of confiscation policies. Secondary analyses of the effects of these laws on other crimes found uncertain effects on stranger homicides, rapes, robberies, and motor vehicle thefts but significant effects suggesting that confiscation laws may increase assaults and burglaries. The authors note that the effects of confiscation laws will depend, to a large extent, on how rigorously they are implemented and enforced and suggest that future research should examine associations between crime reduction and implementation differences.

Zeoli and Webster (2010) examined the effects of policies designed to restrict access to weapons by those with domestic violence–related restraining orders or those convicted of misdemeanors. Among the policies they examined were state laws allowing police to confiscate firearms from a domestic violence incident (they simultaneously examined state laws that allow police to make warrantless arrests for domestic violence restraining order violations and that mandate arrest for domestic violence restraining order violations). They analyzed data from 46 cities between 1979 and 2003 and found no evidence that laws that allow police to confiscate firearms from a domestic violence incident affected rates of intimate partner homicide. However, they

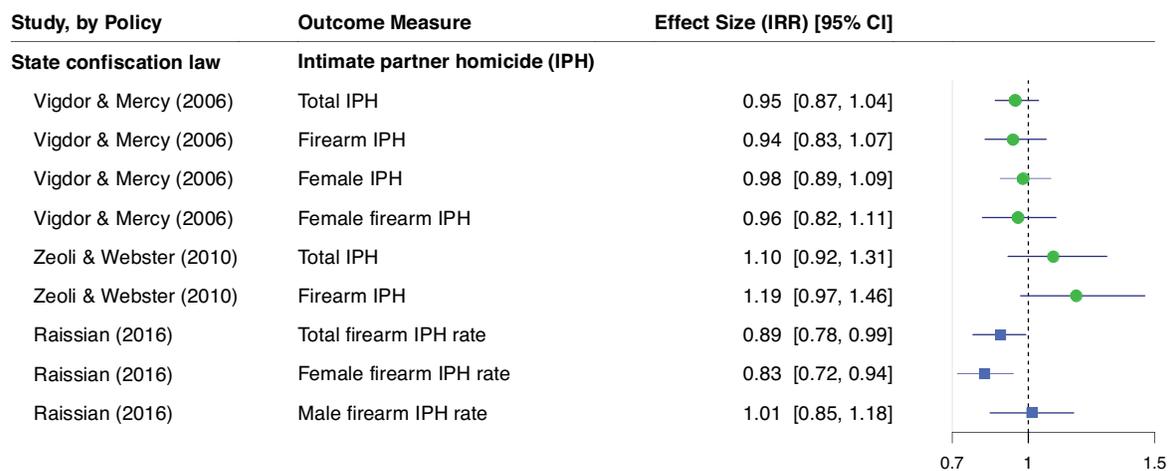
³ Illinois, Iowa, Minnesota, and Tennessee. See 730 Ill. Comp. Stat. 5/5-6-3; Iowa Code Ann. § 724.26 (court shall order the convicted individual to sell or transfer firearms; if not possible, court shall store firearms until a qualified transferee is identified or possession allowed); Minn. Stat. Ann. § 2242 (court shall order the convicted individual to transfer firearms to the state, a licensed dealer, or an eligible third party within three days; the transfer may be temporary or permanent); Tenn. Code Ann. § 39-13-111.

did find a significant reduction in intimate partner homicides from laws that restrict access to firearms for domestic violence–related restraining orders and laws that allow police to arrest restraining order violators without a warrant.

A final study also worth noting examined the 1996 Lautenberg Amendment, which was designed to extend prohibited-possessor status to those convicted of misdemeanor domestic violence offenses. The law also stipulated a mechanism for checking the firearm ownership of newly prohibited possessors and requiring that they surrender all firearms. Raissian (2016) identified the effect of the federal law by exploiting states' variation in assault statues, which, because of imprecise language in the Lautenberg Amendment, affected whether the new federal prohibitions applied to domestic violence misdemeanants. In 2009, the U.S. Supreme Court corrected the ambiguity in *United States v. Hayes*. Raissian (2016) found that intimate partner homicides and other family homicides declined when domestic violence misdemeanants were prohibited from possessing firearms and required to surrender any in their possession. However, because this study evaluates a policy change that simultaneously required firearm surrender and expanded the prohibited class, it does not isolate the specific effect of surrender, so we do not include this study as evidence for the effect of surrender per se.

Figure 11.1 displays the incidence rate ratios (IRRs) and confidence intervals (CIs) associated with the firearm-surrender laws examined in these studies.

Figure 11.1
Incidence Rate Ratios Associated with the Effect of Firearm-Surrender Laws on Violent Crime

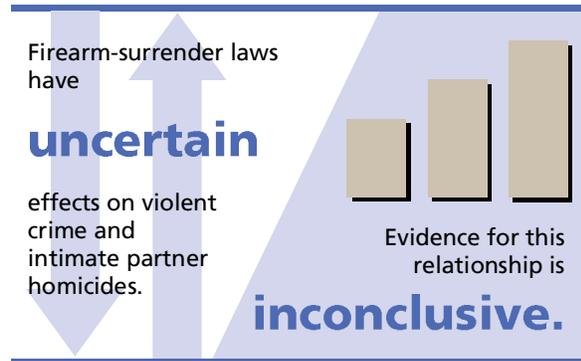


NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details. IPH = intimate partner homicide.

Conclusions

We identified two qualifying studies that examined the effect on any violent crimes of laws requiring prohibited possessors to surrender firearms. Vigdor and Mercy (2006) found such laws to have uncertain effects on total intimate partner homicides committed with firearms. Similarly, they found only uncertain effects of these laws on intimate partner homicides committed by any means, as well as uncertain effects for firearm intimate partner homicides of women. Zeoli and Webster (2010) also found the effects of surrender laws on intimate partner homicides and firearm intimate partner homicides to be uncertain. Additional analyses by Vigdor and Mercy (2006) that focused on other types of violent crime found significant effects of confiscation laws indicating that they increase assaults and burglaries, but they found uncertain effects of these laws on stranger homicides, rapes, and robberies.

Based on the results of these studies, we find *inconclusive evidence for how laws requiring prohibited possessors to surrender firearms affect violent crime generally and intimate partner homicides in particular.*



Outcomes Without Studies Examining the Effects of Firearm-Surrender Laws

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the relationship between the surrender of firearms by prohibited possessors and the following outcomes, and we identified no such studies that met our inclusion criteria:

- suicide
- unintentional injuries and deaths
- mass shootings
- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

Chapter Eleven References

California Department of Justice, “General Notice of Firearm Prohibition and Power of Attorney for Firearms Relinquishment, Sale, or Transfer for Storage,” BOF 110, October 2015. As of June 29, 2017:

<https://www.oag.ca.gov/sites/all/files/agweb/pdfs/firearms/forms/poafirearmsdecl.pdf>

Giffords Law Center to Prevent Gun Violence, “Categories of Prohibited People,” web page, undated-b. As of October 18, 2017:

<http://lawcenter.giffords.org/gun-laws/policy-areas/who-can-have-a-gun/categories-of-prohibited-people/>

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, “Firearms Laws and the Reduction of Violence: A Systematic Review,” *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Raissian, Kerri M., “Hold Your Fire: Did the 1996 Federal Gun Control Act Expansion Reduce Domestic Homicides?” *Journal of Policy Analysis and Management*, Vol. 35, No. 1, Winter 2016, pp. 67–93.

United States Code, Title 18, Section 922, Unlawful Acts.

Vigdor, E. R., and J. A. Mercy, “Do Laws Restricting Access to Firearms by Domestic Violence Offenders Prevent Intimate Partner Homicide?” *Evaluation Review*, Vol. 30, 2006, pp. 313–346.

Zeoli, A. M., and D. W. Webster, “Effects of Domestic Violence Policies, Alcohol Taxes and Police Staffing Levels on Intimate Partner Homicide in Large U.S. Cities,” *Injury Prevention*, Vol. 16, No. 2, 2010, pp. 90–95.

CHAPTER TWELVE

Minimum Age Requirements

Under federal law, licensed dealers cannot sell or deliver handguns to individuals under age 21 or long guns to those under age 18. Unlicensed individuals cannot sell, transfer, or deliver handguns to individuals under age 18. With some exceptions, federal law prohibits individuals under age 18 from possessing handguns, but it does not place age restrictions on the possession of long guns (18 U.S.C. 922).

Laws requiring a minimum age for purchase aim to make it more difficult for underage individuals to acquire a handgun through formal channels, while laws requiring a minimum age of possession are intended to make it more difficult or risky for an underage individual to carry firearms in public. Thus, although the mechanisms by which these laws influence youth access differ, both are designed to limit the availability of firearms to young people—and therefore reduce the gun violence and unintentional shootings they commit.

Firearm homicides and violent crimes disproportionately involve individuals under age 21, both as perpetrators and as victims. Indeed, in 2012, arrest rates for violent crimes peaked at age 18 (Office of Juvenile Justice and Delinquency Prevention, 2016). Of the 7,152 firearm homicides committed in 2014 for which the age of the offender was known, 47.2 percent were perpetrated by individuals aged 12–24 (Puzanchera, Chamberlin, and Kang, 2017), although this group represents only 17.7 percent of the general U.S. population (U.S. Census Bureau, 2017). By influencing the possession of guns among youth, minimum age laws could thus reduce rates of firearm crime perpetrated by juveniles. However, youth are similarly at high risk of victimization. Of all deaths among those aged 16–21, 16.5 percent are homicides, which is greater than the homicide rates for the next-highest risk ages (13.3 percent for those aged 22–27; 8.8 percent for those aged 28–33) (Centers for Disease Control and Prevention [CDC], 2017b). In theory, therefore, stricter age limits on purchasing or possessing a firearm could reduce the incidence of defensive gun use by youth and potentially increase perpetration of violence against younger populations if offenders believe that the likelihood of encountering armed resistance is lower (Marvell, 2001).

Conceptually, by restricting youth access, minimum age restrictions could also reduce rates of firearm suicide or unintentional shootings by the affected age group. Research suggests that the association between firearm availability and suicide is stron-

gest among adolescents and young adults (Birckmayer and Hemenway, 2001; Miller and Hemenway, 1999). In 2015, there were 3,111 suicide deaths among individuals aged 16–21, 43.6 percent of which involved a firearm (calculated using data from CDC, 2015). Evidence indicates that 50 percent to 60 percent of all firearm suicides by youth under age 21 involve a handgun, suggesting that minimum age laws that cover all firearms may have larger effects on suicide rates compared with laws focused on handguns alone (Johnson et al., 2010; Wright, Wintemute, and Claire, 2008; Shah et al., 2000; Grossman, Reay, and Baker, 1999).

The effects of laws requiring a minimum purchase age will depend largely on how youth acquire firearms. Much of the existing evidence on sources of guns to youth comes from surveys of juvenile offenders or high-risk adolescents and suggests that purchases from retailers are relatively rare among adolescents involved with criminal activity. Among juveniles who have been incarcerated or arrested, surveys have found that youth offenders acquire their firearms through similar sources as adult offenders, with more than 80 percent citing a friend, a family member, or the black market as the means by which they acquired their weapon (Webster et al., 2002; LaFree and Birbeck, 1998). This finding indicates that minimum age laws may be effective at limiting youth access through legitimate retail sources. An early study of firearms used by students in school-associated firearm deaths (both suicide and homicide) between 1992 and 1999 similarly found that only 9.6 percent of the firearms used in homicide events and none of the firearms used in suicide events were purchased legally (CDC, 2001). Still, in a 1996 national survey of male high school students, 50 percent of respondents reported that they would have little or no trouble obtaining a gun (Sheley and Wright, 1998). In a 1996 national study of students in grades 8 through 12, 21 percent of respondents reported having easy access to guns at home, and the types of firearms available were evenly distributed among handguns, rifles, and shotguns (Ruback, Shaffer, and Clark, 2011).

The effects of laws requiring a minimum age of possession will depend on the expected costs youth perceive to be associated with violating such laws, which will likely be influenced by state legal penalties and the level of enforcement efforts devoted to enforcing the prohibition (Marvell, 2001). Semi-structured interviews with incarcerated adolescent males in 1998 found fear of arrest and incarceration as the most commonly reported reasons for choosing not to acquire or carry a gun (Freed et al., 2001). Still, in 2015, 5.3 percent of high school students reported carrying a gun (Kann et al., 2016). Given the relative importance of the home and family members as a source of guns to juveniles, the most-significant effects of minimum age of possession policies may occur if they create a disincentive for older individuals to keep guns at home or to allow guns in the home to be easily accessed (Marvell, 2001).

Much of the conversation about minimum age restrictions revolves around handguns rather than long guns. This is because handguns are more frequently used than long guns in firearm suicides and violent crime, so, in theory, raising the minimum age

for such weapons could decrease violence without impacting lawful activities, such as hunting (Tritch, 2014). More-restrictive minimum age laws could plausibly impact the gun industry by reducing the size of the consumer population and decreasing the ownership and use of guns by youth for hunting or recreational purposes. Overall, hunting participation in the United States has declined dramatically over the past decades, and although data on youth recreational firearm use are limited (Vittes and Sorenson, 2005), estimates from 2006 showed 1.7 million youth hunters aged 6–15 (Families Afield, 2010). Further, the vast majority of adult hunters initiate hunting activities before age 20, and those who have not learned to hunt by age 20 have a very low likelihood of participating in hunting activities as an adult (Duda and Young, 1993). Should minimum age laws reduce initiation of firearm use for hunting or recreational purposes, there could be longer-term effects on these outcomes.

Data on suicides and self-inflicted nonfatal injury stratified by age are readily available; thus, analyses can directly test whether effects of minimum age laws on these outcomes are driven by the relevant age group affected by the policy. For outcomes of violent crime and non-self-inflicted injury, causal analyses could be improved with data that reported the age of the shooter. However, as most data sources report only the age of the victim,¹ none of the studies we identified that met our inclusion criteria for this policy used this type of data. Methodological approaches could also leverage state variation in the types of guns restricted under the minimum age laws for outcome data that have information on the type of firearm involved. For any analysis, estimates of causal effects would be strengthened with data showing how minimum age laws affected gun purchase or carrying behavior by youth of the affected age group. While some national surveys (e.g., the Youth Behavioral Risk Surveillance System, National Survey of Drug Use and Health, National Longitudinal Study of Adolescent to Adult Health) ask youth about gun ownership or carrying behaviors, their samples are often limited to high school students, focused on handguns, or available for a limited set of years.

State Implementation of Minimum Age Requirements

States have adopted a range of minimum age requirements that are, in some cases, higher or lower than the federal minimums. For instance, nine states and the District of Columbia restrict all handgun sales to individuals aged 21 or older and long gun sales to individuals aged 18 or older. In effect, this raises the minimum age restrictions above those set by federal law in two ways: The age to purchase handguns through pri-

¹ Exceptions include the Federal Bureau of Investigation's Supplementary Homicide Reports, which contain age of victim and age of offender for murders when such information is known, and the National Violent Death Reporting System, which contains information on the age of the shooter for non-self-inflicted fatal injuries when such information is known for a subset of states.

vate sales is raised from 18 to 21, and a minimum age for private sales of long guns is set to 18.² Two states, Hawaii and Illinois, restrict sales for all firearms to those aged 21 or older.³ This imposes more-restrictive age limits than federal law on all sales other than handgun sales by dealers. Other states set minimums below the federal limits. For instance, Vermont imposes a minimum age of 16 for all sales, and Maine imposes a minimum age of 18 for handgun sales and 16 for long gun sales.⁴ In practice, these affect only long gun sales from nondealers, because minimum age requirements for all other sales would be governed by the more-restrictive federal laws.

As mentioned, federal law places no minimum on the age of possession of long guns (18 U.S.C. 922), but several states have imposed such minimums. For instance, 14 states restrict possession of long guns to those aged 18 or older,⁵ and Illinois and the District of Columbia restrict long gun possession to those aged 21 or older.⁶ The minimum age for possession of a long gun in Alaska, Minnesota, and New York is 16,⁷ and it is 14 in Montana.⁸

Effects on Suicide

Research Synthesis Findings

In 2004, the National Research Council (NRC) identified four quasi-experimental studies of gun policy effects on suicide outcomes, none of which examined minimum age restrictions. Hahn et al. (2005) identified one cross-sectional study of the associa-

² California, Connecticut, Delaware, Iowa, Maryland, Massachusetts, New Jersey, Ohio, Rhode Island, and the District of Columbia. See Calif. Penal Code § 27505; Conn. Gen. Stat. Ann. §§ 29-34, 29-37a; Del. Code tit. 24 § 901, 903, tit. 11 § 1445; Iowa Code Ann. § 724.22; Md. Code Ann., Pub. Safety §§ 5-101, 5-134; Mass. Gen. Laws Ch. 140 §§ 121, 130; N.J. Stat. Ann. § 2C:39-10; Ohio Rev. Code Ann. § 2923.21; R.I. Gen. Laws §§ 11-47-30, 11-47-35; D.C. Code Ann. §§ 7-2507.07, 22-4507.

³ Hawaii Rev. Stat. Ann. § 134-2; Ill. Comp. Stat. 65/3, 65/4. Although Hawaii's law is silent about sales, the state issues permits to acquire to those aged 21 or older, and permits are required for purchases. Illinois requires a firearm owner's identification card for transfer, and the card is issued only to those aged 21 or older. However, 720 Ill. Comp. Stat. 5/24-3.1 prohibits sales of handguns to those under age 18.

⁴ Vt. Stat. Ann. tit. 13, § 4007; Me. Rev. Stat. Ann. tit. 17-A §§ 554-A, 554-B.

⁵ Florida, Idaho, Indiana, Iowa, Michigan, Nevada, New Jersey, Oklahoma, Oregon, Pennsylvania, Rhode Island, Utah, Washington, and Wisconsin. See Fla. Stat. Ann. § 790.22; Idaho Code Ann. § 18-3302E; Ind. Ann. Code § 35-47-10-5; Iowa Code Ann. § 724.22; Mich. Comp. Laws Ann. § 750.234f; Nev. Rev. Stat. Ann. § 202.300; N.J. Stat. Ann. § 2C:58-6.1; Okla. Stat. Ann. §§ 1272, 1273; Ore. Rev. Stat. Ann. § 166.250; Pa. Cons. Stat. § 6110.1; R.I. Gen. Laws Ann. § 11-47-33; Utah Code Ann. § 76-10-509; Wash. Rev. Code Ann. § 9.41.040; Wisc. Stat. § 948.60.

⁶ Ill. Comp. Stat. Ann. 65/4 (regulates the firearm owners identification card); D.C. Code Ann. § 7-2502.03.

⁷ Alaska Stat. § 11.61.220; Minn. Stat. § 97B.021 (but individuals aged 14 or 15 and with firearm safety certificates may possess long guns); N.Y. Penal Code § 265.05.

⁸ Mont. Code Ann. § 45-8-344.

tion between minor age and suicide (Kleck and Patterson, 1993), a study that does not meet our inclusion criteria. Since then, three longitudinal studies provided evidence on the impact of minimum age requirements on suicide.

Using data from 1976 to 2001, Webster et al. (2004) examined the effect of state-level changes in minimum purchase and possession age laws on suicide rates among those aged 14–17 and 18–20. The authors used negative binomial regression models that employed generalized estimating equations and that included state fixed effects and other covariates. They found uncertain effects of the laws on suicide rates among those aged 14–17. However, states that increased the minimum purchase age to 21 saw a statistically significant decrease in firearm suicides among those aged 18–20, but the authors found uncertain effects of the laws on total or nonfirearm suicides. They found that the three states that increased the age of handgun possession to 21 experienced a statistically significant increase in total suicides among those aged 18–20, accounted for, in part, by a suggestive increase in firearm suicides in this group. The authors suggested that this result was weakly estimated, having been based on just three states, two of which implemented their laws in the final years of the study period, meaning there was little time over which to observe changes in state suicide rates attributable to the law. These limitations raise valid questions about whether the observed effects are attributable to raising the age of possession of handguns to 21 or to other factors affecting these states' suicide rates. Finally, the authors examined the effect of federal minimum age of possession and purchase of handguns among states that previously had lower minimum age laws compared with those for which the federal law did not raise the minimum ages. These analyses identified a suggestive increase in total suicides among those aged 14–17 from raising the federal minimum possession age but only uncertain effects for other outcomes associated with raising the minimum age to purchase handguns among this age group.

Gius (2015b) examined how both state-specific laws for minimum age for firearm possession and federal laws for minimum age for handgun possession implemented in 1994 affected suicides by those aged 19 or younger. This analysis controlled for several state-level sociodemographic characteristics and enactment of child-access prevention laws between 1981 and 2010. Its results suggest that state-level minimum age restrictions had uncertain effects on suicide. The weighted least-squares statistical model is not likely to produce reliable estimates for the nonlinear outcome of suicide rates, meaning the model's estimates and their standard errors may be unreliable (Freedman, 2006). The study's estimate for the federal minimum age law for handgun possession passed in 1994 did not meet our inclusion criteria, because, as specified in this model, there was no comparison group that did not get the identical intervention in 1994.

Rosengart et al. (2005) used a similar approach to model the effects of state laws between 1979 and 1998, when “seven states adopted and two states repealed a law restricting the minimum age for the *private purchase* of a handgun to 21 years, [and] five states adopted laws restricting the minimum age for the *private possession* of a hand-

gun to 21 years” (emphasis added). In these models controlling for state fixed effects, time trends, state-level variation in poverty and demographic factors, and two other firearm laws⁹ (but not the federal 1994 law imposing a minimum age requirement for handgun possession), they found mostly uncertain effects of these laws on the firearm suicide rate. However, they did find suggestive effects consistent with minimum possession age laws increasing the total suicide rate among those under age 20, as well as minimum purchase age laws increasing total suicides among those aged 20 or older. These models had limited information to use in identifying causal effects of these laws because relatively few states changed one or both laws over the study period; in addition, every state but one that raised its minimum age for possession did so the same year it implemented a minimum purchase law, making the effects of these laws confounded. Moreover, the statistical model had an unfavorable ratio of covariates to observations (less than one to eight), meaning the model may have been overfit, resulting in estimates and confidence intervals (CIs) that are unreliable indicators of the true causal effects of the laws.

Figure 12.1 displays the incidence rate ratios (IRRs) and CIs associated with the minimum age requirements examined in these studies. We do not present estimates of the federal minimum possession age from Gius (2015b) because they do not meet our criteria for inclusion. Estimates of the federal minimum purchase age and minimum possession age laws from Webster et al. (2004) are included because, although details of the model are not specified, it appears to satisfy our inclusion criteria based on the authors’ following statement: “The federal law establishing a minimum legal age for handgun purchase and possession was assumed to affect only states that, prior to the federal law, either had no minimum-age law of this type or had a law that established a minimum legal age younger than 18 years.”

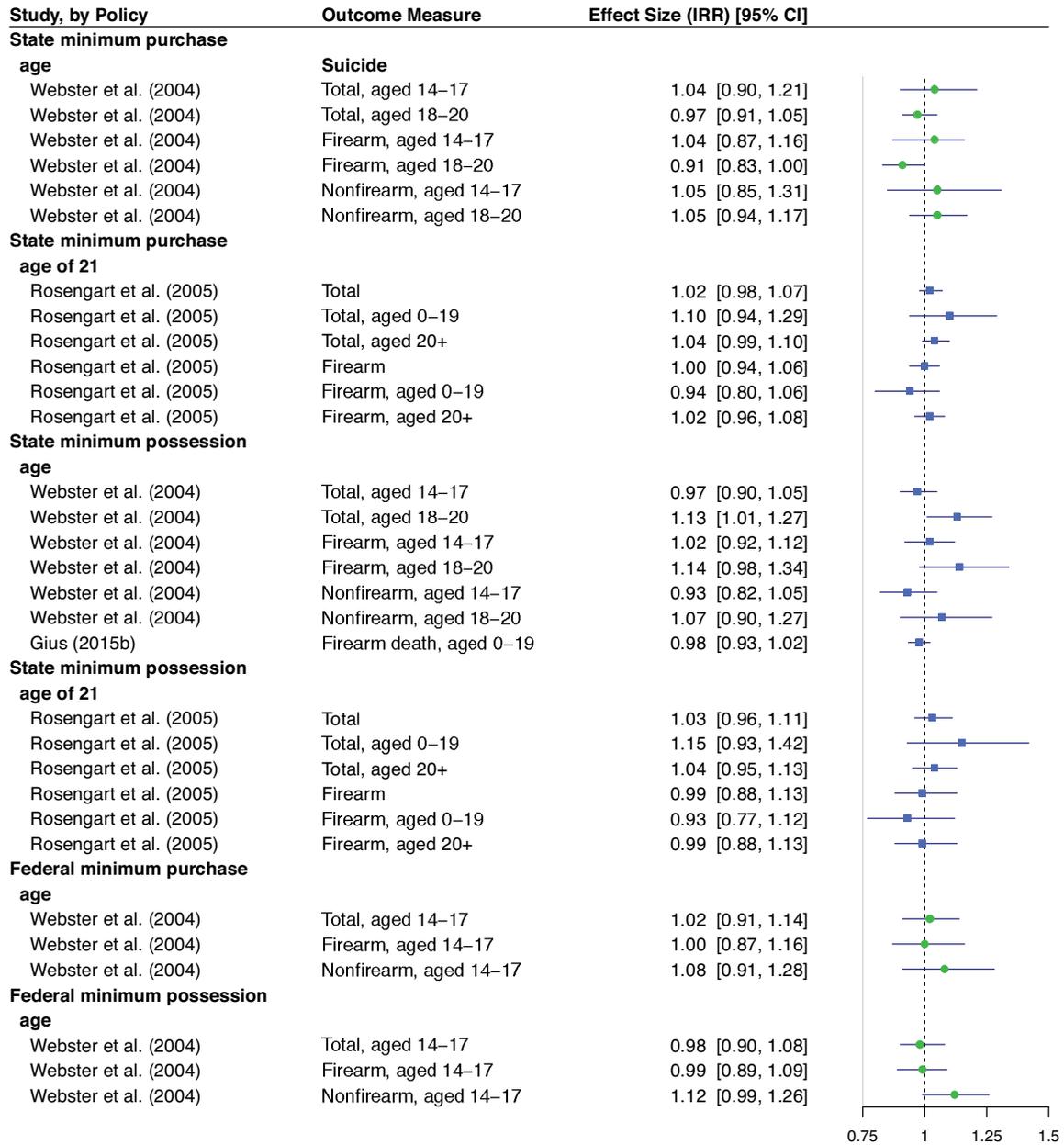
Conclusions

We identified two qualifying studies that examined how suicide rates were affected by laws requiring a minimum purchase age and three that examined how they were affected by laws requiring a minimum possession age.

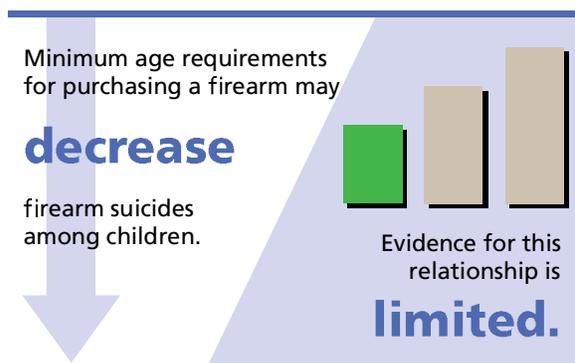
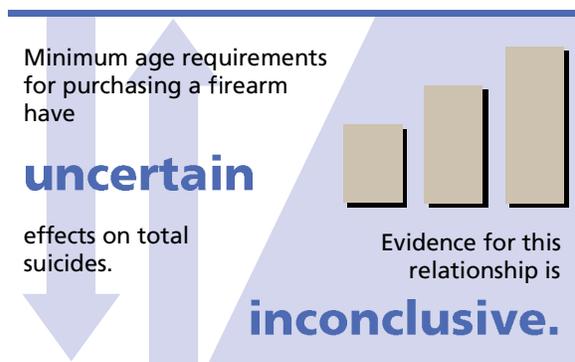
Minimum age requirements for purchasing a firearm. Webster et al. (2004) found uncertain effects for minimum purchase age laws (with restrictions from ages 16 to 21) on suicides among those aged 14–17 and those 18–20. They also found uncertain effects for firearm suicides among the younger age group but a significant effect consistent with these laws reducing firearm suicides among the older group. When re-estimating these effects only for states that set age 21 as the minimum for purchasing a firearm, the authors again found uncertain effects on total suicide rates for the older

⁹ The other laws modeled simultaneously were “one-gun-a-month” laws; “shall-issue” laws, otherwise known as right-to-carry laws, which guarantee the right to a concealed-carry permit for all citizens who are not prohibited from possessing a firearm (see Chapter Thirteen); and “junk-gun” laws, which ban the sale of certain cheaply constructed handguns.

Figure 12.1
Incidence Rate Ratios Associated with the Effect of Minimum Age Requirements on Suicide



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details.



age group and a significant effect indicating such laws reduce firearm suicides among those aged 18–20. Using overlapping, but shorter, time-series data, Rosengart et al. (2005) found the effects of laws requiring a minimum age of 21 to purchase to have uncertain effects on suicides and firearm suicides for all age groups, except for a suggestive effect consistent with these laws increasing total suicides among adults aged 20 or older.

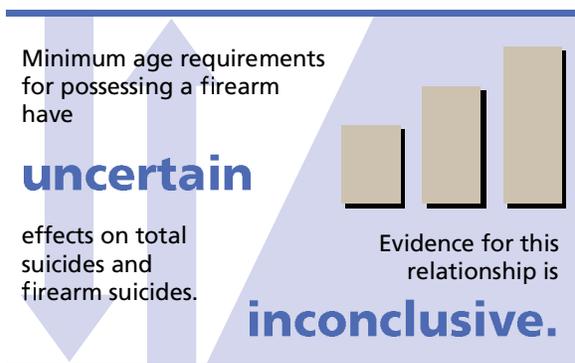
Based on these findings and an assessment of the relative strengths of these studies, we find *inconclusive evidence for how minimum age requirements for purchasing a firearm affect total suicides*. Studies of the effect of laws setting 21 as the minimum age of firearm purchase provide *limited evi-*

dence that such laws may reduce firearm suicides among some people aged 20 or younger.

Minimum age requirements for possessing a firearm. Webster et al. (2004) found uncertain effects of minimum possession age laws (with restrictions from ages 14 to 21) on suicides and firearm suicides among those aged 14–17. However, they found that these laws significantly increase suicide rates among those aged 18–20 and a suggestive effect consistent with increases in firearm suicide rates among this group. For laws requiring a minimum handgun possession age of 21, Rosengart et al. (2005) found uncertain effects on suicides overall and among those aged 20 or older, as well as a suggestive effect consistent with these laws increasing suicides among those under age 20. All effects of these laws on firearm suicides, however, were uncertain. Gius (2015b)

found only uncertain effects of state minimum age of possession laws on firearm suicides among those aged 19 or younger.

Based on these findings and an assessment of study strengths, we find *inconclusive evidence for how minimum age requirements for possessing a firearm affect suicides and firearm suicides.*



Effects on Violent Crime

Research Synthesis Findings

NRC (2004) did not review evidence on the effects of minimum age requirements, and Hahn et al. (2005) identified no research on this topic meeting our inclusion criteria. We identified two studies since 2003 that met our criteria. Rosengart et al. (2005) analyzed state-level data from 1979 to 1998 and examined the effects on violent crime of four types of state laws:

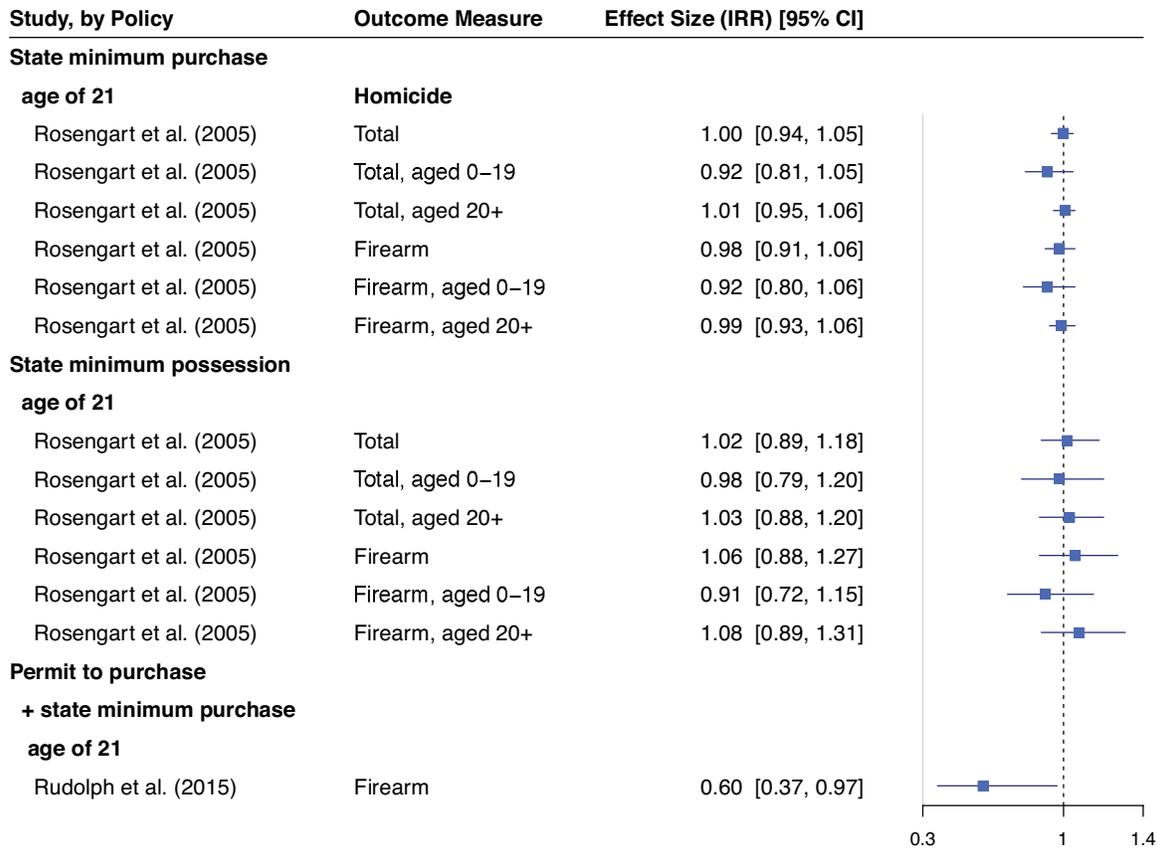
1. restricting handgun purchase to those aged 21 or older
2. restricting private handgun possession to those aged 21 or older
3. limiting the frequency of gun purchases to one gun per 30 days
4. prohibiting the sale of “junk” (cheaply constructed) guns.

The authors controlled for whether a state had a shall-issue (otherwise known as right-to-carry) provision; these results are described in more detail in Chapter Thirteen. The authors found uncertain effects of both types of minimum age laws on total homicide and firearm homicide rates. These models had limited information to use in identifying causal effects of these laws because relatively few states changed one or both laws over the study period; in addition, every state but one that raised its minimum age for possession did so the same year it implemented a minimum purchase age law, making the effects of these laws confounded. Moreover, the statistical model had an unfavorable ratio of covariates to observations (less than one to eight), meaning the model may have been overfit, resulting in estimates and CIs that are unreliable indicators of the true causal effects of the laws.

Rudolph et al. (2015) found a significant effect for a decrease in firearm homicides (and an uncertain effect for nonfirearm homicides) associated with the implementation of a law in Connecticut that established a requirement to have a permit to purchase a firearm and increased the minimum age of handgun purchase from age 18 to age 21. The firearm homicide rate after passage of both provisions was found to be 63 percent of what would have been expected without them. However, because the law included both policies simultaneously, the effect attributable specifically to the minimum age law cannot be identified. In addition, because only one state in the analysis experienced the law change, the effects of the law are not well identified. The observed reduction in firearm homicides could be due to the law or to other events occurring in Connecticut around the same time the law passed.

Figure 12.2 displays the IRRs and CIs associated with the minimum age requirements examined in these studies.

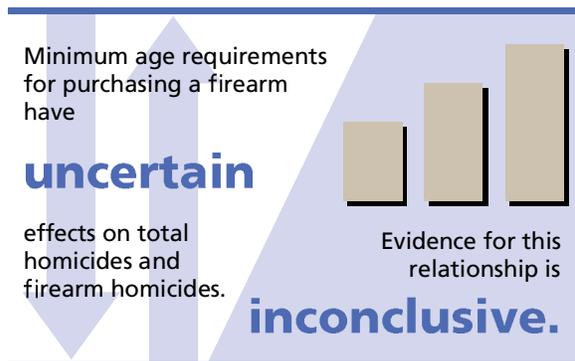
Figure 12.2
Incidence Rate Ratios Associated with the Effect of Minimum Age Requirements on Violent Crime



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

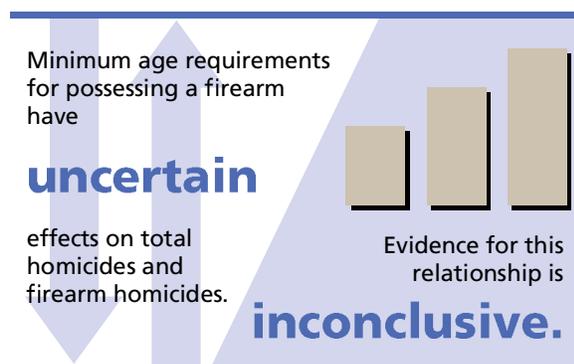
We identified two qualifying studies that examined the effect of minimum age requirements for purchasing or possessing a firearm on total or firearm homicide rates.



Minimum age requirements for purchasing a firearm. Rosengart et al. (2005) found uncertain effects of laws making 21 the minimum age to purchase handguns on homicide rates and firearm homicide rates among all age groups. Rudolph et al. (2015) reported a significant effect consistent with minimum age requirements reducing firearm homicide rates, but they could

not attribute this effect solely to a minimum purchase age policy because a permit-to-purchase provision was passed concurrently in the one state evaluated. On the basis of these results, and in consideration of the relative strengths of these studies, we find *inconclusive evidence for how minimum age requirements for purchasing a firearm affect total and firearm homicides.*

Minimum age requirements for possessing a firearm. Estimates by Rosengart et al. (2005) for the effect of laws making 21 the minimum age for possession of handguns on total and firearm homicides were uncertain for all age groups examined. Therefore, we find *inconclusive evidence for how minimum age requirements for possessing a firearm affect total and firearm homicides.*



Effects on Unintentional Injuries and Deaths

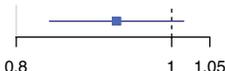
Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of minimum age requirements on unintentional injuries and deaths. One longitudinal study since then examined this relationship. Using data from 1981 to 2010, Gius (2015b) examined the effect of the 1994 federal law establishing a minimum age for handgun possession, as well as other state-specific minimum age requirements for handguns. This model controlled for time and state fixed effects, state-level socio-demographic characteristics, and state-level child-access prevention laws. The authors found that state-level minimum age requirements had uncertain effects on unintentional deaths. The weighted least-squares statistical model used in this study may not have been appropriate for the rate outcome, with many values close to zero in state-year observations. The model's lower bound at zero may result in violations of its assumptions and can yield biased and incorrect parameter estimates and CIs.

Figure 12.3 displays the IRR and CI associated with the minimum age requirements examined in Gius (2015b). The analysis of the federal minimum age of possession law in this study did not meet our inclusion criteria, because, as specified in this model, it appeared that there was no comparison group that did not get the identical intervention in 1994. Therefore, this effect is not included in Figure 12.3.

Figure 12.3
Incidence Rate Ratios Associated with the Effect of Minimum Age Requirements on Unintentional Injuries and Deaths

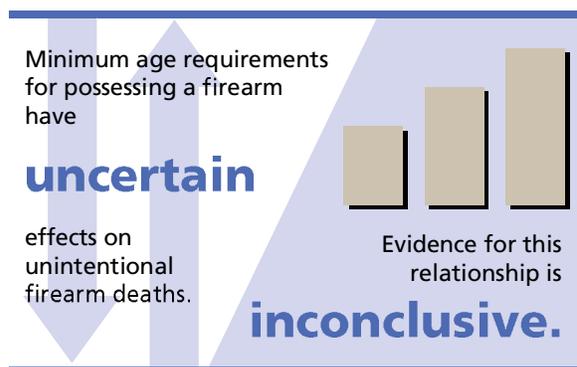
Study, by Policy	Outcome Measure	Effect Size (IRR) [95% CI]
State minimum possession age	Unintentional injuries	
Gius (2015b)	Firearm death, aged 0–19	0.93 [0.84, 1.02]



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified one qualifying study examining the effect of laws requiring either minimum age to purchase or minimum age to possess a firearm. Gius (2015b)



found a suggestive effect consistent with minimum possession age laws decreasing unintentional firearm deaths among those aged 19 or younger. Therefore, we conclude that *there is inconclusive evidence that minimum age requirements for possessing a firearm may reduce unintentional firearm deaths among those aged 19 or younger.*

Effects on Mass Shootings

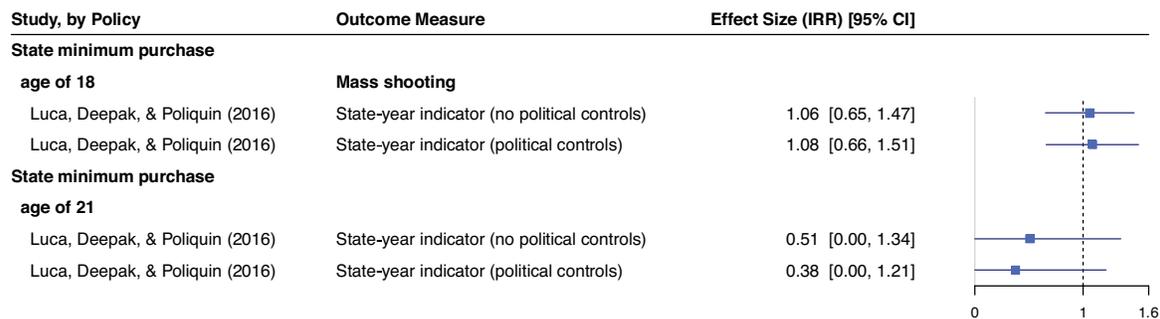
Research Synthesis Findings

NRC (2004) did not identify any research examining the effects of minimum age requirements on mass shootings. Hahn et al. (2005) identified one study, but it did not satisfy our inclusion criteria. Our own search yielded one study. Using a two-way fixed-effects linear probability model, Luca, Deepak, and Poliquin (2016) estimated the effects of minimum age requirements on a binary indicator for whether a mass shooting occurred in a given state-year. The authors included two measures of minimum age requirements: (1) an indicator variable for whether laws prevent vendors from selling handguns to those under age 18 or prevent those under age 18 from purchasing handguns and (2) an analogous indicator variable for laws that set the minimum age at 21. The authors' analysis covered 1989–2014 and included controls for time-invariant state characteristics, national trends, and a host of other state-level gun policies, as well as time-varying state-level demographic, socioeconomic, and political characteristics. They found uncertain effects of laws setting 18 as the minimum age of purchase on the probability of a mass shooting

event occurring, but they found a suggestive effect consistent with laws setting 21 as the minimum age of purchase reducing the likelihood of a mass shooting occurrence. However, it should be noted that assessing the effects of gun policies on mass shootings was not the primary focus of Luca, Deepak, and Poliquin (2016), and the authors intended the estimates to serve solely as a robustness check for their main specification (the effects of mass shootings on gun policy). Although the paper provided limited information to use in evaluating the reported statistical models (e.g., on how these policies were coded), it is clear that the analysis used a linear model to predict a dichotomous outcome. Therefore, model assumptions were violated, making model estimates and CIs unreliable.

Figure 12.4 displays the IRRs and CIs associated with the minimum age requirements examined in Luca, Deepak, and Poliquin (2016).

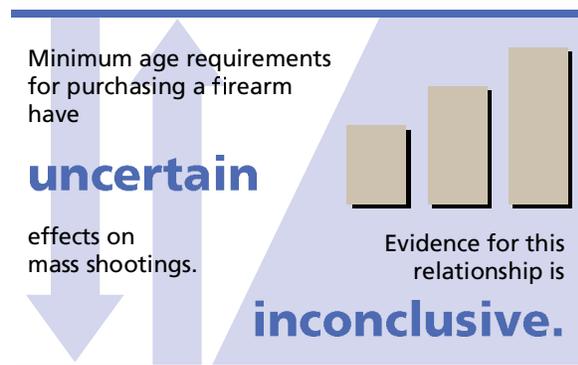
Figure 12.4
Incidence Rate Ratios Associated with the Effect of Minimum Age Requirements on Mass Shootings



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified one qualifying study examining how minimum age requirements for purchasing a firearm affect the incidence of mass shootings. Luca, Deepak, and Poliquin (2016) found that laws setting age 18 as the minimum age to purchase a firearm had uncertain effects on mass shooting incidence, but they found a suggestive effect consistent with such laws reducing the incidence of mass shootings when the minimum purchase age is 21. On the basis of this study, *we find inconclusive evidence for how minimum age requirements for purchasing a firearm affect mass shootings.*



Outcomes Without Studies Examining the Effects of Minimum Age Requirements

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of minimum age requirements on the following outcomes, and we identified no such studies that met our inclusion criteria:

- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

Chapter Twelve References

- Birckmayer, J., and D. Hemenway, "Suicide and Firearm Prevalence: Are Youth Disproportionately Affected?" *Suicide and Life-Threatening Behavior*, Vol. 31, No. 3, 2001, pp. 303–310.
- CDC—See Centers for Disease Control and Prevention.
- Centers for Disease Control and Prevention, "Source of Firearms Used by Students in School-Associated Violent Deaths—United States, 1992–1999," *Morbidity and Mortality Weekly Report*, Vol. 50, No. 31, 2001, pp. 657–660.
- , "Fatal Injury Reports, National and Regional, 1999–2015," WISQARS database, Atlanta, Ga., June 24, 2015. As of March 23, 2017:
https://webappa.cdc.gov/sasweb/ncipc/mortrate10_us.html
- , "Leading Causes of Death Reports, National and Regional, 1999–2015," WISQARS database, Atlanta, Ga., 2017b. As of May 10, 2017:
https://webappa.cdc.gov/sasweb/ncipc/leadcaus10_us.html
- Duda, M. D., and K. C. Young, *Factors Related to Hunting and Fishing Participation in the United States*, Harrisonburg, Va.: Responsive Management, report for the U.S. Fish and Wildlife Service, Grant # 14-48-0009-92-1252, 1993.
- Families Afield, *An Initiative for the Future of Hunting*, 2010. As of March 23, 2017:
http://www.familiesafield.org/pdf/FamiliesAfield_Report.pdf
- Freed, L. H., D. W. Webster, J. J. Longwell, J. Carrese, and M. H. Wilson, "Factors Preventing Gun Acquisition and Carrying Among Incarcerated Adolescent Males," *JAMA Pediatrics*, Vol. 155, 2001, pp. 335–341.
- Freedman, David A., "On the So-Called 'Huber Sandwich Estimator' and 'Robust Standard Errors,'" *American Statistician*, Vol. 60, No. 4, 2006, pp. 299–302.
- Gius, Mark, "The Impact of Minimum Age and Child Access Prevention Laws on Firearm-Related Youth Suicides and Unintentional Deaths," *Social Science Journal*, Vol. 52, No. 2, 2015b, pp. 168–175.
- Grossman, D. C., D. T. Reay, and S. A. Baker, "Self-Inflicted and Unintentional Firearm Injuries Among Children and Adolescents," *JAMA Pediatrics*, Vol. 153, No. 8, 1999, pp. 875–878.
- Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.
- Johnson, R. M., C. Barber, D. Azrael, D. E. Clark, and D. Hemenway, "Who Are the Owners of Firearms Used in Adolescent Suicides?" *Suicide and Life-Threatening Behavior*, Vol. 40, No. 6, 2010, pp. 609–611.
- Kann, L., T. McManus, W. A. Harris, S. L. Shanklin, K. H. Flint, J. Hawkins, B. Queen, R. Lowry, E. O. Olsen, D. Chyen, L. Whittle, J. Thornton, C. Lim, Y. Yamakawa, N. Brener, and S. Zaza, "Youth Risk Behavior Surveillance—United States, 2015," *Morbidity and Mortality Weekly Report*, Vol. 65, No. 6, 2016, pp. 1–174.
- Kleck, G., and E. B. Patterson, "The Impact of Gun Control and Gun Ownership Levels on Violence Rates," *Journal of Quantitative Criminology*, Vol. 9, No. 3, 1993, pp. 249–287.
- LaFree, G., and C. Birbeck, *Controlling New Mexico Juveniles' Possession of Firearms*, Albuquerque, N.M.: New Mexico Criminal Justice Statistical Analysis Center, Working Paper 27, 1998. As of May 10, 2017:
<http://nmsc.unm.edu/reports/1998/JuvFirearmPossession.pdf>

Luca, Michael, Lahotra Deepak, and Christopher Poliquin, *The Impact of Mass Shootings on Gun Policy*, working paper, Boston, Mass.: Harvard Business School, 2016.

Marvell, T. B., "The Impact of Banning Juvenile Gun Possession," *Journal of Law and Economics*, Vol. 44, 2001, pp. 691–713.

Miller, M., and D. Hemenway, "The Relationship Between Firearms and Suicide: A Review of the Literature," *Aggression and Violent Behavior*, Vol. 4, No. 1, 1999, pp. 59–75.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Office of Juvenile Justice and Delinquency Prevention, *OJJDP Statistical Briefing Book*, Washington, D.C.: U.S. Department of Justice, May 25, 2016. As of May 10, 2017:
<https://www.ojjdp.gov/ojstatbb/>

Puzzanchera, C., G. Chamberlin, and W. Kang, "Easy Access to the FBI's Supplementary Homicide Reports: 1980–2014," 2017. As of March 22, 2017:
<http://www.ojjdp.gov/ojstatbb/ezashr/>

Rosengart, M., P. Cummings, A. Nathens, P. Heagerty, R. Maier, and F. Rivara, "An Evaluation of State Firearm Regulations and Homicide and Suicide Death Rates," *Injury Prevention*, Vol. 11, No. 2, 2005, pp. 77–83.

Ruback, R. B., J. N. Shaffer, and V. A. Clark, "Easy Access to Firearms: Juveniles' Risks for Violent Offender and Violent Victimization," *Journal of Interpersonal Violence*, Vol. 26, No. 10, 2011, pp. 2111–2138.

Rudolph, K. E., E. A. Stuart, J. S. Vernick, and D. W. Webster, "Association Between Connecticut's Permit-to-Purchase Handgun Law and Homicides," *American Journal of Public Health*, Vol. 105, No. 8, 2015, pp. E49–E54.

Shah, S., R. E. Hoffman, L. Wake, and W. M. Marine, "Adolescent Suicide and Household Access to Firearms in Colorado: Results of a Case-Control Study," *Journal of Adolescent Health*, Vol. 26, No. 3, 2000, pp. 157–163.

Sheley, J. F., and J. D. Wright, *High School Youths, Weapons, and Violence: A National Survey*, Washington, D.C.: U.S. Department of Justice, National Institute of Justice, 1998.

Tritch, Teresa, "Keep Handguns Away from Teenagers," *New York Times*, May 30, 2014. As of June 29, 2017:
<http://takingnote.blogs.nytimes.com/2014/05/30/keep-handguns-away-from-teenagers/>

United States Code, Title 18, Section 922, Unlawful Acts.

U.S. Census Bureau, "U.S. and World Population Clock," 2017. As of March 22, 2017:
<https://www.census.gov/popclock/>

Vittes, K. A., and S. B. Sorenson, "Recreational Gun Use by California Adolescents," *Health Education and Behavior*, Vol. 32, No. 6, 2005, pp. 751–766.

Webster, D. W., L. H. Freed, S. Frattaroli, and M. H. Wilson, "How Delinquent Youths Acquire Guns: Initial Versus Most Recent Gun Acquisitions," *Journal of Urban Health*, Vol. 79, No. 1, 2002, pp. 60–69.

Webster, D. W., J. S. Vernick, A. M. Zeoli, and J. A. Manganello, "Association Between Youth-Focused Firearm Laws and Youth Suicides," *JAMA*, Vol. 292, No. 5, 2004, pp. 594–601.

Wright, M. A., G. J. Wintemute, and B. E. Claire, "Gun Suicide by Young People in California: Descriptive Epidemiology and Gun Ownership," *Journal of Adolescent Health*, Vol. 43, No. 6, 2008, pp. 619–622.

CHAPTER THIRTEEN

Concealed-Carry Laws

Apart from specifying classes of people who are prohibited from possessing any type of firearm, federal law imposes no restrictions on who may carry a concealed weapon in public, although it specifically grants concealed-carry rights to active and retired law enforcement officers (18 U.S.C. 926). State laws typically specify who may carry concealed weapons and the procedures those people must follow when they wish to exercise this right.

Most states once prohibited the concealed carrying of guns in public, although none does so now. Over the past several decades, many states have relaxed restrictions on concealed handguns. Several states allow individuals to carry concealed weapons without a permit (referred to as *permitless carry*), but most require gun owners to obtain a permit to carry a concealed handgun. Some states have shifted from laws that restrict concealed-carry permits to those who can demonstrate a legitimate need to carry a weapon or that give law enforcement some discretion in issuing concealed-carry permits (referred to as *may-issue* laws) to laws that guarantee the right to a concealed-carry permit for all citizens who are not prohibited from possessing a handgun (referred to as *shall-issue* or *right-to-carry* laws). The key difference among these law categories is that permitless-carry laws do not require individuals to obtain a permit or license before they can carry a concealed weapon, whereas may-issue and shall-issue laws set forth conditions by which such permits may be granted.

There are several ways that concealed-carry laws could affect gun violence and considerable disagreement about which are most likely. Permitless-carry and shall-issue laws that make it easier for citizens to carry concealed weapons could increase the number of people carrying guns. The increased prevalence of concealed weapons could lead to increased crime and violence if disagreements, perceived threats, and conflicts are more likely to result in casualties when a handgun is readily available. Alternatively, concealed-carry laws could lead to reductions in the prevalence or severity of violent crime and mass shootings either because the prospect of encountering an armed victim serves as a deterrent or because victims will more frequently be able to use a gun to defend themselves (Fortunato, 2015).

Whether those who carry concealed weapons pose an elevated or reduced risk of crime or violence is the subject of debate (Violence Policy Center, 2017; Lott, Whitley,

and Riley, 2016). A comparison of criminal conviction rates among holders and non-holders of concealed handgun licenses in Texas found that license holders were less likely to be convicted of crimes, but the license holders' convictions were significantly more likely to involve deadly conduct and intentional killings (Phillips et al., 2013). The likelihood of encountering an armed victim may further lead to increased gun violence by inducing more criminals to carry and use firearms. Alternatively, these laws may result in substitution by criminals to other types of crime, such as larceny, where the probability of encountering armed resistance is lower (Kovandzic and Marvell, 2003).

Each hypothesized effect of relaxed restrictions on concealed carrying produces an effect by increasing the proportion of the population or some subpopulation that is armed. However, data on the prevalence of concealed carrying are not generally available. Indeed, data on the number of persons with carry permits are not readily available for many states. One estimate suggests that the number of concealed-carry permit holders in the United States exceeded 14.5 million in 2016, with substantial variation across states depending on the permit fees in place, duration that the law has been in effect, and whether the law allows local authorities discretion in issuing permits (i.e., may issue versus shall issue) (Lott, Whitley, and Riley, 2016).

We identified only one study that analyzed how changes in the number of concealed-carry permits related to changes in various types of violent crime (Kovandzic and Marvell, 2003). The authors analyzed data from 58 Florida counties spanning 1980–2000, providing coverage of the period before and after the passage of Florida's shall-issue law in 1987. While this study did not analyze the effect of the shall-issue policy change, it did examine how changes in the number of concealed-carry permits over time and across counties corresponded with changes in various types of violent crime. The authors found uncertain effects of changes in per capita concealed-carry permit rates on violent crime.

There is likely to be little effect of concealed-carry laws on hunting or recreational gun use. However, shall-issue policies may encourage more individuals to obtain firearms, thereby increasing handgun sales (Steidley, 2016). To assess these or any other effects of concealed-carry laws, one would ideally like to know whether there are greater increases in gun ownership and carrying in states following passage of shall-issue or permitless-carry laws compared with states that have more-restrictive laws, but such data have not been collected systematically over time. The direct effects of increased concealed carrying by private citizens on suicides, unintentional injuries and deaths, and defensive gun use should be strongest for incidents involving handguns and that occur outside the home (where the laws apply). Similarly, for violent crime, one would expect concealed-carry laws to have greater effects (either negative or positive depending on the role of deterrence) on assaults or homicides occurring in public venues compared with those occurring within the home. Should the effects of concealed-carry laws be driven primarily by expanding the prevalence of gun ownership, then their effects could extend to both private and public areas for such outcomes as suicides, firearm homicides, and unintentional injuries and deaths.

State Implementation of Concealed-Carry Laws

Prior to the Civil War, most states lacked legislation on the legality of carrying concealed weapons. Those states with laws prohibited the practice. Following World War II, most states adopted discretionary may-issue permit laws (Cramer and Kopel, 2005). In the 1980s, 1990s, and early 2000s, a majority of states transitioned to shall-issue laws (Grossman and Lee, 2008). Since 2003, a handful of states have eliminated the permit requirement altogether, allowing permitless carry.

As of the end of 2016, eight states allowed people to carry concealed weapons without first receiving a permit; that includes Vermont, which has never required a permit for concealed carry.¹ Mississippi allows concealed carry without a permit if the handgun is kept “in a sheath, belt holster or shoulder holster or in a purse, handbag, satchel, other similar bag or briefcase or fully enclosed case.”² In addition, Missouri passed a permitless-carry law that went into effect on January 1, 2017.³

Thirty-two states have shall-issue laws, under which law enforcement agencies have no, or very limited, discretion to deny concealed-carry permits to citizens who are otherwise permitted to possess handguns.⁴ Eight states have may-issue laws, in which law enforcement has significant discretionary authority to deny permits.⁵

Many states have reciprocity clauses in their concealed-carry permit laws, meaning that they recognize the concealed-carry permits issued by some but not necessarily all other states (United States Concealed Carry Association, 2013). Often, states honor

¹ Alaska, Arizona, Idaho, Kansas, Maine, Vermont, West Virginia, and Wyoming. See Alaska Stat. § 11.61.220; Ariz. Rev. Stat. § 13-3112; Idaho Code Ann. § 18-3302 (applies only outside cities); Kan. Stat. Ann. §§ 21-6301, 21-6302; Me. Rev. Stat. Ann. § 2001-A; Vt. Stat. Ann. tit. 13, §§ 4004, 4016 (concerning the only two places one cannot carry a concealed weapon in Vermont); W. Va. Ann. Code § 61-7-3; Wyo. Stat. Ann. § 6-8-104.

² Miss. Ann. Code § 45-9-101.

³ Mo. Senate Bill No. 656.

⁴ Alabama, Arkansas, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Michigan, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, and Wisconsin. Ala. Code § 13A-11-75; Ark. Code Ann. § 5-73-309; Colo. Rev. Stat. Ann. § 18-12-203; Conn. Gen. Stat. § 29-28(b); Fla. Stat. Ann. § 790.06; Ga. Code Ann. § 16-11-129; 430 Ill. Comp. Stat. 66/4; Ind. Ann. Code §§ 35-47-2-1, 35-47-2-3; Iowa Code Ann. §§ 724.7, 724.11; Ky. Rev. Stat. Ann. § 237.110; La. Stat. Ann. § 1379.1.1; Mich. Comp. Laws Ann. § 28.425a; Minn. Stat. Ann. § 624.714; Mont. Code Ann. § 45-8-321; Neb. Rev. Stat. § 69-2430; Nev. Rev. Stat. Ann. § 202.3657; N.H. Rev. Stat. Ann. § 159:6; N.M. Stat. Ann. § 29-19-4; N.C. Gen. Stat. § 14-415.11; N.D. Cent. Code § 62.1-04-03; Ohio Rev. Code Ann. § 2923.125; Okla. Stat. Ann. § 1290.5; Ore. Rev. Stat. Ann. § 166.291; 18 Pa. Cons. Stat. § 6109; S.C. Code § 23-31-215; S.D. Codified Laws § 23-7-7; Tenn. Code Ann. § 39-17-1351; Tex. Code Ann. § 411.177; Utah Code Ann. § 53-5-704, Va. Ann. Code § 18.2-308.04; Wash. Rev. Code § 9.41.070; Wisc. Stat. Ann. § 175.60.

⁵ California, Delaware, Hawaii, Maryland, Massachusetts, New Jersey, New York, and Rhode Island. See Calif. Penal Code § 26150; Del. Code Tit. 11 § 1441, 1442; Hawaii Rev. Stat. Ann. § 134-9; Md. Code Ann., Pub. Safety §§ 5-301–5-314; Mass. Gen. Laws Ch. 140, § 131; N.J. Stat. Ann. § 2C:58-4; N.Y. Penal Law § 400.00(2) (f); R.I. Gen. Laws § 11-47-11.

permits only from other states with laws similar to their own. There are some states, however, that recognize concealed-carry permits from states with less-restrictive laws. For instance, Delaware has a may-issue law but recognizes the concealed-carry permits from several states with shall-issue laws (USA Carry, 2017).

Effects on Suicide

Research Synthesis Findings

In 2004, the National Research Council (NRC) identified only four quasi-experimental studies examining the effects of gun policy on suicide outcomes, none of which examined the effect of concealed-carry laws. Hahn et al. (2005) identified two studies of the effects of shall-issue laws on suicide but concluded that the evidence those studies could provide was inconclusive. Since then, there have been no studies examining the effects of permitless-carry laws on suicide, and two quasi-experimental studies have examined the effect of concealed-carry laws on suicide. Using data from 1979 to 1998, Rosengart et al. (2005) modeled the effect of shall-issue laws on suicide mortality across states. In these models—which controlled for state fixed effects, time trends, state-level variation in poverty and demographic factors, and four other firearm laws—the authors found uncertain effects between shall-issue laws and either total suicide or firearm suicide rates (see Figure 13.1). Nevertheless, the statistical model had an unfavorable ratio of covariates to observations (less than one to eight), meaning the model may have been overfit, resulting in estimates and confidence intervals (CIs) that are unreliable indicators of the true causal effects of the laws.

DeSimone, Markowitz, and Xu (2013) also performed a fixed-effects analysis and examined the effects of shall-issue laws on self-inflicted nonfatal gun injuries using hospital discharge data from the National Inpatient Sample spanning 1988 to 2003. The authors did not find that shall-issue laws were significantly associated with self-inflicted firearm injuries for children under age 18 in the 11 states that were part of the sample, but they did find a statistically significant effect of these laws on self-inflicted firearm injuries among those aged 18 or older. Specifically, their estimate suggests that after implementation of the law, suicides were more than double what would have been expected without the law (see Figure 13.1), which would be extraordinary if true. However, the estimated effects of shall-issue laws in this study were based primarily on implementation in one state that changed its law during the study time frame (Arizona); thus, the study offers little evidence that the observed effects are due to the change in the law rather than to other factors affecting the state's suicide rate that occurred around the same time the law was changed. Moreover, as DeSimone, Markowitz, and Xu (2013) note, the data set on which their estimates are made is not strictly longitudinal, and it is not possible to determine the extent to which child-access prevention law effect estimates are estimated cross-sectionally or longitudinally.

Figure 13.1 displays the incidence rate ratios (IRRs) and CIs associated with the concealed-carry laws examined in these studies.

Figure 13.1
Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Suicide

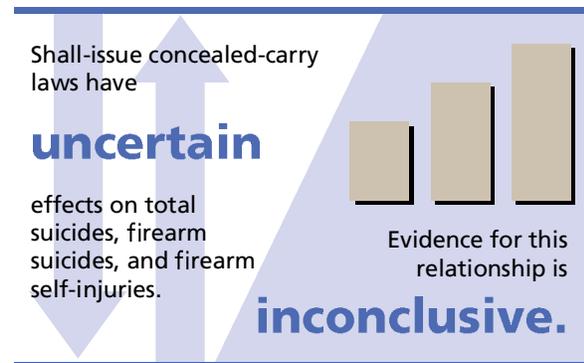


NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified two qualifying studies examining the effects of shall-issue concealed-carry laws on suicide rates or firearm self-injury rates. Ronsegart et al. (2005) found uncertain effects of shall-issue laws on suicides and firearm suicides. DeSimone, Markowitz, and Xu (2013) found the effect of shall-issue laws on firearm self-injuries among those aged 17 or younger to be uncertain. Among all adults aged 18 or older, they found a significant effect indicating that shall-issue laws may increase firearm self-injury.

Based on these studies and an assessment of their relative strengths, *we find inconclusive evidence for the effect of shall-issue concealed-carry laws on total suicides, firearm suicides, and firearm self-injuries.*



Effects on Violent Crime

Research Synthesis Findings

In its review of existing studies examining shall-issue laws, Hahn et al. (2005) found insufficient evidence for determining the effect of such laws on violent crime. NRC (2004) reviewed much of the same literature and reanalyzed data that were common to many of these analyses: a panel data set originally spanning 1977–1992, then expanded through 2000. These data were originally analyzed in Lott and Mustard (1997) and used again by Lott (2000) in revised analyses. Lott (2000) found that shall-issue laws decreased homicides, rapes, and assaults. Other researchers (e.g., Duggan, 2001; Ayres and Donohue, 2003a, 2003b) and NRC reanalyzed the same data but found different results, as well as significant sensitivity of results to specification. With one member dissenting, the NRC (2004) panel concluded,

Some studies find that right-to-carry laws reduce violent crime, others find that the effects are negligible, and still others find that such laws increase violent crime. The committee concludes that it is not possible to reach any scientifically supported conclusion because of (a) the sensitivity of the empirical results to seemingly minor changes in model specification, (b) a lack of robustness of the results to the inclusion of more recent years of data (during which there were many more law changes than in the earlier period), and (c) the statistical imprecision of the results. The evidence to date does not adequately indicate either the sign or the magnitude of a causal link between the passage of right-to-carry laws and crime rates. Furthermore, this uncertainty is not likely to be resolved with the existing data and methods. If further headway is to be made, in the committee's judgment, new analytical approaches and data are needed.

Among the studies since 2003 meeting our inclusion criteria, all examined shall-issue laws; none examined permitless-carry laws. Two studies were included in the NRC review (Helland and Tabarrok, 2004; Plassman and Whitley, 2003). Their findings were subsumed into the overarching NRC finding as described earlier. Among studies from the period after the NRC review, several built on and extended analyses of the county-level panel data used in previous studies. These include Roberts (2009); Moody et al. (2014); Aneja, Donohue, and Zhang (2014); and Durlauf, Navarro, and Rivers (2016). Other studies relied on state-level data, either in addition to or instead of county-level analyses. These studies include Aneja, Donohue, and Zhang (2014); Lott (2010); Rosengart et al. (2005); Grambsch (2008); Webster, Crifasi, and Vernick, (2014); and Gius (2014). Several studies used city-level data, including Kovandzic, Marvell, and Vieraitis (2005); La Valle and Glover (2012); and La Valle (2013). We first describe studies that primarily focused on county-level data. We then turn to studies that focused on state-level data, then studies that employed city-level data.

County-Level Studies

Many of the earliest studies examining the effects of shall-issue laws relied on county-level data, usually county-level data constructed for the Lott and Mustard (1997) report. Subsequent evaluations identified problems with the data for estimating the effects of laws. These problems included:

- Lott and Mustard's data set used county population values that did not correspond to the crime statistics available for counties, especially those with weak reporting of crime statistics (Maltz and Targonski, 2002).
- Large numbers of counties must be dropped from analyses using, for instance, murder rates as a covariate because the counties reported no murders (Ayres and Donohue, 2003a).
- There were errors in the classification of shall-issue states that were only later corrected in this data set.

Lott and Whitley (2003) discounted these concerns, describing them as typical of the types of measurement error commonly encountered in statistical analyses. Moreover, they suggested that even when county-level data were restricted to just those with comparatively low underreporting (where many of the noted problems would have less of an effect), they still observed trends consistent with the view that shall-issue laws reduce crime. NRC (2004) and Hahn et al. (2005), however, disagreed with this claim.

Ayres and Donohue (2009a, 2009b), noting some of the weaknesses of the county-level analyses, reported that some of the significant effects from Lott and Mustard (1997) and Lott (2000) were no longer significant after correcting coding errors. Moreover, Ayres and Donohue (2009a, 2009b) argued that Lott's spline and dummy specifications of the effects of laws were unduly influenced by states that implemented the laws earlier and thus had longer post-implementation periods affecting the estimates. Instead, using county panel data from 1977 to 1997 and a hybrid model that estimated the joint effect that the laws could be shown to have on the levels and trends observed for several crimes, the authors concluded that shall-issue laws were associated with increases in all crime types (with the exception of rape, for which evidence was mixed) in the five years after the laws were passed.

Roberts (2009) analyzed the effect of shall-issue laws on intimate partner homicide rates using county-level data spanning 1985–2004. The author found that (the more-restrictive) may-issue laws significantly increased intimate partner total homicides by 71 percent compared with shall-issue laws, but may-issue (compared to shall-issue) laws had an uncertain effect on intimate partner firearm homicides. The author also found uncertain effects of concealed-carry bans compared with shall-issue laws on either overall or firearm-related intimate partner homicides. However, neither analysis clustered standard errors at the state level, so serial correlation that was unaccounted for in the panel data could have resulted in biased standard errors and CIs.

More recently, Aneja, Donohue, and Zhang (2014) analyzed the county-level data set used in NRC (2004), extended through 2006, and state-level data through 2010. The authors corrected the NRC analyses for several errors that they identified, including data-coding errors related to the timing of shall-issue legislation, an endogenous control variable (arrest rate), and a failure to cluster standard errors at the state level. The authors argued that NRC (2004) was incorrect in its decision not to cluster the standard errors of the county-level analyses at the state level and showed that CIs were badly misestimated when clustering was not accounted for. In their preferred county-level specification including state trend effects, they found no statistically significant effects of shall-issue laws on either the level or trend of any of seven crime rates, and they found only one suggestive effect across the 14 effects they tested.

Moody et al. (2014), responding to an earlier version of the Aneja, Donohue, and Zhang (2014) paper, reestimated their models after adding many more demographic control variables, robbery and assault rates, and a lagged outcome as a predictor meant to capture unmeasured state differences associated with crime rates. Moody et al. (2014) offered statistical tests suggesting that the model with added covariates predicted the data significantly better, which the authors interpreted as evidence that estimates in Aneja, Donohue, and Zhang (2014) suffered from omitted-variable biases. The revised hybrid model results in Moody et al. (2014) suggested that shall-issue laws significantly reduced the trends in rape and murder rates. They found no significant association between shall-issue laws and either assault or robbery. The fact that their model predicted a given outcome better than the Aneja, Donohue, and Zhang (2014) model is not sufficient to demonstrate the claim that the latter's model suffered from omitted variable bias, nor that the model preferred by Moody et al. (2014) offered a less biased estimate. An overfit model can predict the data exceptionally well while producing biased and unreliable coefficient estimates.

Using county-level panel data spanning 1979–2000, Durlauf, Navarro, and Rivers (2016) examined the sensitivity of analyses that estimate the relationship between shall-issue laws and violent crime. They reported that use of population weights may lead to inefficient estimates and upward biases in estimates of the effect of shall-issue laws on crime. In addition, they found that hybrid or spline models are preferred to dummy models and that models that allow for heterogeneity in the effect of laws (including effects that vary with region, the level of gun prevalence, and the level of urbanization in an area) outperform models that do not allow for variation in effects. For the spline model specifications that the authors assessed to perform best for the outcome of violent crime, they estimated that shall-issue laws increase violent crime in the first year after law passage and that violent crime continues to increase in subsequent years. The authors concluded that, overall, there was substantial variation in the estimated effects for each model across the model space analyzed and, thus, there was little evidence that shall-issue laws generate either an increase or a decrease in crime on average.

State-Level Studies

Rosengart et al. (2005) examined the effect of several state gun laws, including shall-issue laws, on firearm homicides and total homicides using state-level data. One limitation was that the data covered only 1979–1998, and other studies have shown the sensitivity of results to shorter periods, partly because shorter periods include observation of fewer states that have adopted shall-issue laws. The policy variable was specified as a dummy variable (indicating that a shall-issue law was or was not in place). The authors found suggestive effects that shall-issue laws increased firearm and total homicide rates. French and Heagerty (2008) tested the sensitivity of these results and similarly concluded that shall-issue laws had a suggestive effect consistent with the laws increasing firearm-related homicide rates, although estimates varied across specifications. However, the Rosengart et al. (2005) paper, and presumably the French and Heagerty (2008) paper, also had an unfavorable ratio of model covariates to observations (less than one to eight), suggesting that the model may have been overfit, and thus its estimates and their CIs may be unreliable.

Martin and Legault (2005) demonstrated that Lott (2000) used incorrect state crime rate estimates that differed substantially from official Federal Bureau of Investigation (FBI) state estimates. They replicated Lott (2000)'s model despite misgivings about its specification to demonstrate that the effects Lott reported were sensitive to this measurement error. In their replication exercise using state-level crime data from the FBI's Uniform Crime Reports spanning 1977–1992, Martin and Legault (2005)'s estimates showed that shall-issue laws significantly reduced total violent crime and, specifically, aggravated assault. They found only suggestive effects that the laws reduced rates of robbery and murder, and uncertain effects on rape (see Figure 13.2). However, as with Lott (2000), their models did not statistically adjust for serial correlation in the panel data, and the model's ratio of estimated parameters to observations was less than one to ten, meaning the model may have been overfit, and thus its parameter estimates and their CIs may be unreliable.

Grambsch (2008) conducted a state-level analysis of (total) murder rates (relative to the U.S. murder rate) from 1976 to 2001 using the 25 states that passed shall-issue laws between 1981 and 1996. She found a selection effect among states adopting shall-issue laws—namely, that states that passed shall-issue laws in this period experienced an increasing trend in murder rates prior to adoption relative to other states. Her estimates showed that, after controlling for regression to the mean, there was either an uncertain effect or a significant positive effect of shall-issue laws on relative murder rates (i.e., shall-issue laws increased murder rates) depending on the model used.

Two studies that focused on assessing the relationship between unmarried fertility or abortions and violent crime included shall-issue laws as a covariate in their models (Kendall and Tamura, 2010; Lott and Whitley, 2007). Analyzing data from 1976 to 1998 and using a Poisson model that controlled for state and year fixed effects, state-specific linear trends, and time-varying state covariates, Lott and Whitley (2007)

found suggestive or significant effects (depending on specification) indicating that murder rates fell approximately 1 percent faster after the adoption of shall-issue laws relative to states without such policies. Employing a different model specification over a longer period (1957–2002), Kendall and Tamura (2010) estimated that shall-issue laws had a suggestive but small association with reduced rates of murder and uncertain relationships with rape, robbery, and assault.

Using a panel of state data, Lott (2010) provided an update of his earlier analyses examining the effect of shall-issue laws on violent crime. His preferred specification included a set of dummy variables that indicated different time intervals before and after shall-issue legislation was in effect for states that passed such legislation. Many of Lott's modeling results were presented as figures and did not indicate statistical significance. Detailed results were provided only for an analysis of homicide rates. These included information on the statistical significance of each coefficient in the model but not for a test comparing post-implementation time intervals with pre-implementation time intervals. Lott interpreted the pattern of effects as demonstrating that homicides declined significantly after implementation of shall-issue laws, but he did not provide test statistics or sufficient description to clarify what specific effect was observed. The author also included coefficients and their statistical significance from dummy and spline models similar to those from his earlier work, but he did not include standard errors or test statistics. All of the preferred models appear to have a ratio of estimated parameters to observations that is less than one to ten, meaning the model may have been overfit, and thus the reported estimates and their CIs may be unreliable.

Webster, Crifasi, and Vernick (2014) analyzed state-level data from 1999 to 2010, using generalized least-squares regression models to estimate the effect of shall-issue laws on age-adjusted homicide rates. They found suggestive effects indicating an association between the implementation of shall-issue laws and a 10-percent increase in rates of nonfirearm homicide, a 6-percent increase in rates of total homicide, and an 11-percent increase in rates of murder and nonnegligent manslaughter. However, their estimates showed an uncertain association between shall-issue laws and firearm homicide rates. The statistical model used to arrive at these results used a large number of estimated parameters relative to observations (a ratio of about one to eight), meaning the model may have been overfit, and thus its estimates and their apparent statistical significance could provide little generalizable information about the true causal effects of shall-issue laws. In addition, the assumptions of least-squares regression models are typically violated when modeling rate data for which many observations have values close to zero. This too could cause this model's estimates to be unreliable.

Gius (2014) examined the effect of shall-issue laws on gun-related murder rates using state-level data from 1980 to 2009. He found that states with may-issue or more-restrictive policies had higher gun-related murder rates than shall-issue states. Relative to states with shall-issue laws, states with more-restrictive firearm-carry policies had rates of firearm homicide that were 11 percent higher (see Figure 13.2). However,

this model did not statistically adjust for the known serial correlation in this panel data, which has been shown to result in misleadingly small standard errors (Aneja, Donohue, and Zhang, 2014). For this reason, the apparently significant effect observed in this study could be invalid.

Using their preferred specification with state-level data from 1979 to 2010 and a dummy, spline, or hybrid specification of shall-issue laws without state trends, Aneja, Donohue, and Zhang (2014) found suggestive evidence that shall-issue laws increase assault by 8 percent (see Figure 13.2). In the dummy specification, shall-issue laws significantly increased rape by 12 percent, although estimates of this effect from the spline model were uncertain. The authors also found suggestive evidence that shall-issue laws increased rates of robbery, although estimates again became uncertain in other specifications. Effects of shall-issue laws on murder rates were uncertain. The authors tested the sensitivity of their results to less-parsimonious (including the Lott and Mustard [1997] specification) and more-parsimonious demographic specifications; the inclusion of state-specific time trends; the inclusion or exclusion of years that were likely to be influenced by the crack cocaine epidemic, which affected crime rates; and the specification of the policy variable (dummy, spline, hybrid). The authors noted that their results, which showed that the significance and sign of estimated effects varied substantially depending on the specification employed, underscored the sensitivity of gun-crime modeling estimates to modeling decisions.

Responding to an earlier version of the Aneja, Donohue, and Zhang (2014) paper, Moody et al. (2014) critiqued the decision to treat models without state-specific trends as the preferred ones. Thus, Moody et al. (2014) reestimated the hybrid models in Aneja, Donohue, and Zhang (2014) and incorporated the state-specific trends and their additional covariates into the corresponding county-level analyses. In doing so, the authors found, as they had with their county-level analyses, that their specification improved model fit over that of Aneja, Donohue, and Zhang (2014). These hybrid models found that shall-issue laws significantly increased assault rate trends and increased robbery rate levels, but they also significantly reduced murder rate trends. As noted earlier, Moody et al. (2014) did not demonstrate either that their model estimates were less biased than those in Aneja, Donohue, and Zhang (2014) or that the latter's model suffered from omitted variable biases. Furthermore, the state-level analyses of Moody et al. (2014) used a statistical model with a large number of estimated parameters relative to observations (close to one to five), meaning the model may have been overfit, and thus the estimates and inferential statistics may provide little generalizable information about the true causal effects of shall-issue laws.

City-Level Studies

Kovandzic, Marvell, and Vieraitis (2005) examined the effect of shall-issue laws on violent crime (homicide, robbery, assault, and rape) using panel data from 1980 to 2000 for 189 large U.S. cities. The authors clustered the standard errors at the state

level, addressed coding errors in previous research, allowed for a time trend in the effect of shall-issue laws, allowed for city-specific time trends, and conducted analyses that allowed for heterogeneity in the effect of shall-issue laws across states. In their analysis that estimated the average effect of shall-issue laws for all included cities using a dummy model specification, Kovandzic, Marvell, and Vieraitis (2005) found uncertain effects for all of the violent crime outcomes analyzed. These findings were largely consistent when they instead modeled the effects of shall-issue laws as a trend variable, except that their preferred spline models showed effects consistent with shall-issue laws increasing assault rates (a significant effect) and increasing rape rates (a suggestive effect). Their estimates for the effect on assault suggest that shall-issue laws are associated with a 10-percent increase in aggravated assault rates after five years. In examining state-specific effects with their spline models, the authors further found that there were more states where shall-issue laws led to statistically significant increases in crime compared with decreases. However, this study had an unfavorable ratio of model covariates to observations (less than one to ten), meaning the model may have been overfit, and thus its estimates and CIs may be unreliable indicators of the true effects of the laws.

La Valle (2013) analyzed data from 56 cities spanning 1980–2010. The author noted that the analyses “include statistical corrections for variation in sample unit independence,” but he did not explicitly mention clustering the standard errors at the state level. La Valle (2013) used a dummy variable specification for the shall-issue law. In his preferred specification (using interpolated control variables for inter-censal years, population weighted analysis, and a one-year lagged outcome as a covariate), he found that shall-issue laws significantly reduced gun homicides by 15 percent and total homicides by 13 percent (see Figure 13.2). Results were sensitive to specification, however, and other authors (e.g., Kovandzic, Marvell, and Vieraitis, 2005; Durlauf, Navarro, and Rivers, 2016) have expressed concern that weighting gives undue influence to localities with large populations and worsens, rather than improves, standard error estimation. In unweighted analyses using inter-censal years, La Valle (2013) found that shall-issue laws reduced gun homicides but not total homicides. In La Valle and Glover (2012), which used similar data (panel data on 57 cities from 1980 to 2006) and a similar approach, the authors included separate indicators for may-issue and shall-issue states. In the authors’ preferred analysis (with interpolated data for controls for inter-censal years and weighting), shall-issue laws were associated with a significant 23-percent increase in the homicide rate, and may-issue laws were associated with a significant 19-percent decrease in the homicide rate (compared with cities that did not clearly have either a may-issue or shall-issue law). Similarly, shall-issue laws were associated with a significant 32-percent increase in the firearm homicide rate, while may-issue laws were associated with a significant 33-percent reduction in the firearm homicide rate. (No estimates for unweighted data with inter-censal years were provided.) The diametric

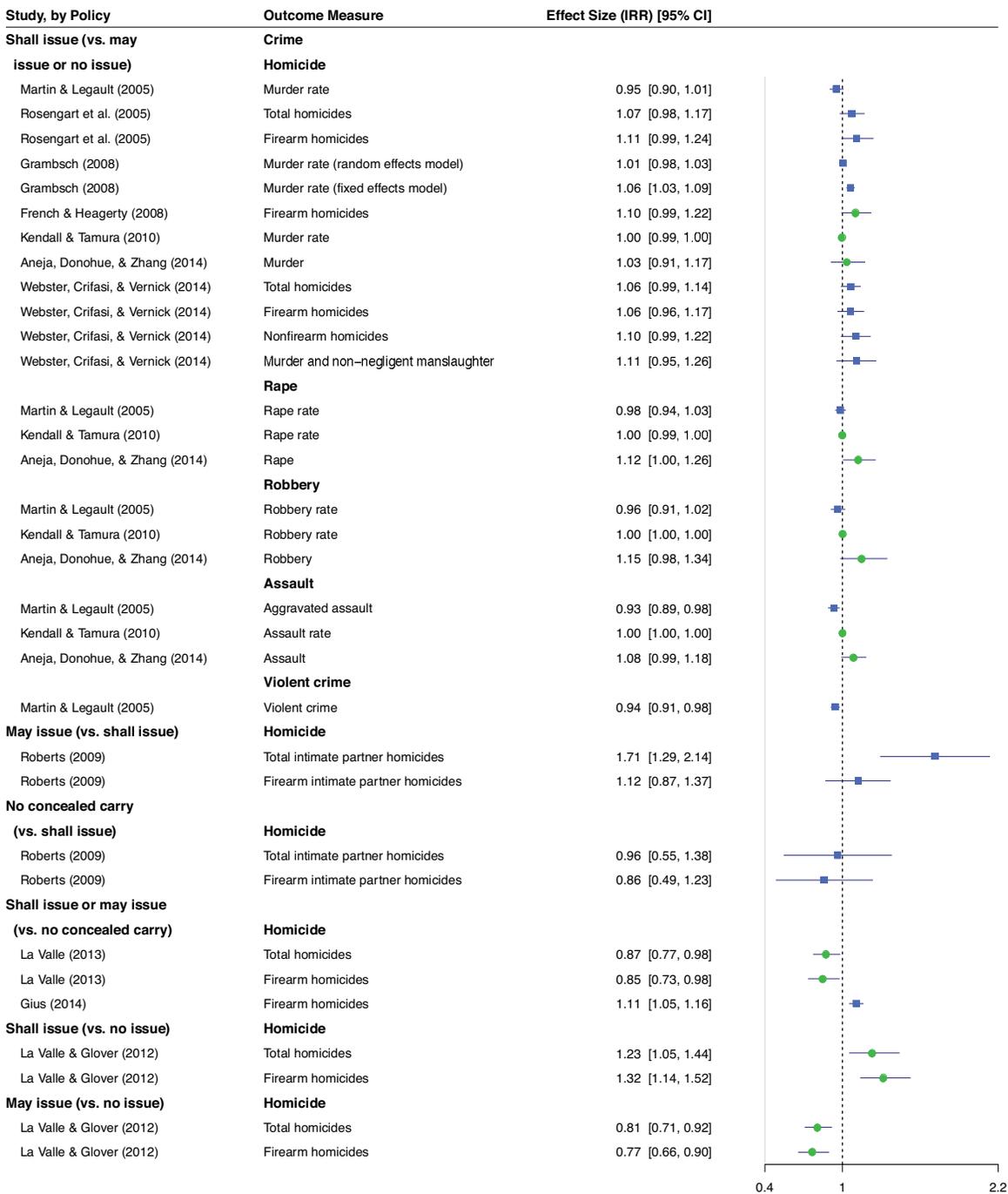
findings from these two studies further highlight the sensitivity of results to model specification, as well as to how shall-issue laws are classified.

Other Studies

Manski and Pepper (2015) investigated the sensitivity of shall-issue effect estimates to a range of assumptions by comparing property and violent crime rates in two states under progressively less-restrictive assumptions about how the laws' effects may vary over time or between states. This study compared outcomes in just two states, meaning causal effects were not well identified. Moreover, it treated Virginia's shall-issue law as having been implemented in 1989, when we believe the correct date is 1995. For these reasons, we do not review this paper's results. Applying Bayesian model comparison techniques, Strnad (2007) reanalyzed Donohue (2004) models of the effects of shall-issue laws. In contrast to the approach of Donohue (2004) and many others, Strnad (2007) did not assess the evidence for or against shall-issue laws in terms of how frequently estimates of the effect were statistically significant or were found to have positive (as opposed to negative) estimated effects under different model specifications. Instead, he used model comparison techniques to establish which models fit the data best and to evaluate whether evidence favored models with or without shall-issue effects. He concluded that Donohue (2004)'s models provided much stronger support for a conclusion that shall-issue laws had little or no effect on most outcomes than Donohue (2004) concluded after examining patterns in the direction and significance levels of these effects.

Figure 13.2 displays the IRRs and CIs associated with the concealed-carry laws examined in the studies published after the NRC (2004) review. In this figure, we highlight effect estimates based only on dummy-coded models, for reasons discussed in Chapter Two and Appendix A. Lott (2010) did not provide enough information for us to calculate IRRs and CIs for the effect size of interest, so we do not include these in the figure. In addition, the estimates in Durlauf, Navarro, and Rivers (2016) were available only for the spline specification; Kovandzic, Marvell, and Vieraitis (2005) preferred their own spline model; Moody and Marvell (2009) and Moody et al. (2014) offered only a hybrid model; and Manski and Pepper (2015) and Strnad (2007) did not seek to produce a preferred estimate of the effect of shall-issue laws. Therefore, we do not include estimates from these studies in Figure 13.2.

Figure 13.2
Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Violent Crime

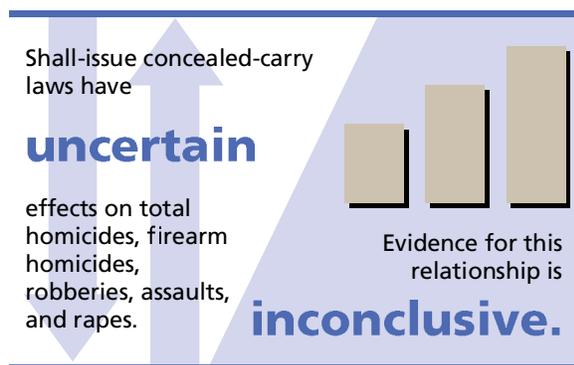


NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. Green circles indicate that we identified no significant methodological concerns. See Appendix B for details.

Conclusions

We focused our review on studies examining the effects of concealed-carry laws on violent crime outcomes since NRC (2004) and Hahn et al. (2005) found that estimates of such effects were too sensitive to reasonable differences in methods to draw conclusions about the direction or magnitude of the laws' effects. Because so much more study has been done of this relationship than of any other gun policy and outcome, there is a much richer evidence base to draw on, including studies raising serious methodological concerns and several that did not raise as many concerns among our methodology review team. Therefore, to focus this review on the best available evidence, we draw our conclusions in this section based just on those seven studies that did not raise serious methodological concerns.

Total homicides. Five of the seven studies examined the effects of shall-issue laws on total homicides. Two studies found only uncertain effects of these laws (Aneja, Donohue, and Zhang, 2014; Kendall and Tamura, 2010); Moody et al. (2014) found that shall-issue laws cause a downward trend in homicides; La Valle and Glover (2012) found that shall-issue laws increased homicides significantly relative to having no law for the legal carriage of a concealed firearm (*no-issue laws*); and La Valle (2013) found that shall-issue or may-issue laws reduce total homicides relative to no-issue laws. This result cannot be used to distinguish the effect of shall-issue laws per se, but it suggests that either shall-issue, may-issue, or both contribute to reducing total homicides. Because comparable studies reach inconsistent results, we conclude that the best available studies provide *inconclusive evidence for the effect of shall-issue laws on homicides*.



Firearm homicides. Three of the seven studies examined the effects of shall-issue laws on firearm homicides. Among these, there was one suggestive (French and Heagerty, 2008) and one significant (La Valle and Glover, 2012) effect, suggesting that these laws increase firearm homicides. La Valle (2013) found that shall-issue or may-issue laws cause decreases in firearm homicide rates relative to no-issue laws. This result cannot be used to distinguish the effect of shall-issue laws per se, but it suggests that either shall-issue, may-issue, or both contribute to reducing firearm homicides. With seemingly conflicting evidence, we conclude that the best available studies provide *inconclusive evidence for the effect of shall-issue laws on firearm homicides*.

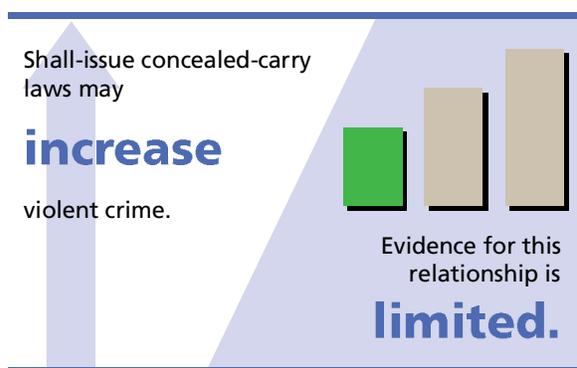
Robberies. Aneja, Donohue, and Zhang (2014) found a suggestive effect that shall-issue laws may increase robbery rates. Moody et al. (2014) and Kendall and Tamura (2010) found only uncertain effects of shall-issue laws on robberies. Therefore, we con-

clude that the best available studies provide *inconclusive evidence for the effect of shall-issue laws on robberies*.

Assaults. Aneja, Donohue, and Zhang (2014) found a suggestive effect that shall-issue laws may increase assault rates. Moody et al. (2014) and Kendall and Tamura (2010) found only uncertain effects of shall-issue laws on assault. Therefore, we conclude that the best available studies provide *inconclusive evidence for the effect of shall-issue laws on assaults*.

Rapes. Aneja, Donohue, and Zhang (2014) found that shall-issue laws significantly increase rates of rape. Moody et al. (2014) found that shall-issue laws produce a significant downward trend on rates of rape. Kendall and Tamura (2010) found only uncertain evidence of an association between shall-issue laws and rape. Therefore, we conclude that the best available studies provide *inconclusive evidence for the effect of shall-issue laws on rapes*.

Violent crime. One study—Durlauf, Navarro, and Rivers (2016)—aggregated all violent crimes into a single category and found that shall-issue laws significantly increase



violent crime rates. Because evidence for the effect of shall-issue laws on each component of violent crime is inconclusive, it could be argued that this single study of the effect of these laws on all violent crimes should not suffice to suggest that there is more than inconclusive evidence for such an effect. However, because analyses on all violent crimes may have greater power to detect any such effects, and

because our scoring criteria indicate it, we conclude that there is *limited evidence that shall-issue laws may increase violent crime*.

Effects on Unintentional Injuries and Deaths

Research Synthesis Findings

NRC (2004) and Hahn et al. (2005) identified one quasi-experimental study examining the effect of shall-issue concealed-carry laws on unintentional injuries and deaths. Both reviews concluded that the effect of such laws could not be determined. Lott and Mustard (1997) examined county-level data on unintentional handgun deaths from national Mortality Detail Records data spanning 1982 to 1991 in counties with and without shall-issue concealed-carry laws. In an ordinary-least-squares regression controlling for arrest rates, population density, and socioeconomic characteristics, shall-issue laws had uncertain effects on unintentional handgun deaths and suggestive

effects consistent with increasing unintentional nonhandgun deaths (see Figure 13.3). However, the authors noted that with only 156 unintentional handgun deaths in counties with more than 100,000 people in 1988, most of the observations in the data set were zeros. They re-analyzed the data using Tobit regression to account for this low number of unintentional deaths but still found uncertain effects, cautioning that, because of computing limitations of the time, they were unable to include covariates other than state dummies in these regressions.

Although Lott and Mustard's 1997 study has been reanalyzed, including by the NRC review panel, the focus of most subsequent work has been on the violence and other crime outcomes they examined, not on unintentional deaths (see the previous section on the effects on violent crime).

We identified only one additional study meeting our inclusion criteria that examined the effect of shall-issue laws on unintentional injuries (no studies identified the relationship between permitless-carry laws and this outcome). DeSimone, Markowitz, and Xu (2013) performed a fixed-effects analysis to examine the effect of shall-issue laws on unintentional firearm injuries using hospital discharge data from the National Inpatient Sample spanning 1988 to 2003. In the 11 states that were part of the sample, the authors found a suggestive effect consistent with shall-issue laws increasing unintentional firearm injuries for children under age 18 and a statistically significant effect of these laws increasing self-inflicted firearm injuries among those 18 or older. Specifically, the estimate suggests that, after implementation of the law, unintentional firearm injuries among those aged 18 or older were more than twice as frequent as would be expected without the law, which would be extraordinary if true. However, the estimated effects of shall-issue laws in this study were based primarily on one state that changed its law during the study time frame (Arizona); thus, the study offers little evidence that the observed effects are due to the change in the law rather than to other factors affecting the state's unintentional injury rate that occurred around the same time the law was changed. Moreover, as DeSimone, Markowitz, and Xu (2013) note, the data set on which their estimates are made is not strictly longitudinal, and it is not possible to determine the extent to which child-access prevention law effect estimates are estimated cross-sectionally or longitudinally.

Figure 13.3 displays the IRRs and CIs associated with the concealed-carry laws examined in these studies.

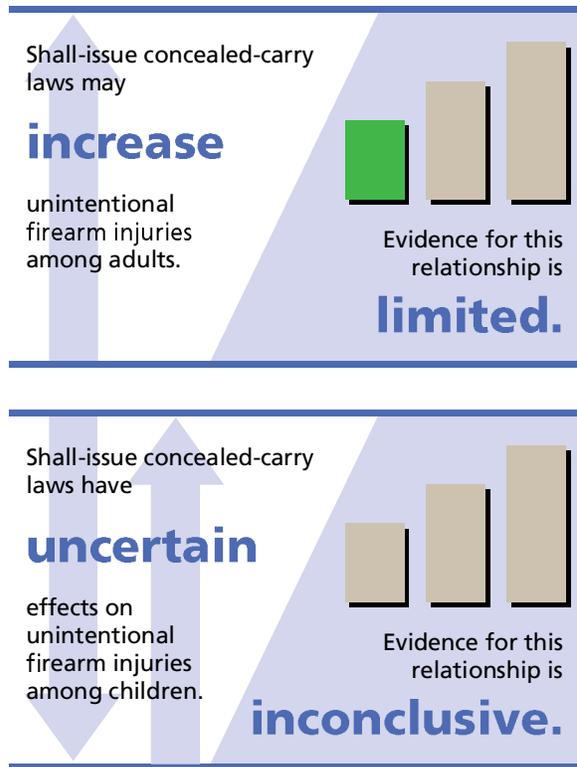
Figure 13.3
Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Unintentional Injuries and Deaths



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

We identified two qualifying studies that examined the effect of shall-issue laws on unintentional firearm deaths. Lott and Mustard (1997) found that shall-issue laws had an uncertain relationship with unintentional handgun deaths and a suggestive relationship with increased nonhandgun unintentional deaths. DeSimone, Markowitz, and Xu (2013) found a significant effect indicating that these laws increase unintentional injury rates among adults aged 18 or older and a suggestive effect in the same direction among youth aged 17 or younger.



Based on these studies and an assessment of their relative strengths, we conclude that there is *limited evidence that shall-issue concealed-carry laws may increase unintentional firearm injuries among adults and inconclusive evidence for the effect of these laws on such injuries among children.*

Effects on Mass Shootings

Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified research examining the effects of concealed-carry laws on mass shootings in the United States. Our search of studies since 2003 that met our inclusion criteria yielded one on permitless carry and three on shall-issue laws.

The three studies that examined the effects of shall-issue laws on mass shootings employed a difference-in-differences methodological design, exploiting state variation in the timing of law enactment to identify the causal effect of these policies on mass shooting incidents.⁶

Using a Poisson specification, Lott (2003) estimated the effect of shall-issue laws on fatalities, injuries, and the incidence of multiple-victim public shootings. The analysis covered 1977 to 1997, and regression models included controls for state and year fixed effects, other state firearm policies, and a broad range of state-level socioeconomic and demographic characteristics. Results showed that shall-issue laws were significantly associated with reductions in total casualties from multiple-victim public shootings and in the total number of multiple-victim public shooting incidents. However, these models had an unfavorable ratio of estimated parameters to observations (approximately one to eight), suggesting that the model may have been overfit, and thus the estimated effects of these laws may be poor indicators of their true effects. In addition, the model did not adjust for clustered standard errors. Together, these shortcomings suggest that the model results may not accurately describe the true effects of shall-issue laws.

Duwe, Kovandzic, and Moody (2002) used a fixed-effects negative binomial model—controlling for national time trends, state-level variation in socioeconomic and demographic factors, and state-level criminal justice characteristics (e.g., prison population)—to estimate the effect of these laws on the number of mass public shooting incidents, fatalities from mass public shootings, and injuries from mass public shooting injuries between 1976 and 1999. In their model, shall-issue laws were represented using two separate measures. A step dummy variable that takes a value of 1 the year after the law went into effect (0 otherwise) captured the immediate impact of the law, while a time trend variable captured dynamic effects of the policy. The authors

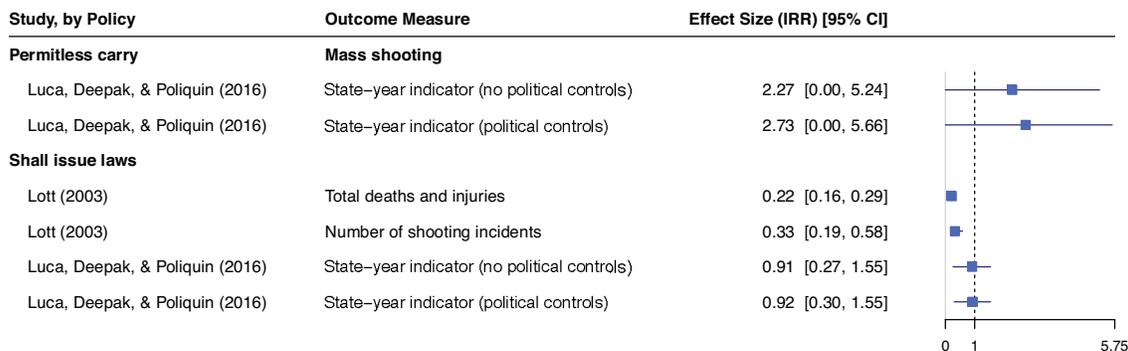
⁶ These studies adopted different definitions for *mass shooting* (see Chapter Twenty-Two for further detail on definitional issues). Lott (2003) examined multiple-victim public shootings, which the author defined as events unrelated to other criminal activity in which two or more people were killed or wounded in a public location. Duwe, Kovandzic, and Moody (2002) focused on *mass public shootings*, which the authors defined as incidents resulting in four or more firearm-related fatalities (excluding the offender), where both the victims and offender(s) were not engaged in criminal activities. Luca, Deepak, and Poliquin (2016) set the same casualty threshold as Duwe, Kovandzic, and Moody (2002) but excluded any incident that occurred in connection with criminal activity or in which fewer than three of the fatally injured victims were not related (e.g., family, romantic partner) to the shooter.

estimated several alternative models, including Poisson fixed-effects models and two dynamic fixed-effects negative binomial models, as specification checks. The findings showed uncertain effects (i.e., no statistically significant evidence) for a relationship between the laws and public mass shooting outcomes (see Figure 13.4). The preferred specification had an unfavorable ratio of estimated parameters to observations (less than one to ten), meaning the model may have been overfit, and thus the estimated effects of these laws may be poor indicators of their true effects.

Examining a partially overlapping but later period (1989–2014), Luca, Deepak, and Poliquin (2016) used a linear probability model to estimate the impact of shall-issue concealed-carry laws on a binary indicator for whether a mass shooting occurred in a given state-year. Controlling for time-invariant state characteristics, national trends, and a host of other state-level gun policies, as well as time-varying state-level demographic, socioeconomic, and political characteristics, the authors found a small and uncertain effect of shall-issue laws and a large but statistically insignificant positive effect of permitless-carry laws on the probability of a mass shooting event occurring. However, assessing the effects of gun policies on mass shootings was not the primary focus of this paper, and the authors intended the estimates to serve solely as a robustness check for their main specification (the effects of mass shootings on gun policy). Although the paper provided limited information to use in evaluating the reported statistical models (e.g., on how these policies were coded), it is clear that the analysis used a linear model to predict a dichotomous outcome. Therefore, model assumptions were violated, making CIs unreliable.

Figure 13.4 displays the IRRs and CIs associated with the concealed-carry laws examined in these studies. Estimates from Duwe, Kovandzic, and Moody (2002) are not included in this figure because their approach yielded effect sizes that vary with time.

Figure 13.4
Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Mass Shootings



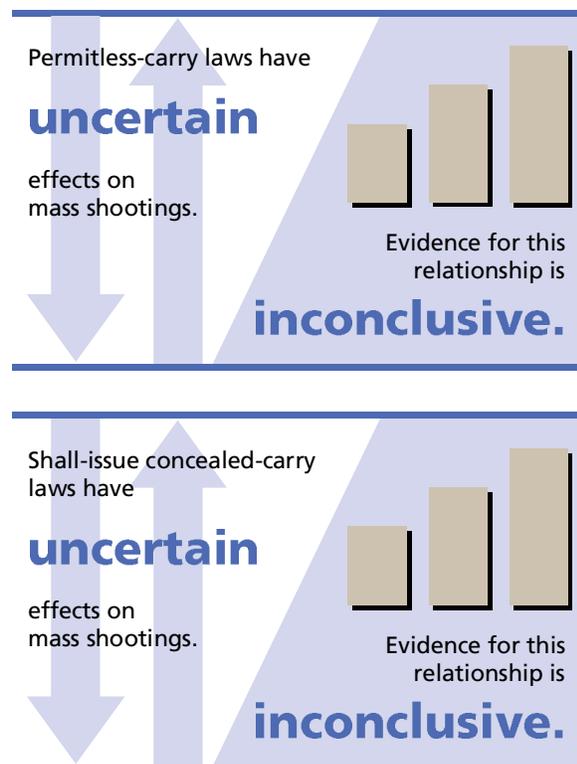
NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

Conclusions

Permitless-carry laws. We identified one qualifying study that examined the effects of permitless-carry laws on the incidence of mass shootings. Luca, Deepak, and Poliquin (2016) found that such laws had uncertain effects on the likelihood that at least one mass shooting event occurred in a given state. On the basis of this study, we find *inconclusive evidence for the effect of permitless-carry laws on mass shootings.*

Shall-issue concealed-carry laws. We identified three qualifying studies that examined the effect of shall-issue laws on mass shooting outcomes. Lott (2003) found that shall-issue laws were associated with significant reductions in multiple-victim shooting incidence and the number of deaths or injuries resulting from multiple-victim shootings. Duwe, Kovandzic, and Moody (2002) and Luca, Deepak, and Poliquin (2016) found uncertain effects of shall-issue laws on mass shooting outcomes (e.g., incidence, injuries, and fatalities).

Based on these studies and an assessment of their relative strengths, we find *inconclusive evidence for the effect of shall-issue laws on mass shootings.*



Effects on the Gun Industry

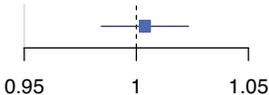
Research Synthesis Findings

Neither NRC (2004) nor Hahn et al. (2005) identified research examining the effects of concealed-carry laws on the gun industry. We identified one such study meeting our inclusion criteria. Duggan (2001) examined the effect of shall-issue laws on changes in gun ownership, using state-level subscription rates to *Guns & Ammo* magazine as a proxy for gun ownership. This study identified uncertain effects of these laws on gun ownership. However, the model also had an unfavorable ratio of explanatory variables to observations (approximately one to five) and provided no information about the quality of the model fit. This raises the possibility that the model was overfit, and thus the estimates may be unreliable indicators of the generalizable effect of shall-issue laws on gun ownership.

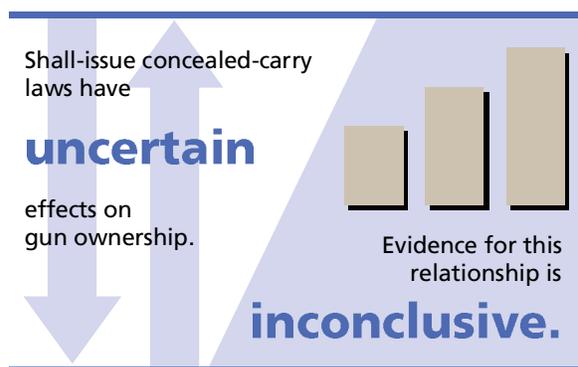
Figure 13.5 displays the IRR and CI associated with the concealed-carry laws examined in Duggan (2001).

Figure 13.5
Incidence Rate Ratios Associated with the Effect of Concealed-Carry Laws on Gun Ownership

Study, by Policy	Outcome Measure	Effect Size (IRR) [95% CI]
Shall issue laws		
Duggan (2001)	Gun ownership	1.00 [0.98, 1.02]



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.



Conclusions

The single study we identified (Duggan, 2001) found an uncertain effect of shall-issue concealed-carry laws on gun ownership. Therefore, we find *inconclusive evidence for the effect of these laws on gun ownership.*

Outcomes Without Studies Examining the Effects of Concealed-Carry Laws

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of concealed-carry laws on the following outcomes, and we identified no such studies that met our inclusion criteria:

- officer-involved shootings
- defensive gun use
- hunting and recreation.

Several of the studies reviewed here drew inferences about how concealed-carry laws influenced the deterrence and defensive benefits of guns, but none we identified directly examined the laws' effects on defensive gun use.

Chapter Thirteen References

Aneja, Abhay, John J. Donohue III, and Alexandria Zhang, *The Impact of Right to Carry Laws and the NRC Report: Lessons for the Empirical Evaluation of Law and Policy*, Stanford, Calif.: Stanford Law School, Olin Working Paper No. 461, December 1, 2014. As of May 21, 2017: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443681

Ayres, Ian, and John J. Donohue III, "Shooting Down the More Guns, Less Crime Hypothesis," *Stanford Law Review*, Vol. 55, No. 4, 2003a, pp. 1193–1312.

———, "The Latest Misfires in Support of the More Guns, Less Crime Hypothesis," *Stanford Law Review*, Vol. 55, No. 4, 2003b, pp. 1371–1398.

———, "Yet Another Refutation of the More Guns, Less Crime Hypothesis—with Some Help from Moody and Marvell," *Econ Journal Watch*, Vol. 6, No. 1, January 2009a, pp. 35–59.

———, "More Guns, Less Crime Fails Again: The Latest Evidence from 1977–2006," *Econ Journal Watch*, Vol. 6, No. 2, May 2009b, pp. 218–238.

Cramer, Clayton E., and David B. Kopel, "'Shall Issue': The New Wave of Concealed Handgun Permit Laws," *Tennessee Law Review*, Vol. 62, No. 3, 2005, pp. 679–757.

DeSimone, J., S. Markowitz, and J. Xu, "Child Access Prevention Laws and Nonfatal Gun Injuries," *Southern Economic Journal*, Vol. 80, No. 1, 2013, pp. 5–25.

Donohue, John J., "Guns, Crime, and the Impact of State Right-to-Carry Laws," *Fordham Law Review*, Vol. 73, No. 2, 2004, pp. 623–652.

Duggan, Mark, "More Guns, More Crime," *Journal of Political Economy*, Vol. 109, No. 5, 2001, pp. 1086–1114.

Durlauf, Steven, S. Navarro, and D. A. Rivers, "Model Uncertainty and the Effect of Shall-Issue Right-to-Carry Laws on Crime," *European Economic Review*, Vol. 81, 2016, pp. 32–67.

Duwe, Grant, Tomislav Kovandzic, and Carlisle E. Moody, "The Impact of Right-to-Carry Concealed Firearm Laws on Mass Public Shootings," *Homicide Studies*, Vol. 6, No. 4, 2002, pp. 271–296.

Fortunato, David, "Can Easing Concealed Carry Deter Crime?" *Social Science Quarterly*, Vol. 96, No. 4, December 2015, pp. 1071–1085.

French, B., and P. J. Heagerty, "Analysis of Longitudinal Data to Evaluate a Policy Change," *Statistics in Medicine*, Vol. 27, No. 24, 2008, pp. 5005–5025.

Gius, Mark, "An Examination of the Effects of Concealed Weapons Laws and Assault Weapons Bans on State-Level Murder Rates," *Applied Economics Letters*, Vol. 21, No. 4, 2014, pp. 265–267.

Grambsch, P., "Regression to the Mean, Murder Rates, and Shall-Issue Laws," *American Statistician*, Vol. 62, No. 4, 2008, pp. 289–295.

Grossman, Richard S., and Stephen A. Lee, "May Issue Versus Shall Issue: Explaining the Pattern of Concealed-Carry Handgun Laws, 1960–2001," *Contemporary Economic Policy*, Vol. 26, No. 2, 2008, pp. 198–206.

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Helland, E., and A. Tabarrok, "Using Placebo Laws to Test 'More Guns, Less Crime,'" *Advances in Economic Analysis and Policy*, Vol. 4, No. 1, 2004.

Kendall, Todd D., and Robert Tamura, “Unmarried Fertility, Crime, and Social Stigma,” *Journal of Law and Economics*, Vol. 53, No. 1, 2010, pp. 185–221.

Kovandzic, Tomislav V., and Thomas B. Marvell, “Right-to-Carry Concealed Handguns and Violent Crime: Crime Control Through Gun Control?” *Criminology and Public Policy*, Vol. 2, No. 3, 2003, pp. 363–396.

Kovandzic, T. V., T. B. Marvell, and L. M. Vieraitis, “The Impact of ‘Shall-Issue’ Concealed Handgun Laws on Violent Crime Rates—Evidence from Panel Data for Large Urban Cities,” *Homicide Studies*, Vol. 9, No. 4, 2005, pp. 292–323.

La Valle, James M., “‘Gun Control’ vs. ‘Self-Protection’: A Case Against the Ideological Divide,” *Justice Policy Journal*, Vol. 10, No. 1, 2013, pp. 1–26.

La Valle, James M., and Thomas C. Glover, “Revisiting Licensed Handgun Carrying: Personal Protection or Interpersonal Liability?” *American Journal of Criminal Justice*, Vol. 37, No. 4, 2012, pp. 580–601.

Lott, John R., Jr., *More Guns, Less Crime: Understanding Crime and Gun-Control Laws*, Chicago, Ill.: University of Chicago Press, 2000.

———, *The Bias Against Guns: Why Almost Everything You’ve Heard About Gun Control Is Wrong*, Washington, D.C.: Regnery Publishing, Inc., 2003.

———, *More Guns, Less Crime: Understanding Crime and Gun-Control Laws*, 3rd ed., Chicago, Ill.: University of Chicago Press, 2010.

Lott, J. R., and D. B. Mustard, “Crime, Deterrence, and Right-to-Carry Concealed Handguns,” *Journal of Legal Studies*, Vol. 26, No. 1, 1997, pp. 1–68.

Lott John R., Jr., and John E. Whitley, “Measurement Error in County-Level UCR Data,” *Journal of Quantitative Criminology*, Vol. 19, No. 2, June 2003, pp. 185–198.

———, “Abortion and Crime: Unwanted Children and Out-of-Wedlock Births,” *Economic Inquiry*, Vol. 45, No. 2, 2007, pp. 304–324.

Lott, John R., Jr., John E. Whitley, and Rebekah C. Riley, *Concealed Carry Permit Holders Across the United States*, Crime Prevention Research Center, 2016.

Luca, Michael, Lahotra Deepak, and Christopher Poliquin, *The Impact of Mass Shootings on Gun Policy*, working paper, Boston, Mass.: Harvard Business School, 2016.

Maltz, M. D., and J. Targonski, “A Note on the Use of County-Level UCR Data,” *Journal of Quantitative Criminology*, Vol. 18, No. 2, 2002, pp. 297–318.

Manski, Charles F., and John V. Pepper, *How Do Right-to-Carry Laws Affect Crime Rates? Coping with Ambiguity Using Bounded-Variation Assumptions*, Cambridge, Mass.: National Bureau for Economic Research, NBER Working Paper 21701, November 2015.

Martin, Robert A., Jr., and Richard L. Legault, “Systematic Measurement Error with State-Level Crime Data: Evidence from the ‘More Guns Less Crime’ Debate,” *Journal of Research in Crime and Delinquency*, Vol. 42, No. 2, May 2005, pp. 187–210.

Moody, Carlisle E., and Thomas B. Marvell, “The Debate on Shall Issue Laws, Continued,” *Econ Journal Watch*, Vol. 6, No. 2, 2009.

Moody, Carlisle E., Thomas B. Marvell, Paul R. Zimmerman, and Fasil Alemante, “The Impact of Right-to-Carry Laws on Crime: An Exercise in Replication,” *Review of Economics and Finance*, Vol. 4, 2014, pp. 33–43.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—*See* National Research Council.

Phillips, C. D., O. Nwaiwu, D. K. McMaughan Moudouni, R. Edwards, and S. Lin, “When Concealed Handgun Licensees Break Bad: Criminal Convictions of Concealed Handgun Licensees in Texas, 2001–2009,” *American Journal of Public Health*, Vol. 103, No. 1, 2013, pp. 86–91.

Plassmann, F., and J. E. Whitley, “Comments: Confirming More Guns, Less Crime,” *Stanford Law Review*, Vol. 55, No. 4, 2003, pp. 1313–1369.

Roberts, Darryl W., “Intimate Partner Homicide: Relationships to Alcohol and Firearms,” *Journal of Contemporary Criminal Justice*, Vol. 25, No. 1, 2009, pp. 67–88.

Rosengart, M., P. Cummings, A. Nathens, P. Heagerty, R. Maier, and F. Rivara, “An Evaluation of State Firearm Regulations and Homicide and Suicide Death Rates,” *Injury Prevention*, Vol. 11, No. 2, 2005, pp. 77–83.

Steidley, Trent Taylor, *Movements, Malefactions, and Munitions: Determinants and Effects of Concealed Carry Laws in the United States*, dissertation, Columbus, Ohio: Ohio State University, 2016. As of May 12, 2017:

http://rave.ohiolink.edu/etdc/view?acc_num=osu1466007307

Strnad, Jeff, “Should Legal Empiricism Go Bayesian?” *American Law and Economics Review*, Vol. 9, No. 1, Spring 2007, pp. 195–304.

United States Code, Title 18, Section 926, Rules and Regulations.

United States Concealed Carry Association, “Traveling? Know Concealed Carry Permit Info by State,” West Bend, Wisc., August 7, 2013. As of June 29, 2017:

<https://www.usconcealedcarry.com/traveling-ccw-permit/>

USA Carry, “Concealed Carry Permit Reciprocity Maps,” web page, April 20, 2017. As of June 29, 2017:

http://www.usacarry.com/concealed_carry_permit_reciprocity_maps.html

Violence Policy Center, “Concealed Carry Killers,” web page, 2017. As of March 23, 2017:

<http://concealedcarrykillers.org/>

Webster, D., C. K. Crifasi, and J. S. Vernick, “Effects of the Repeal of Missouri’s Handgun Purchaser Licensing Law on Homicides,” *Journal of Urban Health*, Vol. 91, No. 2, 2014, pp. 293–302.

CHAPTER FOURTEEN

Waiting Periods

The Brady Handgun Violence Prevention Act (the Brady Act), which went into effect in 1994, imposed a five-day waiting period for handguns purchased from licensed dealers in states with unsatisfactory procedures for conducting background checks. However, this requirement lasted only until 1998, when the National Instant Criminal Background Check System (NICS) became available. Since then, all firearm purchases have required NICS background checks, which normally take no more than a few minutes to complete. Nevertheless, in approximately 10 percent of background checks, the NICS check requires supplementary reviews (Criminal Justice Information Services Division, 2014), and federal law allows the Federal Bureau of Investigation (FBI) up to three days to complete these (18 U.S.C. 922). After three days, the dealer may, but is not required to, transfer possession of a firearm to its purchaser even without completion of the background check. By giving the FBI three days to complete the checks before allowing someone to take possession of a new firearm, the federal law can introduce delays comparable to a waiting period, although most buyers experience no such delay.

Waiting-period laws are intended to reduce suicide, violent crime, and mass shootings in several ways. First, waiting periods are primarily designed to disrupt impulsive acts of violence and self-harm, giving angry or distraught buyers time to “cool off” or gain perspective. While it is plausible that this cooling-off period could reduce impulsive interpersonal gun violence, some evidence exists for the potential effects of this mechanism in reducing suicides. Many suicidal acts are impulsive, with a short time between ideation (thinking about suicide) and attempt (Miller, Azrael, and Barber, 2012; Simon et al., 2002). Suicidal crises are often short-lived and characterized by ambivalence (Daigle, 2005; Glatt, 1987). Delaying access to firearms for individuals in these circumstances can reduce suicide attempts (see Chapter Sixteen, on the relationship between firearm prevalence and suicide). Even if many distraught suicide attempters would seek alternative means of killing themselves, waiting periods may still reduce total rates of suicide because of the high case-fatality ratio of firearms compared with other methods (Anestis, 2016; Vyrostek, Anestis, and Ryan, 2004).

Still, for some individuals, waiting periods may serve only to delay suicides rather than prevent them. Evidence from a cohort of handgun purchasers in California found

that, while almost no firearm suicides were committed by this population during the 15-day waiting period, the most elevated relative risk of firearm suicide (compared with the general population) occurred in the first week after receipt of the weapon and remained highly elevated over the first month of purchase (Wintemute et al., 1999). Moreover, most firearms are purchased by individuals who already own a firearm. Azrael et al. (2017) found that, on average, gun owners had close to five firearms each, and a large majority (62 percent) purchased their most recent weapon from a gun dealer. For those who already own guns, a waiting period may have little or no effect on suicide risk. However, a cooling-off period could still yield some violence reduction benefits by deferring the acquisition of, for instance, more or more-lethal weapons, although such benefits are likely more limited for this group.

Second, waiting periods may provide law enforcement with opportunities to investigate possible straw purchases (in which a lawful buyer makes the purchase on the behalf of a prohibited buyer) under the theory that it is less difficult to intercept a weapon prior to delivery. To assess whether waiting periods disrupt illegal firearm trafficking or transfers through this mechanism, causal inference could be strengthened by examining crime gun trace data in addition to changes in homicide or violent crime rates.¹ Specifically, if these laws restrict straw purchasing from in-state retailers, one should observe a larger share of crime guns originating from out-of-state sources after law passage and/or a reduction in guns with a short time-to-crime (Webster and Wintemute, 2015; Braga et al., 2012).² However, a series of provisions attached to Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) appropriations (commonly known as the Tiahrt Amendments) has denied most researchers access to firearm trace data since 2003, making it currently infeasible to conduct this type of analysis (Krouse, 2009).

Third, waiting periods provide law enforcement agencies with additional time to complete background checks that sometimes cannot be completed within the three-day window provided by the federal law. In 2014, for instance, 2,511 firearms were transferred from federally licensed firearm dealers to prohibited persons as a result of delays in NICS background checks that exceeded three business days (Criminal Justice Information Services Division, 2015). An additional 1 percent of all background checks, or about 230,000, could not be completed within 88 days and were thus purged from the NICS review system by law without a determination about whether the buyer was a prohibited possessor (Office of the Inspector General, U.S. Department of Justice, 2016). When a buyer is determined to have been a prohibited possessor and has

¹ The Bureau of Alcohol, Tobacco, and Firearms (2002, p. A-3) defined *crime gun* as “any firearm that is illegally possessed, used in a crime, or suspected to have been used in a crime. An abandoned firearm may also be categorized as a crime gun if it is suspected it was used in a crime or illegally possessed.”

² Per Webster and Wintemute (2015), the metric known as *time-to-crime* is the “unusually short interval—ranging from less than 1 year to less than 3 years—between a gun’s retail sale and its subsequent recovery by police from criminal suspects or crime scenes A short [time-to-crime] is considered an indicator of diversion, especially when the criminal possessor is someone different from the purchaser of record.”

taken possession of a firearm, the NICS alerts ATF, which in the vast majority of cases (e.g., 116 of the 125 examined by the Office of the Inspector General, U.S. Department of Justice, 2016) is successful in recovering the weapon.

Waiting periods provide additional time that can facilitate a more thorough check before buyers take possession of a new weapon, thereby increasing the effectiveness of background check laws in limiting firearm access by prohibited possessors who are considered to present elevated risk of violence. As discussed in Chapter Three, the majority of prohibited possessors who perpetrate gun violence acquire their firearms from social acquaintances or the black market; thus, a large portion of violent gun crime is unlikely to be affected through this mechanism. In addition, it is unclear whether extending the time to complete background checks would reduce mass shootings. An analysis of the sources of firearms used in a sample of 16 mass shootings between 2009 and 2016 found one instance (6.3 percent) in which the shooter acquired a firearm used in the assault because the background check could not be completed in three business days (Buchanan et al., 2016). One additional instance involved an administrative error that resulted in a failure to trigger an automatic rejection and delayed completion of the background check within the requisite three-day period (Buchanan et al., 2016). However, the small sample of mass shooting cases explored in this analysis makes generalizations about the association of waiting periods and mass shooting incidents unwarranted.

Waiting-period laws may have the unintended consequence of delaying needed self-protection, although little empirical evidence exists to assess how often this may occur. The waiting periods may inconvenience some hunters or sport shooters who would otherwise benefit from more quickly obtaining a new firearm and, by extension, could reduce gun sales. Moreover, the laws may discourage some gun sales because they can require buyers to make two trips to the dealer, which delays the satisfaction of taking possession of the weapon.

Ideally, the effects of waiting periods would be studied among those populations most directly affected by the presumed mechanisms of their effect. In particular, it would be valuable to examine the effects of waiting periods on suicide and violence among those who do not already own a gun. However, this information is not available in the large data sets typically used to analyze the effects of gun policy (although there are some data on the time frame between purchase of a firearm and suicide risk; see Chapter Sixteen). Similarly, understanding the effect of waiting periods on the gun industry would be straightforward if sales data were available at state or local levels.

Analyses could also exploit the types of firearms for which waiting periods are required, as well as the duration of the waiting period. The importance of accounting for such policy heterogeneity will depend on the extent to which different types of firearms are substitutes and the marginal effect of requiring an additional day or days of delay before transfer can occur. State waiting-period laws applying to only a subset of firearms (e.g., handguns) should primarily affect outcomes involving those

firearms, although one might expect to observe substitution toward other firearms excluded from waiting-period requirements. With respect to the waiting-period length, should the urge to commit suicide subside within one day, waiting periods of 48 hours or two weeks should generate similar effects, but if suicidal impulses persist for one week, different waiting period lengths may generate heterogeneous effects (Lewiecki and Miller, 2013).

State Implementation of Waiting Periods

A few jurisdictions impose a waiting period to purchase a firearm (Giffords Law Center to Prevent Gun Violence, undated-g). For example, California and the District of Columbia require a ten-day waiting period before buyers take possession of a new firearm.³ In Hawaii, buyers must wait 14 days to receive a permit to purchase a firearm.⁴ Other states impose waiting periods only for handguns or only for handguns and assault rifles.

Effects on Suicide

Research Synthesis Findings

The Hahn et al. (2005) review identified six studies that examined the effects of waiting periods on suicides, but the authors found that the evidence was inconclusive. And according to the National Research Council (NRC) (2004, p. 184), “While suicide has rarely been the basis for public support of specific gun laws, suicide prevention may be the unintended by-product of such laws.” Although NRC did not make any conclusions about specific gun policies, the report stated, “Some gun control policies may reduce the number of gun suicides, but they have not yet been shown to reduce the overall risk of suicide in any population.” On waiting-period policies, NRC concluded, “The risk of suicide is highest immediately after purchase of a handgun, suggesting that some firearms are specifically purchased for the purpose of committing suicide.”⁵

Cook and Ludwig (2003) provides results similar to the authors’ earlier paper (Ludwig and Cook, 2000). Because the earlier paper included a larger data set spanning a wider time frame, we focus on its analyses, although the results reported in the two papers are comparable. Both papers examined changes in suicide rates before and

³ Calif. Penal Code §§ 26815, 27540, 27545 (the waiting period applies to dealers, but, in California, all sales must be processed through a dealer); D.C. Code Ann. §§ 22-4508.

⁴ Hawaii Rev. Stat. Ann. § 134-2. A separate permit is required for each handgun purchase, and the permit expires after ten days; long-gun permits are valid for one year.

⁵ This finding derives from studies that have estimated suicide risk after purchase of firearms, described in more detail in Chapters Sixteen and Seventeen.

after the implementation of the Brady Act in 1994, which initially imposed waiting periods and background checks for purchases from licensed firearm dealers. When the Brady Act was implemented, 18 states and the District of Columbia already had background checks, 27 states were required to implement background checks and waiting periods, and five states were required to implement only background checks (because they already had waiting periods or had an instant background check procedure that satisfied the Brady requirements). Ludwig and Cook (2000) sought to identify the effects of waiting periods by comparing reductions in suicide rates found in the states that did and did not implement waiting periods. They found that, when compared with the 18 unaffected states (plus the District of Columbia), the states implementing and those not implementing waiting periods saw uncertain reductions in suicide and firearm suicide rates. A subgroup analysis found a significant 9-percent reduction in firearm suicide rates among older victims in states that introduced waiting periods, whereas the reductions in states that did not have to introduce waiting periods were smaller and uncertain. The paper did not demonstrate that the difference between these rate reductions was statistically significant. In addition, the analyses of states that were not required to implement waiting periods had a ratio of estimated parameters to observations of less than one to three, and the study provided no additional evidence to demonstrate model fit. Therefore, in accordance with our review methodology, we discount the evidence provided by this analysis because of the possibility the model was overfit, and thus the estimated effects and their confidence intervals (CIs) may be unreliable indicators of the true causal effects of the laws.

Conclusions

We identified no qualifying studies that estimated the effects of waiting periods on suicides.

Effects on Violent Crime

Research Synthesis Findings

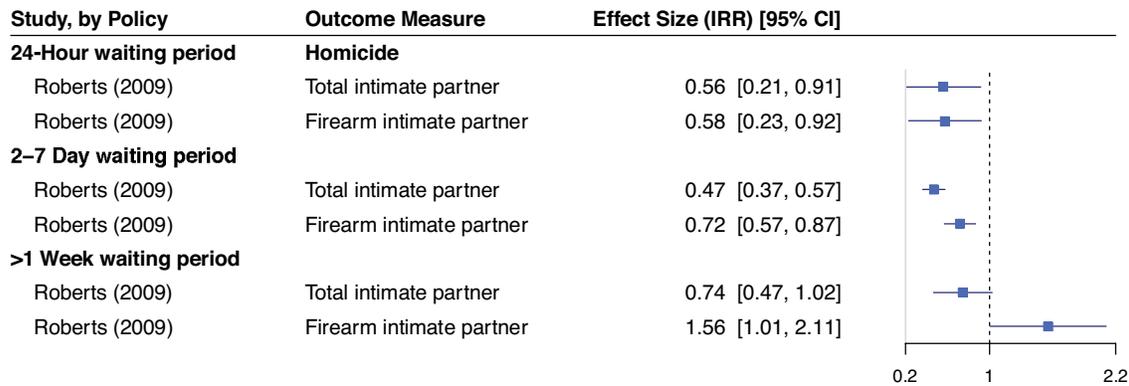
In their review of existing science, Hahn et al. (2005) found insufficient evidence for determining the effectiveness of waiting periods on violent crime. In its review, NRC (2004) profiled a study by Ludwig and Cook (2000)—a version of which was published in our review period (Cook and Ludwig, 2003)—that examined changes in homicide rates before and after implementation of the Brady Act in 1994. The authors sought to identify the effects of waiting periods by comparing reductions in homicide rates in states that had to implement waiting periods in 1994 with reductions in states that did not. Ludwig and Cook (2000) found that, compared with the 18 unaffected states (plus the District of Columbia), states implementing waiting periods saw non-significant drops in homicide and nonfirearm homicide rates, whereas the five states

that were not required to implement waiting periods saw nonsignificant increases in homicide and firearm homicide rates. However, the paper did not report whether these effects differed by a statistically significant amount. In addition, the analyses of states that were not required to implement waiting periods had a ratio of estimated parameters to observations of less than one to three, and the paper provided no additional evidence to demonstrate model fit. Therefore, in accordance with our review methodology, we discount the evidence provided by this analysis because of the possibility the model was overfit, and thus the estimated effects and their CIs may be unreliable indicators of the true causal effects of the laws.

We identified one study that specifically examined the effect of waiting periods on violent crime. Roberts (2009) separately analyzed the effects of waiting-period length (none, 24 hours, between two and seven days, and more than seven days) and shall-issue laws on intimate partner homicides (using county-level data from 1985 to 2004). The author found that a waiting period of between two and seven days significantly lowered intimate partner homicide rates compared with no waiting period, but longer (more than seven days) or shorter (24-hour) waiting periods (compared with no waiting period) had only suggestive effects on reducing total intimate partner homicides. The author also reported that a waiting period of between two and seven days significantly reduced firearm-related intimate partner homicides (compared with no waiting period), but a waiting period longer than seven days significantly increased intimate partner firearm homicides (compared with no waiting period). However, these analyses did not cluster standard errors at the state level, so serial correlation that was unaccounted for in the panel data could have resulted in biased standard errors and CIs. In addition, the analysis examined alternative specifications, such as spline or hybrid models, for the effects of shall-issue laws.

Figure 14.1 displays the incidence rate ratios (IRRs) and CIs associated with the waiting-period policies examined in these studies (except for Ludwig and Cook [2000] and Cook and Ludwig [2003] for the reasons stated earlier). Our standardized effects suggest that after a 24-hour waiting period went into effect, the intimate partner firearm homicide rate was 58 percent of what would have been expected without the policy, and the intimate partner total homicide rate was 56 percent of what would have been expected without the policy. Further, when the waiting period of between two and seven days went into effect, the intimate partner firearm homicide rate and total homicide rate were 72 percent and 42 percent, respectively, of what would have been expected without the policy. Oddly, waiting periods of longer than seven days were

Figure 14.1
Incidence Rate Ratios Associated with the Effect of Waiting Periods on Violent Crime

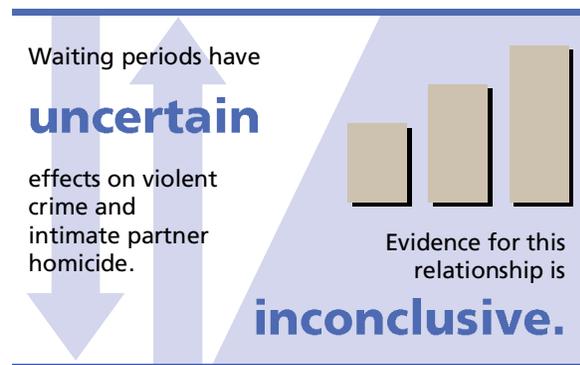


NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details.

estimated to decrease total intimate partner homicide rates by 36 percent but increase firearm intimate partner homicide rates by 56 percent.

Conclusions

We identified one qualifying study that examined the effects of waiting periods on homicide rates. Specifically, Roberts (2009) found that a waiting period of between two and seven days was significantly associated with reduced intimate partner homicides generally and those committed with firearms in particular. He found only a suggestive effect for 24-hour waiting periods reducing total and firearm-involved intimate partner homicides. He found suggestive effects for waiting periods of more than seven days reducing intimate partner homicides. However, he also found that these longer waiting periods were significantly associated with increases in intimate partner homicides in which a firearm was the murder weapon. Based on this one study and an assessment of its strengths, we find *inconclusive evidence for the effect of waiting periods on violent crime generally or intimate partner homicides in particular.*



Based on this one study and an assessment of its strengths, we find *inconclusive evidence for the effect of waiting periods on violent crime generally or intimate partner homicides in particular.*

Effects on Mass Shootings

Research Synthesis Findings

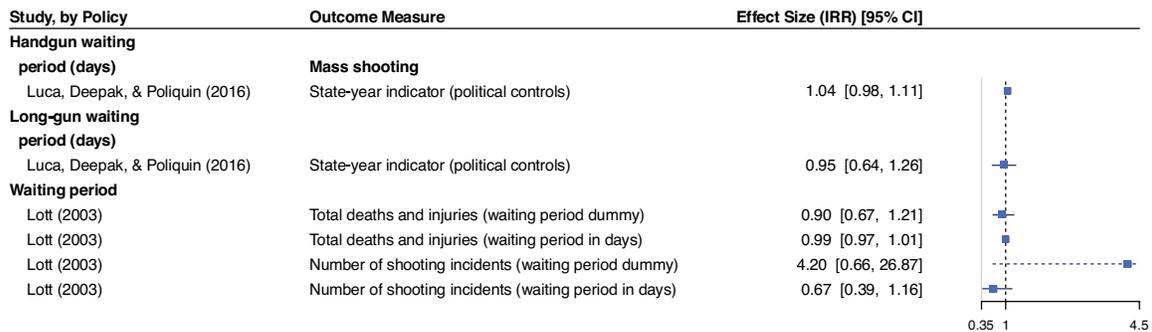
Neither NRC (2004) nor Hahn et al. (2005) identified research examining the effects of waiting periods on mass shootings in the United States. Our search yielded two studies that met our inclusion criteria.

Lott (2003) used a Poisson regression model to estimate the effect of waiting periods on fatalities, injuries, and the incidence of *multiple-victim public shootings*, which the author defined as events unrelated to other criminal activity in which two or more people were killed or wounded in a public location. The analysis covered 1977 to 1997, and regression models included controls for state and year fixed effects, other state firearm policies, and a broad range of state-level socioeconomic and demographic characteristics. The author characterized waiting-period laws using three variables: a dummy variable for whether state laws required a waiting period before delivery of a firearm, the length of the waiting period in days, and the length of the waiting period in days squared. For all three policy variables, findings showed effects that were small and not statistically significant for total casualties from multiple-victim public shootings and for total number of multiple-victim public shooting incidents (see Figure 14.2). However, these models had an unfavorable ratio of estimated parameters to observations (approximately one to eight), suggesting that the model may have been overfit, and thus the estimated effects of these laws may be poor indicators of their true effects. In addition, the model did not adjust for clustered standard errors. Together, these shortcomings suggest that the model results may not accurately describe the true effects of waiting periods.

Using a two-way fixed-effects linear probability model, Luca, Deepak, and Poliquin (2016) estimated the effects of waiting periods on a binary indicator for whether a mass shooting occurred in a given state-year. The authors included two measures of waiting periods: the number of days that purchasers must wait before accepting delivery of a handgun and the number of days before accepting delivery of a long gun. The authors' regression analysis covered 1989–2014 and included controls for time-invariant state characteristics, national trends, and a host of other state-level gun policies, as well as time-varying state-level demographic, socioeconomic, and political characteristics. Their findings showed uncertain effects that were small in magnitude of both waiting-period measures on the probability of a mass shooting event. However, assessing the effects of gun policies on mass shootings was not the primary focus of Luca, Deepak, and Poliquin (2016), and the authors intended the estimates to serve solely as a robustness check for their main specification (the effects of mass shootings on gun policy). Although the paper provided limited information to use in evaluating the reported statistical models (e.g., on how these policies were coded), it is clear that the analysis used a linear model to predict a dichotomous outcome. Therefore, model assumptions were violated, making CIs unreliable.

Figure 14.2 displays the IRRs and CIs associated with the waiting-period policies examined in these studies.

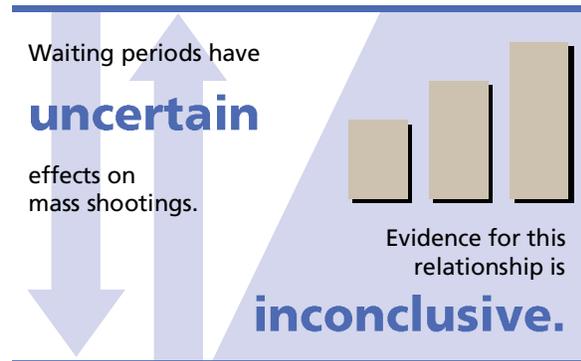
Figure 14.2
Incidence Rate Ratios Associated with the Effect of Waiting Periods on Mass Shootings



NOTE: IRR values marked with blue squares indicate that methodological concerns are discussed in the text. See Appendix B for details. We abbreviated the full range of the CI for one Lott (2003) outcome measure so that it fit within the scale of the figure; for this CI, we use a dotted line.

Conclusions

We identified two qualifying studies examining the effect of waiting periods on mass shooting outcomes. Luca, Deepak, and Poliquin (2016) found the length of waiting periods required for handguns and for long guns to have uncertain effects on the likelihood that at least one mass shooting occurred in a state. Lott (2003) found a suggestive effect consistent with the passage of any waiting-period law increasing the incidence of mass shootings. However, estimates in the same model also showed a suggestive effect of waiting-period length on decreasing the incidence of mass shootings, which complicates interpretation of the overall effect of the law. Further, Lott (2003) found uncertain effects of both waiting-period measures on the number of casualties from mass shooting events. Based on these studies, we find *inconclusive evidence for the effect of waiting periods on mass shootings*.



Outcomes Without Studies Examining the Effects of Waiting Periods

Neither NRC (2004) nor Hahn et al. (2005) identified any research examining the effects of waiting periods on the following outcomes, and we identified no such studies that met our inclusion criteria:

- unintentional injuries and deaths
- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

Chapter Fourteen References

- Anestis, M. D., "Prior Suicide Attempts Are Less Common in Suicide Decedents Who Died by Firearms Relative to Those Who Died by Other Means," *Journal of Affective Disorders*, Vol. 189, No. 1, 2016, pp. 106–109.
- Azrael, Deborah, Lisa Hepburn, David Hemenway, and Matthew Miller, "The Stock and Flow of U.S. Firearms: Results from the 2015 National Firearms Survey," *Russell Sage Foundation Journal of the Social Sciences*, Vol. 3, No. 5, 2017, pp. 38–57.
- Braga, Anthony A., Garen J. Wintemute, Glenn L. Pierce, Philip J. Cook, and Greg Ridgeway, "Interpreting the Empirical Evidence on Illegal Gun Market Dynamics," *Journal of Urban Health*, Vol. 89, No. 5, 2012, pp. 779–793.
- Buchanan, Larry, Josh Keller, Richard A. Oppel, Jr., and Daniel Victor, "How They Got Their Guns," *New York Times*, June 12, 2016. As of March 16, 2017:
<https://www.nytimes.com/interactive/2015/10/03/us/how-mass-shooters-got-their-guns.html>
- Bureau of Alcohol, Tobacco, and Firearms, *Crime Gun Trace Reports (2000): Memphis, Tennessee*, Washington, D.C.: U.S. Department of the Treasury, July 2002.
- Cook, P. J., and Jens Ludwig, "The Effect of the Brady Act on Gun Violence," in B. Harcourt, ed., *Guns, Crime, and Punishment in America*, New York: New York University Press, 2003, pp. 283–298.
- Criminal Justice Information Services Division, *National Instant Criminal Background Check System (NICS) Operations 2013*, Washington, D.C.: U.S. Department of Justice, Federal Bureau of Investigation, 2014. As of June 29, 2017:
<https://archives.fbi.gov/archives/about-us/cjis/nics/reports/2013-operations-report>
- , *National Instant Criminal Background Check System (NICS) Operations 2014*, Washington, D.C.: U.S. Department of Justice, Federal Bureau of Investigation, 2015. As of March 16, 2017:
<https://www.fbi.gov/file-repository/2014-nics-ops-report-050115.pdf>
- Daigle, M. S., "Suicide Prevention Through Means Restriction: Assessing the Risk of Substitution—A Critical Review," *Accident Analysis and Prevention*, Vol. 37, 2005, pp. 625–632.
- Giffords Law Center to Prevent Gun Violence, "Waiting Periods," web page, undated-g. As of October 18, 2017:
<http://lawcenter.giffords.org/gun-laws/policy-areas/gun-sales/waiting-periods/>
- Glatt, K. M., "Helpline: Suicide Prevention at a Suicide Site," *Suicide and Life-Threatening Behavior*, Vol. 17, 1987, pp. 299–309.
- Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.
- Krouse, W. J., *Gun Control: Statutory Disclosure Limitations on ATF Firearms Trace Data and Multiple Handgun Sales Reports*, Washington, D.C.: Congressional Research Service, 7-5700, 2009.
- Lewiecki, E. M., and S. A. Miller, "Suicide, Guns, and Public Policy," *American Journal of Public Health*, Vol. 103, No. 1, 2013, pp. 27–31.
- Lott, John R., Jr., *The Bias Against Guns: Why Almost Everything You've Heard about Gun Control Is Wrong*, Washington, D.C.: Regnery Publishing, Inc., 2003.
- Luca, Michael, Lahotra Deepak, and Christopher Poliquin, *The Impact of Mass Shootings on Gun Policy*, working paper, Boston, Mass.: Harvard Business School, 2016.

Ludwig, J., and P. J. Cook, "Homicide and Suicide Rates Associated with Implementation of the Brady Handgun Violence Prevention Act," *JAMA*, Vol. 284, No. 5, 2000, pp. 585–591.

Miller, M., D. Azrael, and C. Barber, "Suicide Mortality in the United States: The Importance of Attending to Method in Understanding Population-Level Disparities in the Burden of Suicide," *Annual Review of Public Health*, Vol. 33, 2012, pp. 393–408.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Office of the Inspector General, U.S. Department of Justice, *Audit of the Handling of Firearms Purchase Denials Through the National Instant Criminal Background Check System*, Washington, D.C., September 2016. As of May 11, 2017:
<https://oig.justice.gov/reports/2016/a1632.pdf>

Roberts, Darryl W., "Intimate Partner Homicide: Relationships to Alcohol and Firearms," *Journal of Contemporary Criminal Justice*, Vol. 25, No. 1, 2009, pp. 67–88.

Simon, T. R., A. C. Swann, K. E. Powell, L. B. Potter, M. Kresnow, and P. W. O'Carroll, "Characteristics of Impulsive Suicide Attempts and Attempters," *Suicide and Life-Threatening Behavior*, Vol. 32, No. 1, 2002, pp. 49–59.

United States Code, Title 18, Section 922, Unlawful Acts.

Vyrostek, S. B., J. L. Annett, and G. W. Ryan, "Surveillance for Fatal and Nonfatal Injuries—United States, 2001," *MMWR Surveillance Summary*, Vol. 53, 2004, pp. 1–57.

Webster, D.W., and G. J. Wintemute, "Effects of Policies Designed to Keep Firearms from High-Risk Individuals," *Annual Review of Public Health*, Vol. 36, 2015, pp. 21–37.

Wintemute, G. J., C. A. Parham, J. J. Beaumont, M. Wright, and C. Drake, "Mortality Among Recent Purchasers of Handguns," *New England Journal of Medicine*, Vol. 341, No. 21, 1999, pp. 1583–1589.

CHAPTER FIFTEEN

Gun-Free Zones

Federal and state laws bar most individuals from carrying firearms or other weapons in certain locations. For instance, federal laws prohibit the possession of firearms in federal facilities, other than federal court facilities, except for hunting or other lawful purposes (18 U.S.C. 930). Similarly, firearms are prohibited on property belonging to the U.S. Department of Veterans Affairs (38 C.F.R. 1.218) or the U.S. Postal Service (39 C.F.R. 232.1).

Two federal laws restrict guns in or around schools offering elementary or secondary education. The Gun-Free School Zones Act of 1990 prohibits most firearms within 1,000 feet of a school, but it does not apply to possession by individuals with state licenses (18 U.S.C. 922).¹ In addition, the Gun-Free Schools Act of 1994 applies to schools receiving federal funds and requires the schools to expel for at least one year any student found in possession of a firearm on school property (20 U.S.C. 7961).

Gun-free zones are intended to reduce violent crime, suicides, unintentional firearm injuries and deaths, and mass shootings in specific locations. In theory, the gun-free zone reduces or eliminates the presence of guns in these areas, thereby eliminating the risk of unintentional firearm injuries due to recklessness, escalatory conflicts, or criminal activity. Gun-free zones establish the legal foundation for imposing screening measures, such as bag checks at stadiums or magnetometer screening at some schools or public buildings, that can be used to ensure that fewer or no guns are present in the location.

Alternatively, if the presence or potential presence of armed civilians deters violence, gun-free zones could serve as more-attractive targets to violent criminals or mass shooters because perpetrators will be less likely to encounter armed resistance in these areas. There is debate over the extent to which perpetrators target gun-free zones. One analysis of 133 mass shooting events between 2009 and 2016 found that 10 percent of

¹ The law states, “It shall be unlawful for any individual knowingly to possess a firearm that has moved in or that otherwise affects interstate or foreign commerce at a place that the individual knows, or has reasonable cause to believe, is a school zone.” A Supreme Court decision (*United States v. Lopez*, 514 U.S. 549) ruled the act to be an unconstitutional attempt to legislate under the Commerce Clause of the U.S. Constitution, so the law was amended in 1995 to restrict application to firearms that have moved via interstate commerce.

incidents occurred in designated gun-free zones (Everytown for Gun Safety Support Fund, 2017b). However, another analysis focused on public mass shootings between 1998 and 2015 and reported that 96.2 percent of incidents took place in gun-free zones (Crime Prevention Research Center, 2014). While the discrepancy in these estimates is partially due to differences in how mass shootings are defined—the latter study restricts analysis to public mass shootings—there also appears to be some disagreement about how gun-free zones are classified.

To evaluate the effects of gun-free zones, the ideal data would be at fine-enough geographic detail to examine changes in outcomes specifically in areas in which gun-free zones were implemented or removed. However, a nationwide database on gun-free zones does not exist, and different decisions about how to classify these areas can lead to widely differing conclusions. Determining whether a given shooting incident occurred in a gun-free zone requires collecting information on local firearm policies; determining whether the place an incident occurred had a policy of allowing or disallowing firearms; and determining whether it had a means of enforcing that policy, such as bag checks or magnetometer screening.

State Implementation of Gun-Free Zones

Courts are explicitly exempted from the ban on weapons in federal facilities, but many states have enacted laws banning firearms, or concealed firearms, in state court buildings.² Most states prohibit guns in schools for kindergarten through grade 12. In addition, many have more-restrictive laws for gun-free school zones, extending the prohibition to holders of concealed-carry permits (see Chapter Thirteen), prohibiting the open carry of firearms, or making colleges and other postsecondary schools gun-free zones (Giffords Law Center to Prevent Gun Violence, undated-c).

² Alaska, Arkansas, California, Colorado, Florida, Georgia, Idaho, Illinois, Kansas, Kentucky, Louisiana, Maine, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. See Alaska Stat. Ann. § 11.61.220; Ark. Code Ann. § 5-73-122; Calif. Penal Code § 171b; Col. Rev. Stat. § 18-12-214; Fla. Stat. Ann. § 790.06; Ga. Stat. Ann. § 16-11-127; Ida. Code Ann. § 18-3302C; 430 Ill. CS 66/65; Kan. Stat. Ann. § 21-6309; Ky. Rev. Stat. Ann. § 237.110; La. Stat. Ann. § 1379.3; 17 Me. Rev. Stat. Ann. § 1058; Administrative Order of the Michigan Supreme Court 2001-1; Minn. Stat. Ann. § 609.66; Miss. Ann. Code § 45-9-101; Mo. Stat. Ann. § 571.030; Neb. Rev. Stat. § 69-2441; Nev. Rev. Stat. Ann. § 202.3673; N.H. Rev. Stat. § 159:19; N.M. Stat. Ann. § 29-19-11; N.C. Gen. Stat. Ann. § 14-269.4; Ohio Rev. Code Ann. § 2923.123; Okla. Stat. Ann. § 1272; Ore. Rev. Stat. Ann. § 166.370; 18 Pa. Cons. Stat. § 91; R.I. Supreme Court Executive Order 2003-6; S.C. Ann. Code § 23-31-215; S.D. Cod. Laws § 22-14-23; Tenn. Code Ann. § 39-17-1306; Tex. Penal Code § 46.03; Utah Code Ann. § 78A-2-203; 18 Vt. Stat. Ann. § 4016; Va. Code Ann. § 18.2-283.1; Wash. Rev. Code Ann. § 9.41.300; W. Va. Code § 61-7-11a; Wisc. Stat. Ann. § 175.60; Wyo. Stat. § 6-5-209.

Recently, some states have passed laws requiring college and university campuses to allow concealed carry,³ although some of these states still prohibit, or allow schools to prohibit, guns in particular locations on campus.⁴ Idaho removed the authority of the governing bodies of colleges or universities to regulate or prohibit gun possession on campus.⁵ Tennessee allows nonstudents to carry concealed weapons on campus.⁶

In Colorado, the courts found that only the General Assembly can regulate firearm possession on any college campus, and according to statute, concealed weapons are allowed on campus. Schools may regulate but not ban guns.⁷ Similarly, Oregon's Court of Appeals ruled that public colleges and universities may not ban weapons on campus grounds.⁸ In contrast, Oklahoma recently granted schools and universities authority to make their own policies concerning guns on campus.⁹

Outcomes Without Studies Examining the Effects of Gun-Free Zones

Although Hahn et al. (2005) did identify one cross-sectional study on the effect of magnetometers on school violence, neither the National Research Council (2004) nor Hahn et al. (2005) identified any research examining the effects of gun-free zones on the following outcomes, and we identified no such studies that met our inclusion criteria:

- suicide
- violent crime
- unintentional injuries and deaths
- mass shootings
- officer-involved shootings
- defensive gun use
- hunting and recreation
- gun industry.

³ Idaho, Kansas, Mississippi, Texas, Utah, and Wisconsin. See Ida. Code Ann. § 18-3309; Kan. Stat. Ann. § 75-7c20 (concealed weapons shall not be prohibited unless adequate security measures are in place to ensure that no weapons are permitted); Miss. Ann. Code §§ 97-37-7, 45-9-101 (advanced permit required); Tex. Govt. Code § 411.2031; Utah Code Ann. § 53B-3-103; Wisc. Stat. Ann. § 943.13.

⁴ For example, Idaho and Texas.

⁵ Ida. Code Ann. § 18-3309.

⁶ Tenn. Code Ann. § 39-17-1309.

⁷ *Regents of the Univ. of Colorado v. Students of Concealed Carry on Campus, LLC*, 271 P.3d 496 (Colo. 2012); Colo. Rev. Stat. Ann. § 18-12-201 et seq.

⁸ *Ore. Firearms Educ. Found. v. Bd. Of Higher Educ.*, 264 P.3d 160 (Or. Ct. App. 2011).

⁹ Okla. Stat. Ann. tit 21, § 1277.

Chapter Fifteen References

Code of Federal Regulations, Title 38, Section 1.218, Security and Law Enforcement at VA Facilities.

Code of Federal Regulations, Title 39, Section 232.1, Conduct on Postal Property.

Crime Prevention Research Center, “Updated: More Misleading Information from Bloomberg’s Everytown for Gun Safety on Guns: ‘Analysis of Recent Mass Shootings,’ Showing How Mass Public Shootings Keep Occurring in Gun-Free Zones,” September 1, 2014. As of March 13, 2017: <http://crimeresearch.org/2014/09/more-misleading-information-from-bloombergs-everytown-for-gun-safety-on-guns-analysis-of-recent-mass-shootings/>

Everytown for Gun Safety Support Fund, “Mass Shootings in the United States: 2009–2016,” April 11, 2017b. As of May 3, 2017: <http://everytownresearch.org/reports/mass-shootings-analysis/>

Giffords Law Center to Prevent Gun Violence, “Guns in Schools,” web page, undated-c. As of October 18, 2017: <http://lawcenter.giffords.org/gun-laws/policy-areas/guns-in-public/guns-in-schools/>

Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, “Firearms Laws and the Reduction of Violence: A Systematic Review,” *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

United States Code, Title 18, Section 922, Unlawful Acts.

United States Code, Title 18, Section 930, Possession of Firearms and Dangerous Weapons in Federal Facilities.

United States Code, Title 20, Section 7961, Gun-Free Schools Act.

PART C

**Supplementary Essays on Gun Policy Mechanisms
and Context**

A Note on the Scope of Part C

The 13 policies reviewed in Part B and the scope of the systematic review for the research syntheses were selected a priori and represent the central focus of our research synthesis efforts. Nevertheless, in reviewing evidence on these policies, other important themes emerged that we believed warranted further discussion or review. Therefore, to augment and provide context for Part B's syntheses, Part C includes supplementary essays on what rigorous studies reveal about

- the possible mechanisms by which laws may affect outcomes (Chapters Sixteen and Seventeen on the effects of firearm prevalence on suicide and violent crime)
- how taxes, access to health care, and media campaigns might affect gun violence (Chapters Eighteen through Twenty)
- the effectiveness of laws used to target domestic violence (Chapter Twenty-One)
- methodological challenges in defining and estimating the prevalence of mass shootings and defensive gun use (Chapters Twenty-Two and Twenty-Three)
- how suicide, violent crime, and mass shootings were affected by Australia's implementation of the National Firearms Agreement (Chapter Twenty-Four).

CHAPTER SIXTEEN

The Relationship Between Firearm Availability and Suicide

In 2004, the National Research Council (NRC) concluded,

States, regions, and countries with higher rates of household gun ownership have higher rates of gun suicide. There is also cross-sectional, ecological association between gun ownership and *overall* risk of suicide, but this association is more modest than the association between gun ownership and gun suicide; it is less consistently observed across time, place, and persons; and the causal relation remains unclear. . . . The risk of suicide is highest immediately after the purchase of a handgun, suggesting that some firearms are specifically purchased for the purpose of committing suicide.

Suicide attempts involving a firearm are more likely to result in death than attempts using any other means (Azrael and Miller, 2016). If firearms are available to a person who is thinking about taking his or her life, the presence of firearms might be linked with a higher likelihood of suicide and higher regional suicide rates. However, if firearms are not available, a person might either not attempt to take his or her life or might do so using other means. In this chapter, we examine the empirical evidence on the relationship between firearm availability (or prevalence) and suicide.

Methods

Our literature review strategy was based on the comprehensive search described in Chapter Two of this report. Although the focus of that search was from 2003 forward, we highlight some highly cited articles published prior to 2003. As we did for the policy discussions (Chapters Three through Fifteen), we prioritize the evidence from studies that employ a quasi-experimental approach. However, because this line of scientific inquiry is so much more extensive than most of the other topics reviewed in these syntheses, we take a broader approach referencing noteworthy international studies and cross-sectional studies that were identified in our review.

We categorize these studies as those that examine associations between individual *access* to firearms and suicide rates and those that examine associations between the regional *prevalence* of firearms and suicide rates in census regions, states, and cities.

Individual Access to Firearms

A primary conclusion of the NRC report was that although there are limitations of studies that examine suicide outcomes among those with access to guns (e.g., gun purchasers) or those that look at firearm ownership among suicide decedents relative to some other group, these research approaches have generally been “underutilized in the literature” (NRC, 2004, p. 183). These studies are broadly defined as “individual-level studies” and, as described in this section, can be categorized into two groups: those that examine suicide risk among gun owners and those that examine firearm access among suicide decedents.

Our review identified eight U.S.-based individual-level studies conducted since 2003, six of which analyzed data from the 1993 National Mortality Followback Survey (Dahlberg, Ikeda, and Kresnow, 2004; Joe, Marcus, and Kaplan, 2007; Kung, Pearson, and Liu, 2003; Kung, Pearson, and Wei, 2005; Shenassa et al., 2004; Wiebe, 2003), one of which examined suicides in the Navy (Stander et al., 2006), and one of which examined suicides in California (Grassel et al., 2003).

Suicide Risk Among Gun Owners

In 2004, NRC identified that the strongest evidence for the effect of firearm availability on individual suicide rates derived from two studies that examined individual outcomes after the purchase of a firearm; we identified no similar studies that have been conducted since NRC published its findings. Cummings et al. (1997b) used a case-control approach in which they linked health insurance records with firearm licenses in Washington state from 1980 to 1992. During this time, those who died by suicide (using any means) were more likely than living, demographically matched controls to have a history of the decedent or somebody in the family having purchased a handgun (24.6 percent versus 15.1 percent, respectively; incidence rate ratio [IRR] = 1.9; 95-percent confidence interval [CI]: 1.4, 2.5). Compared with the controls, this risk was greatest in the year after the handgun was purchased (3.1 percent versus 0.7 percent; IRR = 5.7; 95-percent CI: 2.4, 13.5); the median interval between the first handgun purchase and any suicide with a firearm was 10.7 years (range: 11 days to 52.5 years). Wintemute et al. (1999) took a prospective study approach in which they linked applications for handgun purchases among California residents in 1991 to death records maintained by the state from 1991 to 1994. Compared with the general mortality trends in the state for the same years and adjusting for age and sex, handgun purchasers had elevated standardized mortality ratios for suicide (4.31) and firearm suicide

(7.12). The elevated firearm suicide rate among purchasers was seen across all six years after purchase, although the effect was greatest in the first week after purchase (644 per 100,000) and diminished over longer intervals—specifically, the first month after purchase (350–375 per 100,000) and the first year after purchase (75–100 per 100,000). This pattern may indicate that a subset of handgun purchasers acquire a firearm for the purpose of killing themselves.

Whether the mere availability of a gun increases the risk of suicide is a complex question to disentangle from observational data because some of the association between gun accessibility and suicide is likely attributable to the fact that those who wish to kill themselves may go out of their way to procure a gun or otherwise ensure that a gun is accessible. Others with access to guns may be at higher risk of suicide because their attempt to kill themselves with an available gun is more likely to be fatal than if they had used a less lethal means, such as poison or drug overdose. Experimental studies that could systematically test the effects of gun availability on suicides are unlikely to be performed, because they would almost certainly be found to be unethical. The next-best source of rigorous evidence, quasi-experimental observational studies, may never be able to adequately control for the myriad, sometimes intersecting, reasons why individuals might want guns available and might also wish to kill themselves. Nevertheless, the results of such studies shed some light on this association, as we discuss next.

Firearm Access Among Suicide Decedents

Prior to 2004, a series of U.S.-based studies routinely and consistently found that access to a firearm, particularly a handgun, in one's home was more prevalent among those who died by suicide than among various comparison groups. These studies were generally based on psychological autopsies, in which ascertainment about the presence of firearms was provided by proxy respondents for the decedent after his or her death and compared with the presence of firearms as reported by comparison or control cases who were matched to the decedent in various ways but who typically had not died. A concern with all such studies is the possibility that cases and controls may not be matched on important characteristics that influence both the person's decision to acquire firearms and his or her risk of suicide. Relatedly, while proxy respondents are likely to know and acknowledge that the decedent who died by firearm suicide had access to a firearm, it is less certain that all controls would acknowledge having access to a gun. Either bias could result in firearm access appearing to be more closely associated with suicide risk than it really is. (For more on potential biases in psychological autopsy studies, see NRC, 2004, pp. 171–172.) Only three U.S.-based psychological autopsy studies have been conducted since 2005.

The relationship between firearm access and suicide has been shown in studies comparing suicide decedents with those who have died by other causes (Dahlberg, Ikeda, and Kresnow, 2004; Grassel et al., 2003; Kung, Pearson, and Liu, 2003; Kung, Pearson, and Wei, 2005; Shenassa et al., 2004), those living in the same community

(Bailey et al., 1997; Brent et al., 1993a; Brent et al., 1993b; Brent et al., 1999; Conwell et al., 2002; Kellermann et al., 1992; Wiebe, 2003), and those with histories of mental illness who have not died by suicide (Brent et al., 1991; Brent et al., 1993a; Brent et al., 1994). This relationship has also been seen in suicides among older adolescents and adults in the general population (Dahlberg, Ikeda, and Kresnow, 2004; Grassel et al., 2003; Kellermann et al., 1992; Kung, Pearson, and Liu, 2003; Kung, Pearson, and Wei, 2005; Shenassa et al., 2004; Wiebe, 2003), as well as specifically among older age groups (Conwell et al., 2002), adolescents (Brent et al., 1991; Brent et al., 1993a; Brent et al., 1993b; Brent et al., 1994; Brent et al., 1999; Bukstein et al., 1993), and women (Bailey et al., 1997). In addition, studies with community-based controls often control for demographic characteristics (through either matching or covariate adjustment) and other family and clinical characteristics (e.g., history of mental illness, alcohol misuse, drug use). Furthermore, studies limited to suicide decedents have shown that prevalence of firearms was higher among those who died by suicide using a firearm than those who used other means (Dahlberg, Ikeda, and Kresnow, 2004; Joe, Marcus, and Kaplan, 2007; Shenassa et al., 2004; Stander et al., 2006).

Eight individual-level studies were published in or after 2003 (Dahlberg, Ikeda, and Kresnow, 2004; Grassel et al., 2003; Joe, Marcus, and Kaplan, 2007; Kung, Pearson, and Liu, 2003; Kung, Pearson, and Wei, 2005; Shenassa et al., 2004; Stander et al., 2006; Wiebe, 2003) (see Table 16.1 for details). One of these studies (Grassel et al., 2003) is particularly informative, as it linked California death data with administrative data on handgun purchases. Findings showed that those who died by suicide were more likely to have purchased a handgun in the previous three years, with the relationship even greater between suicide death and purchase of a handgun in the past year, an effect magnified for women. Five studies used the 1993 National Mortality Followback Survey. One compared suicide decedents with living, matched controls from the National Health Interview Survey and found having a gun in the home to be associated with suicide and specifically firearm suicide, but not with nonfirearm suicide (Wiebe, 2003). The other four studies limited their findings to decedents only and found a relationship between having a gun in the home and elevation in the risk of suicide (Kung, Pearson, and Wei, 2005; Shenassa et al., 2004), a relationship generally robust in models that stratify by gender (Dahlberg, Ikeda, and Kresnow, 2004; Kung, Pearson, and Liu, 2003)¹ and race (Kung, Pearson, and Wei, 2005). Two studies limited their analysis of the 1993 National Mortality Followback Survey to suicides and found a relationship between having a gun in the home and firearm suicide (Dahlberg, Ikeda, and Kresnow, 2004; Joe, Marcus, and Kaplan, 2007), an approach similar to that employed by Stander et al. (2006) in analysis of Navy suicides.

¹ For an exception, see Dahlberg, Ikeda, and Kresnow (2004), who found that among suicides in the home, the relationship for women was only marginally statistically significant, as the lower limit of the CI was the null value, 1.0.

With individual-level studies, any observed differences in gun access between groups can be interpreted in at least two ways: The differences could suggest that gun access increases the risk of suicide, or they could suggest that people who are suicidal may obtain guns at a higher rate because they are considering killing themselves with guns. In other words, these studies are criticized for providing little insight into the relationship between firearm access and suicide because they are generally consistent with a wide range of causal models, including models postulating effects in opposite directions. A recent review by Azrael and Miller (2016) suggests that the evidence in support of the former of these two interpretations (that gun access increases the risk of suicide) is strong based on two findings. First, the authors note that a series of studies find that the relationship between household gun ownership and suicide exists not just for the firearm owner but for all other household members. Second, although covariate adjustment for factors related to suicidality could attenuate the relationship between the presence of a firearm and suicide, a number of studies reveal no difference in past suicide attempts (described in the next section), mental illness, and substance use disorders between households with firearms and those without. In addition, an omitted variable analysis suggests that if there is actually some third risk factor associated with both household firearm ownership and suicide, this third factor would need to be a better predictor of suicide than any currently known risk factor to fully account for the association between household firearms and suicide (Miller, Swanson, and Azrael, 2016). While compelling, this does not entirely refute an argument about reverse causation: An individual feeling suicidal may acquire a firearm as a means to take his or her life and thus make the weapon readily available in the household.

Other work has used different control groups to attempt to address this selection bias (that suicidal people are more likely to acquire guns so that they can kill themselves). For example, firearm access was higher among adolescents who had committed suicide than among adolescents in inpatient mental health treatment who had either previously attempted suicide or never attempted suicide (Brent et al., 1991). Additionally, adolescent suicides with no history of a mental health disorder had higher rates of firearm access relative to adolescent suicides with a mental health disorder (Brent et al., 1994). This pattern of results may indicate that access to firearms was a causal factor in the suicidal adolescent's death or that parents or caretakers removed guns from the homes of adolescents at risk of suicide because of prior attempts or mental health problems, or a combination of the two.

Firearm Storage Among Suicide Decedents

Individual-level studies have examined not only whether decedents had access to firearms in their households but also how those guns were stored. In general, these studies consistently show that, relative to comparison groups of individuals who die other ways or of living community members, those who die by suicide have guns stored less safely (Conwell et al., 2002; Shenassa et al., 2004; Grossman et al., 2005). These studies sug-

gested to one set of researchers a “dose-response” relationship between firearm accessibility and risk for suicide (Azrael and Miller, 2016). However, the relationship is not seen in all studies. Brent et al. (1991; 1993b) found no differences in storage practices in homes with adolescents who died by suicide and a comparison group of adolescents living in the community. Dahlberg, Ikeda, and Kresnow (2004) found no association between storage practices and firearm suicide (versus suicide by other means).

Suicidality (Not Death) as an Outcome

Individual-level studies that conduct postmortem inventories of the presence of firearms may be biased because they rely on proxy respondents who may report incorrect information either purposely or because they do not know the correct information. At times, researchers have used proxy outcomes—most commonly, living individuals’ past suicide attempts and *suicide ideation* (thinking about suicide), which they can ascertain directly from the individuals whose behavior and firearm access are being studied. Yet, while suicide attempts and ideation are potentially important markers of anguish or distress, they are not reliable proxies for or predictors of suicide deaths.²

Since 2005, one longitudinal study (Watkins and Lizotte, 2013) and a series of cross-sectional studies (described in Table 16.1) examined firearm access among those who have attempted suicide (and survived), who have made plans to kill themselves, or who have thought about suicide (*suicide ideation*). In general, there was not much evidence of a relationship between suicide ideation and firearm access (Ilgen et al., 2008; Miller et al., 2009; Oslin et al., 2004; Simonetti et al., 2015; Smith, Currier, and Drescher, 2015), although Thompson et al. (2006) found that veterans receiving outpatient treatment for opioid dependence and who had suicide ideation were more likely to own a firearm than those in treatment without such thoughts. However, those with a history of suicide attempts are less likely to have access to a firearm in both population-based (Ilgen et al., 2008; Miller et al., 2009; Simonetti et al., 2015) and psychiatric clinical samples (Kolla, O’Connor, and Lineberry, 2011; Smith, Currier, and Drescher, 2015).³ In another study, firearm access was higher among those who had made a plan to take their lives using a firearm than among those who made a plan involving some other means (Betz, Barber, and Miller, 2011). Although cross-sectional studies examining suicide attempts and ideation are common, they provide little insight into the relationship between firearm access and suicide, because these results are consistent with a wide range of causal models, including ones that postulate effects in opposite directions.

² A history of self-injurious thoughts and behaviors is a weak predictor of risk for suicide death (Ribeiro et al., 2016).

³ An exception is Borowsky et al. (1999), which found that knowing where to get a gun was associated with lifetime suicide attempts among American Indian youth, particularly girls.

There are similar studies examining suicide attempts and ideation with respect to firearm storage practices. Studies generally find no difference in storage practices between adults who have thought about or attempted suicide versus those who have not (Betz et al., 2016; Ilgen et al., 2008; Oslin et al., 2004; Smith, Currier, and Drescher, 2015).

Although suicide attempts and ideation are not reliable proxies of suicide risk, these studies do yield insights into the differences in suicidality between those who have access to guns and those who do not. These studies find little evidence that firearm access or storage practices are associated with suicidality among household members, which refutes criticism that associations between access and suicide are due to differences in a propensity to take one's life and whether a person owns or how he or she stores guns. However, other problems in a household might cause poor storage security and increased suicide risk, which could account for their apparent association without storage practice itself contributing to suicide risk. Still, at least one study suggests that such an omitted variable would need to be improbably influential to explain the strong observed association between household firearm access and suicide risk (Miller, Swanson, and Azrael, 2016).

Weapon-Carrying and Suicide Attempts

A third type of individual-level study examined the association between weapon-carrying and suicide attempts. Three such studies fell within the time frame of our literature review (2003–2016), most of which derived from analyses of the Youth Risk Behavior Survey. Two studies documented positive relationships between past suicide attempts and carrying a gun in the past 30 days (Molina and Duarte, 2006; Ruggles and Rajan, 2014), and one found a positive relationship between past suicide attempts and carrying a weapon (though not necessarily a gun) in the past 30 days (Swahn et al., 2012). Again, these results are consistent with a wide range of causal models, including ones that postulate effects in opposite directions (i.e., that suicidality causes one to carry a weapon).

Table 16.1 details the studies published in or after 2003 that examined the relationship between firearm access and suicide.

Table 16.1
Individual-Level Studies Published in or After 2003 That Examined the Relationship Between Firearm Access and Suicide

Study	Sample	Cases	Controls	Results
Case status: Suicide deaths				
Grassel et al., 2003	California deaths in 1998	2,798 suicides in California	207,851 noninjury causes of death (with some exclusions)	Those who died by suicide were more likely to have purchased a handgun in the past three years (aOR = 6.8; CI: 5.7, 8.1) and in the past year (aOR = 12.5; CI: 10.0, 15.6). The association for purchase in the past three years was especially pronounced for women (aOR = 33.9; CI: 19.3, 59.3).
Kung, Pearson, and Liu, 2003	1993 National Mortality Followback Survey	441 female and 1,022 male suicides	2,337 female and 5,055 male deaths from natural causes	Both males and females who died by suicide were more likely to have lived in a home with a gun, regardless of whether they lived alone or with others (female, lived with others: aOR = 2.99; CI: 1.58, 5.65; female, lived alone: aOR = 25.83; CI: 8.36, 77.29; male, lived with others: aOR = 3.53; CI: 2.42, 5.15; male, lived alone: aOR = 16.13; CI: 6.97, 37.25).
Wiebe, 2003	1993 National Mortality Followback Survey	1,959 suicides	13,535 respondents from the 1994 National Health Interview Survey	Those who died by suicide were more likely to have lived in a home with a gun (aOR = 3.44; CI: 3.06, 3.86). Having a gun in the home was also associated with firearm suicide (aOR = 16.89; CI: 13.26, 21.52) but inversely associated with nonfirearm suicide (aOR = 0.68; CI: 0.55, 0.84).
Dahlberg, Ikeda, and Kresnow, 2004	1993 National Mortality Followback Survey	1,049 suicides in the home and 687 firearm suicides	535 deaths in the home from other means, excluding suicide, and 362 nonfirearm suicides	Males with guns in the home were at a significantly greater risk of suicide than males without guns in the home (OR = 10.4; CI: 5.8, 18.9); the association for females included the null value (= 1.0) in the CI. Among those who died by suicide, those living with a gun in the home were more likely to take their lives using a gun than other means. There was no evidence of an association between suicide method and type or number of guns in the home or between suicide method and storage practices.
Shenassa et al., 2004	1993 National Mortality Followback Survey	Firearm suicide	Died from other causes	Those who died by firearm suicide were more likely to have lived in a home with a firearm (no adjustment).

Table 16.1—Continued

Study	Sample	Cases	Controls	Results
Kung, Pearson, and Wei, 2005	1993 National Mortality Followback Survey	Suicide death among those aged 15–64	Death from natural causes among those aged 15–64	Those who died by suicide were more likely to have lived in a home with a gun in analyses adjusted for race, living arrangements, educational status, marijuana use, excessive alcohol use, depressive symptoms, and past-year use of mental health services.
Stander et al., 2006	1999–2004 Navy suicides	Firearm suicide	Nonfirearm suicide	Among Navy suicides, 66 percent of those with access to a military weapon used a gun to die, compared with 54 percent of those without access. Furthermore, 65 percent of those with training on military weapons used a gun to die, compared with 54 percent of those without training.
Joe, Marcus, and Kaplan, 2007	1993 National Mortality Followback Survey	Firearm suicide	Nonfirearm suicide	In models controlling for demographic, socioeconomic, and clinical variables, having a firearm in the home was associated with firearm suicide in the total sample and when stratified by race.
Case status: Suicide ideation or attempts				
Oslin et al., 2004	Older adults receiving primary care treatment	Suicide ideation	No suicide ideation	There was no relationship between suicide ideation and having a gun in the home.
Thompson et al., 2006	Veterans receiving outpatient treatment for opiate addiction	Suicide ideation (n = 26)	No suicide ideation (n = 75)	Owning a firearm was associated with suicide ideation in bivariate analyses.
Ilgen et al., 2008	National Comorbidity Survey	Those who report having ever thought about committing suicide, made a plan for committing suicide, or attempted suicide	Those who did not meet case criteria	There was no significant difference in gun access between those who thought about attempting suicide (31 percent) or made a plan to attempt suicide (31 percent) and those who did not (36 percent for both sets of controls), but those who had attempted suicide were less likely to have access (36 percent versus 24 percent; OR = 0.6; CI: 0.5, 0.8).
Miller et al., 2009	National Comorbidity Survey Replication	Past-year suicide ideation, suicide planning, or suicide attempt	No past-year suicide ideation, suicide planning, or suicide attempt	Living in a home with a firearm was not associated with past-year suicide ideation, planning, or attempts in models that accounted for age, sex, race/ethnicity, educational attainment, and poverty.

Table 16.1—Continued

Study	Sample	Cases	Controls	Results
Betz, Barber, and Miller, 2011	Second Injury Control and Risk Survey	20 people who, in the past 12 months, had a suicide plan involving a firearm	155 people who, in the past 12 months, had a suicide plan that did not involve a firearm	Of those who had a suicide plan involving a firearm, 81 percent lived in a home with a firearm, compared with 38 percent of those whose plan did not involve a firearm (OR = 7.4).
Kolla, O'Connor, and Lineberry, 2011	Psychiatric inpatients	Access to a firearm (N = 138)	No access to a firearm	Females, those with a past suicide attempt, those with a family history of a suicide attempt, and those aged 65 or older were less likely to report access to a firearm in multiple logistic regression. Patients with bipolar disorder diagnoses were more likely to report access in multiple regression analyses.
Simonetti et al., 2015	National Comorbidity Survey: Adolescent Supplement	Access to a firearm in the home	No access to a firearm in the home	There was no relationship between household access to a firearm and lifetime suicide ideation, planning, or attempts, nor in any stratified analyses or multivariable models.
Smith, Currier, and Drescher, 2015	Veterans entering treatment for posttraumatic stress disorder	Two samples of veterans with suicidal thoughts or attempts: <ul style="list-style-type: none"> Sample 1: N = 82 ideators, 62 attempters Sample 2: N = 27 ideators, 23 attempters 	Veterans without suicidal thoughts or attempts (Sample 1 = 57, Sample 2 = 22)	In Sample 1, attempters were less likely to own a gun at the beginning of treatment (26 percent) relative to ideators (39 percent) or nonattempters/nonideators (32 percent). In Sample 2, there were no significant differences among groups (attempters = 29 percent, ideators = 36 percent, nonattempters/nonideators = 36 percent).
Betz et al., 2016	Seven emergency departments across the United States	1,358 emergency department patients with suicidal thoughts or an attempt	None	Of patients with suicidal thoughts or an attempt, 11 percent reported having access to a gun at home. Among those with a firearm at home, 58 percent of men and 25 percent of women personally owned at least one gun.

NOTE: All CIs in this table are at the 95-percent level. aOR = adjusted odds ratio; OR = odds ratio.

Regional Availability of Firearms

NRC (2004) concluded that there were regional associations between firearm prevalence and firearm suicide but uncertain relationships between firearm availability and total suicides. The report also concluded that results varied by the age group studied, the covariates included in the models, and the measure of firearm availability used (discussed later in this section). Further, the report noted that there was uncertain evidence that firearm prevalence explained changes in total suicide rates over time. Evidence about change over time derived primarily from studies examining suicide rates in the District of Columbia before and after 1976, when the District established a policy that prohibited the purchase, sale, transfer, and possession of handguns. There was a 23-percent reduction in the frequency of firearm-related suicides following the policy change, and no changes in nonfirearm-related suicides or in firearm-related suicides in the surrounding areas (Loftin et al., 1991), although, as NRC pointed out, this study was sensitive to modeling choices (Britt, Kleck, and Bordua, 1996), and its results may have been caused by other changes in the District of Columbia over the same period (Jones, 1981).

In this discussion, we prioritize longitudinal studies conducted since 2003 that applied a quasi-experimental research design. We describe these studies in the following sections, noting that while some studies are longitudinal, only a handful utilize measures of exposure (firearm prevalence, or a proxy for prevalence) and outcome (suicides) that vary over time, conditions necessary to employ a quasi-experimental design. The studies meeting that criteria are Briggs and Tabarrok (2014), Miller et al. (2006), Phillips and Nugent (2013), and Rodriguez Andrés and Hempstead (2011). Each of these four studies employs unique methods to reach empirical and causal estimates of the effects of changes in firearm prevalence on changes in suicides. This is challenging to estimate empirically because firearm prevalence does not change significantly over regions over time (Smith and Son, 2015) and because, in cross-sectional analyses, firearm prevalence is consistently associated with suicide. Thus, methods need to decompose within-region changes over time from cross-region known associations. In the four studies described here, three (Miller et al., 2006; Briggs and Tabarrok, 2014; and Rodriguez Andrés and Hempstead, 2011) did so in a time-series model with regional fixed effects. Phillips and Nugent (2013) employed a decomposition random-effects model approach that estimated separate between- and within-region effects.

Measures of Firearm Prevalence

One of the biggest challenges to estimating the effects of regional firearm availability (i.e., prevalence) on suicide risk is the lack of valid data on the exposure of interest: household prevalence of firearms or of firearm ownership at the state level. Survey data on firearm ownership collected as part of the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance Survey (BRFSS) for all 50 states are

available for three years (2001, 2002, and 2004) and for census regions (and large cities) as part of the General Social Survey (GSS) biannually (though for some periods, annually). Thus, while there are studies examining the relationship between regional prevalence rates and suicide outcomes, researchers interested in examining variability in gun prevalence and its association with suicide at the state level must rely on proxy measures. Sometimes they apply the earlier BRFSS estimates to the current period or apply regional measures to the states within the region.

Some studies validate different proxy measures of firearm prevalence (see, for example, Azrael, Cook, and Miller, 2004; Kleck, 2004; Siegel, Ross, and King, 2014). However, evidence for the validity of these proxies as measures of gun prevalence over time is limited (Kleck, 2004), and establishing such evidence in the absence of survey data, particularly at the state level, over time is challenging. Our goal here is not to review all proxy measures; rather, we describe information on the ones found in the quasi-experimental studies described in this chapter, as well as those used in Chapter Seventeen. The proxy measures we discuss are as follows:

- *FS/S*. The most frequently utilized measure of firearm prevalence is the proportion of total suicides that are firearm suicides (FS/S). The correlation between FS/S and BRFSS state-based prevalence estimates is 0.80 (Siegel, Ross, and King, 2014), between FS/S and GSS regional-based prevalence estimates is 0.93 (Azrael, Cook, and Miller, 2004), and between FS/S and estimates from large cities is 0.87 (Kleck, 2004). NRC (2004, p. 169), however, emphasized that FS/S could introduce biases in models examining the effects of gun availability on suicide.
- *Hunting licenses per capita*. Rodriguez Andrés and Hempstead (2011) used hunting licenses per capita. Kleck (2004) provided only a correlation of this proxy with 45 large cities and estimated a weak correlation of 0.37, although Rodriguez Andrés and Hempstead (2011) reported that hunting license per capita has a 0.74 correlation with FS/S.
- *FS/S combined with hunting license rate*. In Chapter Seventeen, we review Siegel, Ross, and King (2014), which used a composite measure that includes both FS/S and the hunting license rate. The authors presented evidence that this measure has a 0.95 correlation with BRFSS estimates, although they suggest that the measure overestimates absolute levels of gun ownership and thus its utility should be restricted to a proxy reflecting proportional differences between states.
- *Google searches for gun-related terms*. Briggs and Tabarrok (2014) used as a proxy of gun ownership Google searches, aggregated to states, for gun-related terms. The correlation between this measure and the three-year average of the BRFSS estimates is greater than 0.80, although the authors did not present the actual correlation estimate.
- *Composite index of FS/S, the rate of background checks for gun purchases, and the rate of unintentional death by firearm*. Briggs and Tabarrok (2014) also used this

composite index to “overcome weaknesses” of the measures individually. The correlation between this composite measure and the three-year average of the BRFSS estimates is 0.84.

For other proxy measures—including firearm homicides divided by homicides, subscriptions to firearm-related publications (e.g., *Guns & Ammo*), membership in the National Rifle Association, percentage of hunters, and carry permits per population—see Azrael, Cook, and Miller (2004) and Kleck (2004).

Quasi-Experimental Results

In the earliest of the four studies in our review, Miller et al. (2006) used data from the GSS on firearm prevalence in census regions over time. Using generalized estimating equations with region-level fixed effects, the authors concluded that a *regional reduction* in firearms of 10 percent would result in an estimated 4.2-percent reduction in firearm suicides, 2.5-percent reduction in total suicides, and no change in nonfirearm suicides.

Briggs and Tabarrok (2014) used four measures of gun prevalence over time: state-level ownership from the BRFSS in 2001, 2002, and 2004; state-level estimates of searches for gun-related terms on Google from 2004 to 2009; FS/S from 2000 to 2009; and a composite index comprising FS/S, the rate of background checks for gun purchases, and the rate of unintentional death by firearm for 2000 to 2009. In ordinary-least-squares models with time and regional (not state) fixed effects, along with other regional covariate adjustments, all four measures of gun prevalence showed that a 1-percent increase in the prevalence of individuals having firearms in their households in a state is associated with a positive and statistically significant increase in firearm suicides (between 1.3 and 3.1 percent), and three of the four measures found positive and statistically significant increases in total suicides (between 0.7 and 0.9 percent) (Table 16.2). The effect on total suicide was not significant at $p < 0.05$ for the direct measure of gun ownership from the BRFSS.

The foregoing findings were correlational, without additional analyses that attempted to determine whether the correlation should be interpreted as evidence

Table 16.2
Estimated Effects of a 1-Percent Increase in Firearm Prevalence on Firearm and Total Suicides

Measure of Gun Prevalence	Increase in Firearm Suicide	Increase in Total Suicide
Gun ownership (from the BRFSS)	1.7 percent	0.5 percent (not significant)
Gun-related Google searches	1.3 percent	0.7 percent
FS/S	3.1 percent	0.9 percent
Composite index (FS/S, rate of background checks for gun purchases, rate of unintentional death by firearm)	2.3 percent	0.8 percent

NOTE: All effects are significant at $p < 0.01$, except as noted (Briggs and Tabarrok, 2014).

that increases in gun prevalence cause an increased suicide rate. However, Briggs and Tabarrok (2014) also reported results using methods that might better support causal interpretation. In these analyses, gun prevalence measures were modeled using “interest in hunting” (based on hunting magazine subscriptions and Google searches for hunting-related terms). This type of “instrumental variable” method can provide evidence of a causal effect if the chosen instrument has no direct effect on suicide but instead can affect suicide only indirectly through its effect on gun prevalence. These models showed suggestive, but nonsignificant, effects consistent with gun prevalence causing suicide. However, the authors provided no empirical evidence for the validity of their instruments, and the instruments’ conceptual validity may also be questioned.

Phillips and Nugent (2013) used a decomposition random-effects model that provided separate estimates for the effect of gun prevalence on suicide between states and on annual suicides within states from 1976 to 2000. The authors measured gun prevalence using GSS data at the regional level (with each state in a region assigned the regional value). They found that gun prevalence was associated with total and firearm suicides across states, but there was no evidence that prevalence explained variation *within* states (for total, firearm, or nonfirearm suicides) over time.

Rodriguez Andrés and Hempstead (2011) was the only study to find no association between changes in firearm prevalence and total or firearm suicides. The authors used a negative binomial model of suicides between 1995 and 2004 with fixed effects for state and year. However this analysis used one of the weakest proxies of gun ownership: hunting licenses per capita (Kleck, 2004).

Table 16.3 details the four longitudinal studies conducted since 2003 that applied a quasi-experimental research design and examined the regional relationship between firearm availability and suicide.

Table 16.3
Quasi-Experimental Studies Published in or After 2003 That Examined the Regional Relationship Between Firearm Prevalence and Suicide

Study	Sample	Outcome	Measure of Prevalence	Covariates	Analytic Approach	Results
Miller et al., 2006	U.S. Census regions	Suicide rates, 1981–2002	GSS gun ownership data (1982, 1984, 1985, 1987–1991, 1993, 1994, 1996–2002; missing years imputed); for sex-specific and child outcomes, gun availability was estimated using responses from these specific groups	Age, unemployment, per capita alcohol consumption, poverty, and region of the country	Log-log generalized estimating equation regressions with regional fixed effects	<p>Percentage decrease in outcome based on a 10-percent regional decrease in firearm ownership:</p> <ul style="list-style-type: none"> Total suicides: 2.5 percent (95% CI: 1.4, 3.6) Firearm suicides: 4.2 percent (95% CI: 2.3, 6.1) Nonfirearm suicides: 0.3 percent (95% CI: -1.4, 2.3). <p>Rate of decline did not vary significantly by gender but was greatest for those aged 0–19.</p>
Rodríguez Andrés and Hempstead, 2011	U.S. states	Number of male suicides, 1999–2004	Hunting licenses per capita	Education, income, alcohol consumption, percentage older than age 65, percentage non-Hispanic white, relevant population size, one index of gun availability (general prohibitions)	Negative binomial with state and year fixed effects	<p>There was no statistically significant association between gun availability and outcome.</p>
Phillips and Nugent, 2013	U.S. states	Suicide rates, 1976–2000	GSS gun ownership (regional) using the three-year moving average	Percentage aged 15–24; percentage older than age 65; percentage male; percentage white; population size; percentage living in urban areas; percentage foreign-born; unemployment rate; per capita income; percentage divorced; religious adherence rate per 1,000; percentage Catholic, Episcopalian, or other mainline Protestant; annual alcohol consumption	Decomposition model with random effects and regional and year-level fixed effects	<p>Gun ownership rate was associated with increases in total suicide rate across states (0.105 percent, $p < 0.05$) and firearm suicide rate across states (0.129 percent, $p < 0.05$) but not across time for either outcome. Also, neither outcome was related to nonfirearm suicide.</p>

Table 16.3—Continued

Study	Sample	Outcome	Measure of Prevalence	Covariates	Analytic Approach	Results
Briggs and Tabarrok, 2014	U.S. states	Suicide rates, 2000–2009	(1) BRFSS gun ownership from 2001, 2002, and 2004; (2) Google searches for gun-related terms (2004–2009); (3) FS/S; (4) composite index comprising FS/S, the rate of background checks for gun purchases, and the rate of unintentional death by firearm	Baseline model: population, poverty rate, annual average unemployment rate, percentage urban land area, percentage urban population, Gini coefficient of household income inequality, prevalence of drug and/or alcohol abuse or dependence in the population aged 12+, prevalence of frequent mental distress among noninstitutionalized adults, percentage of males aged 65+, and percentage white Full model: median household, percentage of children living in a single-mother family, percentage of divorced adults, distance to the nearest hospital emergency room, and a measure of social connectedness	Ordinary-least-squares model with time-specific and regional-specific (not state-specific) fixed effects; standard errors account for clustering at the state level. Minimal model excluded Gini, frequent mental distress, drug/alcohol covariates. Used circulation of <i>Field & Stream</i> magazine as an instrumental variable. For Google exposure, the instrumental variable was a Google search for hunting-related terms.	<p>Ownership (BRFSS):</p> <ul style="list-style-type: none"> Total suicides: $\beta = 0.003 - 0.005$, $p < 0.10$ in baseline and minimal model, not significant in full model Firearm suicides: $\beta = 0.014 - 0.017$, $p < 0.01$ Nonfirearm suicides: $\beta = -0.008 - 0.01$, $p < 0.01$ in full model, $p < 0.05$ in baseline model, $p < 0.10$ in minimal model <p>Google searches, baseline model:</p> <ul style="list-style-type: none"> Total suicides: $\beta = 0.007$, $p < 0.01$ Firearm suicides: $\beta = 0.013$, $p < 0.01$ Nonfirearm suicides: $\beta = -0.000$, $p =$ not significant <p>FS/S, baseline model:</p> <ul style="list-style-type: none"> Total suicides: $\beta = 0.009$, $p < 0.01$ Firearm suicides: $\beta = 0.031$, $p < 0.01$ Nonfirearm suicides: $\beta = -0.012$, $p < 0.01$ <p>Composite index, baseline model:</p> <ul style="list-style-type: none"> Total suicides: $\beta = 0.008$, $p < 0.01$ Firearm suicides: $\beta = 0.023$, $p < 0.01$ Nonfirearm suicides: $\beta = -0.007$, $p < 0.01$ <p>When adding a quadratic term to the baseline regressions, they found that it was significant and negative (diminishing effect). The instrumental variable results reported qualitatively similar findings.</p>

Longitudinal, Non-Quasi-Experimental Results

In addition to the four studies just discussed, our search identified two other U.S.-based longitudinal studies that do not meet our criteria for a quasi-experimental design. Desai, Dausey, and Rosenheck (2008) did not use a measure of gun prevalence that varied over time but found that state-level firearm prevalence (measured prior to hospital discharge) is associated with increased risk that a veteran discharged from an inpatient U.S. Department of Veterans Affairs facility with a psychiatric diagnosis will use a firearm to take his or her life relative to not taking his or her life or doing so using some other means. Wadsworth, Kubrin, and Herting (2014) did not employ a control group but found that the suicide rate increase among black males aged 15–34 between 1982 and 1993 was not associated with changes in gun availability (while also controlling for social and economic disadvantage) but that reductions in gun availability during the 1990s had some association with decreasing suicide rates in that group over the same period.

Cross-Sectional Results

Cross-sectional studies that examined regional associations provided little or no evidence for the causal effect of gun availability on suicide. Nonetheless, most such studies since 2003 generally found a positive relationship between gun prevalence and total or firearm suicide in the United States (Duggan, 2003; Miller, Azrael, and Hemenway, 2004; Price, Thompson, and Dake, 2004; Miller et al., 2009; Kubrin and Wadsworth, 2009; Price, Mrdjenovich, and Dake, 2009; Kposowa, 2013; Miller et al., 2013; Smith and Kawachi, 2014; Miller et al., 2015; Kposowa, Hamilton, and Wang, 2016), although there were exceptions (e.g., Shenassa, Daskalakis, and Buka, 2006). Details of these studies are presented in Table 16.4.

Table 16.4
Cross-Sectional Studies Published in or After 2003 That Examined the Regional Relationship Between Firearm Availability and Suicide

Study	Focal Area	Main Findings
Duggan, 2003	U.S. states	Firearm prevalence (FS/S and sales rates for <i>Guns & Ammo</i> magazine) was positively correlated with total, firearm, and nonfirearm suicide rates (although there were age groups for which the relationship with nonfirearm suicides was not significant or was negative). Change in firearm prevalence (sales rates for <i>Guns & Ammo</i> magazine, 1980–1998) was correlated with change in firearm suicide, but there was no evidence of a statistically significant association with nonfirearm suicide, while the association with total suicide was dependent on model specification.
Miller, Azrael, and Hemenway, 2004	U.S. states	Among seven Northeastern states, prevalence of firearms was positively correlated with suicides (except female suicides) and firearm suicides (but not nonfirearm suicides), as well as suicide attempts (except among those aged 15–64), firearm suicide attempts, and nonfirearm suicide attempts among females.

Table 16.4—Continued

Study	Focal Area	Main Findings
Price, Thompson, and Dake, 2004	U.S. states	Firearm prevalence (FS/S) was positively associated with firearm suicide mortality (1999) in models controlling for number of firearm dealers, race, presence of gun laws, per capita alcohol consumption, level of urbanization, violent crime rate, and socioeconomic status.
Shenassa, Daskalakis, and Buka, 2006	Chicago neighborhoods	Neighborhood levels of gun-carrying and gun availability (based on youth self-report) were not associated with the proportion of suicides by firearm.
Kubrin and Wadsworth, 2009	U.S. cities	Firearm prevalence (combined FS/S and ratio of homicides that are firearm homicides) was associated with a greater number of suicides among both white males and black males aged 35 or younger aggregated between 1998 and 2001, with some suggestion that gun availability mediates the effect of structural disadvantage and suicide among black males.
Miller et al., 2009	U.S. states	Firearm prevalence (2001 BRFSS) was positively associated with 2000–2002 total and firearm suicides in models that controlled for rates of unemployment, urbanization, poverty, serious mental illness, and alcohol and illicit drug dependence and abuse.
Price, Mrdjenovich, and Dake, 2009	U.S. states	Firearm prevalence (2002 BRFSS) was positively associated with firearm suicide mortality (2002) in models controlling for prevalence of serious mental illness, psychotropic medications, access to mental health care, per capita expenditures for mental health services, race/ethnicity, untreated mental health conditions, and educational expenditures and attainment.
Kposowa, 2013	U.S. states	Firearm prevalence (2001 BRFSS) was positively associated with death by suicide relative to other causes of death (2000–2004) in models that controlled for individual-level (marital status, sex, race, place of residence, city size, age, year of death) and state-level (2000 suicide rate, percentage voted for George W. Bush, percentage church adherents, percentage immigrants) variables.
Miller et al., 2013	U.S. states	Firearm prevalence (2004 BRFSS) was positively associated with 2008–2009 total and firearm suicide rates in models that accounted for state-level suicide attempt rates. These relationships held in models stratified by gender and age (18–29, 30+).
Smith and Kawachi, 2014	U.S. states	Firearm prevalence (2001 BRFSS) was positively associated with 1999–2002 total suicides among all men and all women, as well as in stratified analyses for white men and non-Hispanic white men.
Miller et al., 2015	U.S. cities	Firearm prevalence (BRFSS averaged for 2002 and 2004) was positively associated with firearm and total suicides in U.S. cities (data aggregated from 1999 to 2010).
Kposowa, Hamilton, and Wang, 2016	U.S. states	Firearm prevalence (BRFSS) was positively associated with 2011–2013 total and firearm suicide rates in models that controlled for religious adherence, long-term unemployment, percentage of population with a serious mental illness, divorce rate, and percentage rural.

International Evidence

Some of the most suggestive evidence that the prevalence of guns in a community may have a causal effect on suicide rates comes from two international studies published since 2003. Reisch et al. (2013) examined suicide rates in Switzerland between 1995 and 2008, following large-scale reforms in the Swiss military in 2004 that reduced the size of the Swiss Army by half; lowered the discharge age from 43 to 33; and adopted new policies that, among other things, increased the cost to service members of purchasing their military guns after separation from the service and introduced a gun license requirement. This study showed that suicide rates among men aged 18–43 were lower immediately after the 2004 Army reforms than would have been expected based on the pre-reform trends. The authors reasonably suggested that the two new firearm policies probably had the effect of reducing firearm ownership in the country and that this reduced gun prevalence caused the observed reductions in suicide rates.

The quasi-experimental Reisch et al. (2013) study relied on data from a single treated unit: Switzerland (i.e., there was no control or comparison country or region). To demonstrate that it was specifically the firearm restrictions imposed in 2004 that led to reductions in suicide by younger men, rather than other aspects of the Army reform or other changes in Swiss society around 2004, the authors noted that the observed reductions among younger men were exclusively found for firearm suicides, not other forms of suicide, and that similar reductions were not found among women after 2004. In addition, they found that the effect was more pronounced for younger men (aged 18–43) who would be more directly affected by the firearm restrictions than older men (aged 44–53).

The strength of these findings rests on the question of whether it is plausible that changes other than a reduction in gun prevalence could account for this pattern. For instance, there were, contemporaneously, large-scale changes to the military and, by extension, to Swiss society and the experience of young men after the military reforms. It is plausible that these large social changes affected suicide rates or attitudes toward firearm suicide. If so, then the effect of the additional cost of acquiring a firearm and any consequent effect on firearm prevalence is not well identified. Moreover, other changes in Swiss society must have been responsible for the substantial declines in suicide rates and firearm suicide rates among younger men in the years immediately preceding the Army reforms. Without understanding the factors driving that change, it is not possible to know whether they also shifted around 2004 in ways that further reduced firearm suicides.

Moreover, the comparison group of older men does not offer a strong demonstration that the effect was specific to those who would have been directly affected by the Army's new gun policies. Specifically, Reisch et al. (2013) found marginally significant reductions in suicide rates after 2004 among older men aged 44–53. Although this effect was no longer significant after Bonferonni corrections, the report did not provide an estimate for whether the reductions found among younger men

were significantly different from those found for older men. If the two estimates were not significantly different, then either reducing access to separating soldiers' service weapons had powerful spillover effects that reduced suicides among older men or, conversely, the Army reforms were not the best explanation of reduced suicides among younger men. If the reductions in suicides among younger and older men were significantly different, then (as the authors argued) changes in firearm policies may well have been the Army reforms' key feature that explains why suicides declined among younger men.

In our assessments of quasi-experimental studies of U.S. law, we raised concerns about any study with fewer than four treated units. This is because, as the number of treated units declines, it becomes increasingly difficult to distinguish the effect of interest from the effects of other contemporaneous events affecting the treated unit or units. Given that only one treated unit was available in the Reisch et al. (2013) natural experiment, stronger evidence for the effect of firearm restrictions on suicide reductions among younger men in Switzerland might include evidence that reductions in suicide rates were disproportionately found among younger men who left the Army in 2004 or later, or that reductions in suicides were disproportionately found among those using their service weapon to kill themselves. Similarly, evidence that Army reforms had a meaningful effect on household gun ownership among younger men could bolster the argument that the effects of Army reforms on suicide were likely to have been mediated by significant changes to gun prevalence among younger men.

A second compelling foreign study examined a 2006 policy implemented by the Israel Defense Forces, which required soldiers to leave their firearms on base when they returned home on weekends. The Israeli suicide rate among men aged 18–21 (including men both in service and not in service) following this policy decreased by 40 percent, from 28 per year in 2003–2005 to 16.5 per year in 2007–2008—a change largely resulting from weekend firearm suicide rates (ten per year in 2003–2005 to three per year in 2007–2008) (Lubin et al., 2010).

As with the Swiss study, Lubin et al. (2010) investigated an intervention on a single treatment unit (Israeli soldiers), so it must provide a strong argument that it was the weekend firearm policy that accounted for the observed changes, not any other contemporaneous changes that could have affected suicide rates. Because firearm and nonfirearm suicide rates were falling in Israel over the studied period (World Health Organization, 2017), the fact that firearm suicides among men aged 18–21 declined by 40 percent may not itself be distinguishable from declines in firearm suicides in groups that would be less directly affected by the military policy. For instance, firearm suicides among Israelis aged 25–29 also fell by 40 percent over this same period, from 10.7 per year to 6.3 per year (World Health Organization, 2017). On the other hand, the fact that greater reductions in firearm suicide rates among those aged 18–21 were found among weekend suicides rather than weekday suicides suggests that the policy may well have had an influence on suicidal behavior. Whether that involved shifting

suicides from the weekend to the weekday or contributing to the ongoing reductions in suicides cannot be answered with the reported analyses.

Both the Swiss and Israeli studies provide some evidence that gun prevalence may have a causal effect on suicides. Both also suffer from studying a single intervention that occurred once in a particular population. The challenge posed by this design is to show persuasively that other events that occurred at the same time, such as the large-scale reform of the Army in Switzerland, do not provide plausible alternative explanations for observed changes in suicide rates. Other relevant international evidence is reviewed in Chapter Twenty-Four on Australia's experience banning certain firearms through its National Firearms Agreement. However, that law also does not provide strong evidence of a causal effect of gun prevalence on suicide risk. As we conclude later in the report, although there is some evidence that the 1996 agreement reduced firearm suicides in Australia, studies also found significant reductions in nonfirearm suicides at the same time, calling into question whether the reductions in firearm and nonfirearm suicides were caused by the new law or some other concurrent events.

Conclusions

NRC (2004) concluded that the causal relationship between household gun ownership and suicide is unclear. Since that 2004 report, evidence from U.S.-based studies has substantiated associations that existed then—namely, that

- people who die by suicide are more likely than matched controls to live in a house known by informants to contain a gun
- living in a house known by informants to have a gun stored unsafely is associated with higher risk of firearm suicide than living in a house with a safely secured gun, but unsafe storage has no association with nonfirearm suicide
- changes in firearm prevalence in a region are associated with changes in suicide prevalence in the region.

These observations are all consistent with the conclusion that gun availability increases the risk of suicide. Indeed, there appears to be a consensus among most experts in the public health community that these observed associations, in combination with the results of natural experiments like those in Switzerland and Israel (Reisch et al., 2013; Lubin et al., 2010), provide strong evidence that gun availability has a causal effect on suicide rates. Despite this mounting evidence, quasi-experimental studies providing strong evidence for an effect of gun prevalence on suicide risk have not yet been conducted. Therefore, those who doubt the causal effect can view the observed associations between gun prevalence and suicide rates over time or across regions as indicating that the kinds of people who might consider suicide at some future time may be more

likely to purchase a gun (which is a plausible interpretation of, for instance, findings in Wintemute et al., 1999) or that informants in case-control studies may be biased toward describing unsafe storage practices in cases where firearms were used in suicides or may be more likely to incorrectly deny gun availability for control cases in which no firearm injuries occurred.

For example, Kleck (1997) suggests that “one would expect the personality trait of self reliance to encourage both suicide and gun ownership for self-protection, contributing to a spurious correlation between the two” (p. 282). Miller, Swanson, and Azrael (2016) counter this suggestion by noting that any such third-factor explanation (such as a “self-reliance” trait) would have to be as strong a predictor of suicide as are the strongest known predictors (e.g., major depression), as well as “an order of magnitude more imbalanced across households with versus without firearms than is any known risk factor” (p. 1). This, the authors argue correctly, would make explanations of the association based on unmeasured factors highly unlikely. However, their analysis is based on the large gun availability effect sizes produced by the same case-control studies that are subject to methodological concerns about, for instance, whether informants provide unbiased information about gun availability in case versus control homes.

The natural experiments investigated in Switzerland and Israel (Reisch et al., 2013; Lubin et al., 2010) are quite interesting and suggest a possible effect of firearm prevalence on suicide risk but, for reasons described earlier, do not provide especially strong or unambiguous evidence for such an effect. Moreover, even if the studies did provide strong evidence, it is not clear whether similar interventions would have comparable effects in the context of the United States. For these reasons, even though new and important studies have been published since NRC reviewed the case for gun prevalence having a causal effect on suicides, we draw the same conclusion that NRC reached in 2004: Available empirical research does not provide strong causal evidence for the effects of gun prevalence on suicide risk.

Although the empirical research is ambiguous, which suggests that there is more to learn before we can conclude with confidence that gun prevalence has a causal effect of increasing suicide rates, the theoretical or logical arguments for this claim are sufficiently compelling that individuals and policymakers might reasonably choose to assume that gun availability *does* increase the risk of suicide. These logical considerations include that guns are an especially lethal means of attempting suicide and that suicide attempts are impulsive acts that may never be repeated if the first attempt fails. Because those who impulsively attempt suicide with a gun rarely get a chance to reconsider the decision, it is reasonable to suspect that when guns are less available, fewer suicide attempts will result in fatality, more people will have the chance to reconsider their decisions, and suicide rates will therefore decline. We view this as a logical and reasonably persuasive argument but distinguish it from what empirical research can currently demonstrate persuasively about the net effects of gun prevalence on suicide rates.

Stronger study designs may be available to more persuasively establish the causal effects of gun availability or gun prevalence on suicide risk. However, many such study designs are currently hampered by poor information on the prevalence of gun ownership and the consequent reliance on proxy measures of availability and prevalence. For this reason, we recommend in Chapter Twenty-Five that the Centers for Disease Control and Prevention or another federal agency resume routine collection of voluntarily provided survey data on gun ownership and use.

Chapter Sixteen References

- Azrael, Deborah, Philip J. Cook, and Matthew Miller, "State and Local Prevalence of Firearms Ownership Measurement, Structure, and Trends," *Journal of Quantitative Criminology*, Vol. 20, No. 1, March 2004, pp. 43–62.
- Azrael, Deborah, and Matthew Miller, "Reducing Suicide Without Affecting Underlying Mental Health: Theoretical Underpinnings and a Review of the Evidence Base Lining the Availability of Lethal Means and Suicide," in Rory C. O'Connor and Jane Pirkis, eds., *The International Handbook of Suicide Prevention*, 2nd ed., Hoboken, N.J.: John Wiley and Sons, 2016.
- Bailey, J. E., A. L. Kellermann, G. W. Somes, J. G. Banton, F. P. Rivara, and N. P. Rushforth, "Risk Factors for Violent Death of Women in the Home," *Archives of Internal Medicine*, Vol. 157, No. 7, 1997, pp. 777–782.
- Betz, M. E., C. Barber, and M. Miller, "Suicidal Behavior and Firearm Access: Results from the Second Injury Control and Risk Survey," *Suicide and Life-Threatening Behavior*, Vol. 41, No. 4, 2011, pp. 384–391.
- Betz, M. E., M. Miller, C. Barber, B. Beaty, I. Miller, C. A. Camargo, Jr., and E. D. Boudreaux, "Lethal Means Access and Assessment Among Suicidal Emergency Department Patients," *Depression and Anxiety*, Vol. 33, No. 6, 2016, pp. 502–511.
- Borowsky, I. W., M. D. Resnick, M. Ireland, and R. W. Blum, "Suicide Attempts Among American Indian and Alaska Native Youth: Risk and Protective Factors," *Archives of Pediatrics and Adolescent Medicine*, Vol. 153, No. 6, 1999, pp. 573–580.
- Brent, D. A., M. Baugher, J. Bridge, T. H. Chen, and L. Chiappetta, "Suicide in Affectively Ill Adolescents: A Case-Control Study," *Journal of Affective Disorders*, Vol. 31, No. 3, 1994, pp. 193–202.
- , "Age- and Sex-Related Risk Factors for Adolescent Suicide," *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 38, No. 12, 1999, pp. 1497–1505.
- Brent, D. A., J. A. Perper, C. J. Allman, G. M. Moritz, M. E. Wartella, and J. P. Zelenak, "The Presence and Accessibility of Firearms in the Homes of Adolescent Suicides: A Case-Control Study," *JAMA*, Vol. 266, No. 21, 1991, pp. 2989–2995.
- Brent, D. A., J. Perper, G. Moritz, M. Baugher, and C. Allman, "Suicide in Adolescents with No Apparent Psychopathology," *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 32, No. 3, 1993a, pp. 494–500.
- Brent, D. A., J. A. Perper, G. Moritz, M. Baugher, J. Schweers, and C. Roth, "Firearms and Adolescent Suicide—A Community Case-Control Study," *American Journal of Diseases of Children*, Vol. 147, No. 10, 1993b, pp. 1066–1071.
- Briggs, J. T., and A. Tabarrok, "Firearms and Suicides in U.S. States," *International Review of Law and Economics*, Vol. 37, 2014, pp. 180–188.
- Britt, Chester L., Gary Kleck, and David J. Bordua, "A Reassessment of the D.C. Gun Law: Some Cautionary Notes on the Use of Interrupted Time Series Designs for Policy Impact Assessment," *Law and Society Review*, Vol. 30, No. 2, 1996, pp. 361–380.
- Bukstein, O. G., D. A. Brent, J. A. Perper, G. Moritz, M. Baugher, J. Schweers, C. Roth, and L. Balach, "Risk Factors for Completed Suicide Among Adolescents with a Lifetime History of Substance Abuse: A Case-Control Study," *Acta Psychiatrica Scandinavica*, Vol. 88, No. 6, 1993, pp. 403–408.

- Conwell, Y., P. R. Duberstein, K. Connor, S. Eberly, C. Cox, and E. D. Caine, "Access to Firearms and Risk for Suicide in Middle-Aged and Older Adults," *American Journal of Geriatric Psychiatry*, Vol. 10, No. 4, 2002, pp. 407–416.
- Cummings, P., T. D. Koepsell, D. C. Grossman, J. Savarino, and R. S. Thompson, "The Association Between the Purchase of a Handgun and Homicide or Suicide," *American Journal of Public Health*, Vol. 87, No. 6, 1997b, pp. 974–978.
- Dahlberg, L. L., R. M. Ikeda, and M. J. Kresnow, "Guns in the Home and Risk of a Violent Death in the Home: Findings from a National Study," *American Journal of Epidemiology*, Vol. 160, No. 10, 2004, pp. 929–936.
- Desai, R. A., D. Dausey, and R. A. Rosenheck, "Suicide Among Discharged Psychiatric Inpatients in the Department of Veterans Affairs," *Military Medicine*, Vol. 173, No. 8, 2008, pp. 721–728.
- Duggan, Mark, "Guns and Suicide," in Jens Ludwig and Philip J. Cook, eds., *Evaluating Gun Policy: Effects on Crime and Violence*, Washington, D.C.: Brookings Institution Press, 2003, pp. 41–73.
- Grassel, K. M., G. J. Wintemute, M. A. Wright, and M. P. Romero, "Association Between Handgun Purchase and Mortality from Firearm Injury," *Injury Prevention*, Vol. 9, No. 1, 2003, pp. 48–52.
- Grossman, D. C., B. A. Mueller, C. Riedy, M. D. Dowd, A. Villaveces, J. Prodzinski, J. Nakagawara, J. Howard, N. Thiersch, and R. Harruff, "Gun Storage Practices and Risk of Youth Suicide and Unintentional Firearm Injuries," *JAMA*, Vol. 293, No. 6, 2005, pp. 707–714.
- Ilgen, M. A., K. Zivin, R. J. McCammon, and M. Valenstein, "Mental Illness, Previous Suicidality, and Access to Guns in the United States," *Psychiatric Services*, Vol. 59, No. 2, 2008, pp. 198–200.
- Joe, S., S. C. Marcus, and M. S. Kaplan, "Racial Differences in the Characteristics of Firearm Suicide Decedents in the United States," *American Journal of Orthopsychiatry*, Vol. 77, No. 1, 2007, pp. 124–130.
- Jones, Edward D. III, "The District of Columbia's 'Firearms Control Regulations Act of 1975': The Toughest Handgun Control Law in the United States—or Is It?" *Annals of the American Academy of Political and Social Science*, Vol. 455, 1981, pp. 138–149.
- Kellermann, A. L., F. P. Rivara, G. Somes, D. T. Reay, J. Francisco, J. G. Banton, J. Prodzinski, C. Fligner, and B. B. Hackman, "Suicide in the Home in Relation to Gun Ownership," *New England Journal of Medicine*, Vol. 327, No. 7, 1992, pp. 467–472.
- Kleck, Gary, *Targeting Guns: Firearms and Their Control*, New York: Aldine de Gruyter, 1997.
- , "Measures of Gun Ownership Levels for Macro-Level Crime and Violence Research," *Journal of Research in Crime and Delinquency*, Vol. 41, No. 1, 2004, pp. 3–36.
- Kolla, B. P., S. S. O'Connor, and T. W. Lineberry, "The Base Rates and Factors Associated with Reported Access to Firearms in Psychiatric Inpatients," *General Hospital Psychiatry*, Vol. 33, No. 2, 2011, pp. 191–196.
- Kposowa, A. J., "Association of Suicide Rates, Gun Ownership, Conservatism and Individual Suicide Risk," *Social Psychiatry and Psychiatric Epidemiology*, Vol. 48, No. 9, 2013, pp. 1467–1479.
- Kposowa, A., D. Hamilton, and K. Wang, "Impact of Firearm Availability and Gun Regulation on State Suicide Rates," *Suicide and Life-Threatening Behavior*, Vol. 46, No. 6, 2016, pp. 678–696.
- Kubrin, Charis E., and Tim Wadsworth, "Explaining Suicide Among Blacks and Whites: How Socioeconomic Factors and Gun Availability Affect Race-Specific Suicide Rates," *Social Science Quarterly*, Vol. 90, No. 5, 2009, pp. 1203–1227.

Kung, H. C., J. L. Pearson, and X. Liu, "Risk Factors for Male and Female Suicide Decedents Ages 15–64 in the United States—Results from the 1993 National Mortality Followback Survey," *Social Psychiatry and Psychiatric Epidemiology*, Vol. 38, No. 8, 2003, pp. 419–426.

Kung, H. C., J. L. Pearson, and R. Wei, "Substance Use, Firearm Availability, Depressive Symptoms, and Mental Health Service Utilization Among White and African American Suicide Decedents Aged 15 to 64 Years," *Annals of Epidemiology*, Vol. 15, No. 8, 2005, pp. 614–621.

Loftin, C., D. McDowall, B. Wiersema, and T. J. Cottey, "Effects of Restrictive Licensing of Handguns on Homicide and Suicide in the District of Columbia," *New England Journal of Medicine*, Vol. 325, No. 23, 1991, pp. 1615–1620.

Lubin, G., N. Werbeloff, D. Halperin, M. Shmushkevitch, M. Weiser, and H. Y. Knobler, "Decrease in Suicide Rates After a Change of Policy Reducing Access to Firearms in Adolescents: A Naturalistic Epidemiological Study," *Suicide and Life-Threatening Behavior*, Vol. 40, No. 5, 2010, pp. 421–424.

Miller, M., D. Azrael, and D. Hemenway, "The Epidemiology of Case Fatality Rates for Suicide in the Northeast," *Annals of Emergency Medicine*, Vol. 43, No. 6, 2004, pp. 723–730.

Miller, M., D. Azrael, L. Hepburn, D. Hemenway, and S. J. Lippmann, "The Association Between Changes in Household Firearm Ownership and Rates of Suicide in the United States, 1981–2002," *Injury Prevention*, Vol. 12, No. 3, 2006, pp. 178–182.

Miller, M., C. Barber, D. Azrael, D. Hemenway, and B. E. Molnar, "Recent Psychopathology, Suicidal Thoughts and Suicide Attempts in Households With and Without Firearms: Findings from the National Comorbidity Study Replication," *Injury Prevention*, Vol. 15, No. 3, 2009, pp. 183–187.

Miller, M., C. Barber, R. A. White, and D. Azrael, "Firearms and Suicide in the United States: Is Risk Independent of Underlying Suicidal Behavior?" *American Journal of Epidemiology*, Vol. 178, No. 6, 2013, pp. 946–955.

Miller, M., S. A. Swanson, and D. Azrael, "Are We Missing Something Pertinent? A Bias Analysis of Unmeasured Confounding in the Firearm-Suicide Literature," *Epidemiologic Reviews*, Vol. 38, No. 1, 2016, pp. 62–69.

Miller, M., M. Warren, D. Hemenway, and D. Azrael, "Firearms and Suicide in U.S. Cities," *Injury Prevention*, Vol. 21, No. E1, 2015, pp. E116–E119.

Molina, J. A., and R. Duarte, "Risk Determinants of Suicide Attempts Among Adolescents," *American Journal of Economics and Sociology*, Vol. 65, No. 2, 2006, pp. 407–434.

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

NRC—See National Research Council.

Oslin, D. W., C. Zubritsky, G. Brown, M. Mullahy, A. Puliafico, and T. Ten Have, "Managing Suicide Risk in Late Life: Access to Firearms as a Public Health Risk," *American Journal of Geriatric Psychiatry*, Vol. 12, No. 1, 2004, pp. 30–36.

Phillips, J. A., and C. N. Nugent, "Antidepressant Use and Method of Suicide in the United States: Variation by Age and Sex, 1998–2007," *Archives of Suicide Research*, Vol. 17, No. 4, 2013, pp. 360–372.

Price, James H., Adam J. Mrdjenovich, and Joseph A. Dake, "Prevalence of State Firearm Mortality and Mental Health Care Resources," *Journal of Community Health*, Vol. 34, No. 5, 2009, pp. 383–391.

- Price, James H., Amy J. Thompson, and Joseph A. Dake, "Factors Associated with State Variations in Homicide, Suicide, and Unintentional Firearm Deaths," *Journal of Community Health*, Vol. 29, No. 4, 2004, pp. 271–283.
- Reisch, T., T. Steffen, A. Habenstein, and W. Tschacher, "Change in Suicide Rates in Switzerland Before and After Firearm Restriction Resulting from the 2003 'Army XXI' Reform," *American Journal of Psychiatry*, Vol. 170, No. 9, 2013, pp. 977–984.
- Ribeiro, J. D., J. C. Franklin, K. R. Fox, K. H. Bentley, E. M. Kleiman, B. P. Chang, and M. K. Nock, "Self-Injurious Thoughts and Behaviors as Risk Factors for Future Suicide Ideation, Attempts, and Death: A Meta-Analysis of Longitudinal Studies," *Psychological Medicine*, Vol. 46, No. 2, January 2016, pp. 225–236.
- Rodriguez Andrés, Antonio, and Katherine Hempstead, "Gun Control and Suicide: The Impact of State Firearm Regulations in the United States, 1995–2004," *Health Policy*, Vol. 101, No. 1, 2011, pp. 95–103.
- Ruggles, K. V., and S. Rajan, "Gun Possession Among American Youth: A Discovery-Based Approach to Understand Gun Violence," *PLoS ONE*, Vol. 9, No. 11, 2014.
- Shenassa, E. D., C. Daskalakis, and S. L. Buka, "Utility of Indices of Gun Availability in the Community," *Journal of Epidemiology and Community Health*, Vol. 60, No. 1, 2006, pp. 44–49.
- Shenassa, E. D., M. L. Rogers, K. L. Spalding, and M. B. Roberts, "Safer Storage of Firearms at Home and Risk of Suicide: A Study of Protective Factors in a Nationally Representative Sample," *Journal of Epidemiology and Community Health*, Vol. 58, No. 10, 2004, pp. 841–848.
- Siegel, M., C. S. Ross, and C. King, "Examining the Relationship Between the Prevalence of Guns and Homicide Rates in the USA Using a New and Improved State-Level Gun Ownership Proxy," *Injury Prevention*, Vol. 20, No. 6, 2014, pp. 424–426.
- Simonetti, Joseph A., Jessica L. Mackelprang, Ali Rowhani-Rahbar, Douglas Zatzick, and Frederick P. Rivara, "Psychiatric Comorbidity, Suicidality, and in-Home Firearm Access Among a Nationally Representative Sample of Adolescents," *JAMA Psychiatry*, Vol. 72, No. 2, 2015, pp. 152–159.
- Smith, N. D., and I. Kawachi, "State-Level Social Capital and Suicide Mortality in the 50 U.S. States," *Social Science and Medicine*, Vol. 120, 2014, pp. 269–277.
- Smith, P. N., J. Currier, and K. Drescher, "Firearm Ownership in Veterans Entering Residential PTSD Treatment: Associations with Suicide Ideation, Attempts, and Combat Exposure," *Psychiatry Research*, Vol. 229, No. 1–2, 2015, pp. 220–224.
- Smith, T. W., and J. Son, *Trends in Gun Ownership in the United States, 1972–2014*, Chicago, Ill.: NORC at the University of Chicago, March 2015. As of March 9, 2017:
http://www.norc.org/PDFs/GSS%20Reports/GSS_Trends%20in%20Gun%20Ownership_US_1972-2014.pdf
- Stander, V. A., S. M. Hilton, A. P. Doran, A. D. Werbel, and C. J. Thomsen, *Department of the Navy Suicide Incident Report (DONSIR): Summary of 1999–2004 Findings*, San Diego, Calif.: Naval Health Research Center, 2006.
- Swahn, M. H., B. Ali, R. M. Bossarte, M. van Dulmen, A. Crosby, A. C. Jones, and K. C. Schinka, "Self-Harm and Suicide Attempts Among High-Risk, Urban Youth in the U.S.: Shared and Unique Risk and Protective Factors," *International Journal of Environmental Research and Public Health*, Vol. 9, No. 1, 2012, pp. 178–191.
- Thompson, R., V. Kane, J. M. Cook, R. Greenstein, P. Walker, and G. Woody, "Suicidal Ideation in Veterans Receiving Treatment for Opiate Dependence," *Journal of Psychoactive Drugs*, Vol. 38, No. 2, 2006, pp. 149–156.

Wadsworth, T., C. E. Kubrin, and J. R. Herting, “Investigating the Rise (and Fall) of Young Black Male Suicide in the United States, 1982–2001,” *Journal of African American Studies*, Vol. 18, No. 1, 2014, pp. 72–91.

Watkins, Adam M., and Alan J. Lizotte, “Does Household Gun Access Increase the Risk of Attempted Suicide? Evidence from a National Sample of Adolescents,” *Youth and Society*, Vol. 45, No. 3, 2013, pp. 324–346.

Wiebe, Douglas J., “Homicide and Suicide Risks Associated with Firearms in the Home: A National Case-Control Study,” *Annals of Emergency Medicine*, Vol. 41, No. 6, 2003, pp. 771–782.

Wintemute, G. J., C. A. Parham, J. J. Beaumont, M. Wright, and C. Drake, “Mortality Among Recent Purchasers of Handguns,” *New England Journal of Medicine*, Vol. 341, No. 21, 1999, pp. 1583–1589.

World Health Organization, World Health Organization Mortality Database, Geneva, 2017. As of October 13, 2017:

http://www.who.int/healthinfo/mortality_data/en/

CHAPTER SEVENTEEN

The Relationship Between Firearm Prevalence and Violent Crime

In its 2004 review, the National Research Council (NRC) found that

existing research studies and data include a wealth of descriptive information on homicide, suicide, and firearms, but, because of the limitations of existing data and methods, do not credibly demonstrate a causal relationship between the ownership of firearms and the causes or prevention of criminal violence or suicide.

Conceptually, the effects of gun prevalence on violent crimes are ambiguous. Firearms could embolden criminals or disputants or make their encounters more lethal, suggesting that as the prevalence of firearms increases, so too would the number of violent crimes. But gun prevalence may also deter would-be criminals, which could have the opposite effect on violent crime (see Chapter Twenty). In this chapter, we examine the empirical evidence on the relationship between firearm prevalence and violent crime, including homicide, domestic violence, aggravated assault, rape, and robbery. Most of the studies we examined used the proportion of suicides that were firearm suicides (FS/S) as a proxy for gun prevalence.

Methods

Our synthesis focuses on research published after NRC (2004) and takes up where that report left off, reviewing the literature from 2005 to 2016 to assess available new evidence on the relationship between firearm prevalence and violent crime. Our search yielded 25 studies that examined the relationship between gun availability and homicide, other types of violent crime, or domestic violence. We focus our synthesis on U.S.-based studies that met similar methodological criteria for our policy discussions (Chapters Three through Fifteen) in that they attempted to identify a causal effect of prevalence on violent crime. The studies we include here either identify the effect of gun prevalence on violent crime using changes over time in gun prevalence and in violent crime outcomes or use an instrumental-variable approach to cross-sectional data on gun prevalence and violent crime ($N = 11$).

Firearm Prevalence and Violent Crime

We identified 11 studies that met our criteria. Two were by the same authors: Kleck, Kovandzic, and Schaffer (2005) and Kovandzic, Schaffer, and Kleck (2013). We consider the 2013 study, which used the same basic data and approach as the 2005 study, to supersede the earlier study. One study (Hoskin, 2011) provided insufficient information on its methods for us to evaluate the evidence it provided; in particular, the study used instrumental-variable methods, but the author did not indicate what variable(s) he used to instrument for household gun prevalence and did not provide results of empirical tests for the appropriateness of the instrument(s). We thus excluded this study from consideration in our assessment of the overall weight of the evidence. Three studies (Miller, Azrael, and Hemenway, 2002; Swedler et al., 2015; and Monuteaux et al., 2015) employed longitudinal data but had study designs that limited causal inference, and we thus excluded them from our synthesis results. Specifically, Miller, Azrael, and Hemenway (2002) analyzed data from 2001 to 2003 but aggregated the outcome (homicide rate) over the three-year period, resulting in a cross-sectional analysis. Swedler et al. (2015) pooled data from 1996 to 2010 to create a state-level law enforcement officer homicide rate because these deaths are rare, so the main analyses in that study were cross-sectional as well. The authors reanalyzed their data using three five-year periods but provided few details and no tabled results on this analysis. Additionally, their primary measure of gun prevalence was an average measure from the Behavioral Risk Factor Surveillance Survey for the 2001–2004 period, potentially violating a requirement of causal analysis that causes must be known to precede their effects. Monuteaux et al. (2015) analyzed state-level firearm ownership rates and annual rates of criminal acts from 2001, 2002, and 2004. But the length of the longitudinal panel was limited, and the authors were not primarily using the temporal variation in firearm ownership and outcomes for identification.

The six remaining studies examined a range of homicide outcomes, including total homicides, firearm-related homicides, nonfirearm-related homicides, intimate partner homicides, homicides committed by youth (aged 13–17 or 18–24), and homicides by race (of the decedent). These six studies are summarized in Table 17.1.

Five studies (Cook and Ludwig, 2006; Zeoli and Webster, 2010; Chauhan et al., 2011; Parker et al., 2011; Siegel, Ross, and King, 2014) used longitudinal data to analyze changes over time in gun prevalence and changes over time in homicide outcomes. Cook and Ludwig (2006) identified the effect of gun prevalence on total homicides, firearm homicides, and nonfirearm homicides using data from 200 large U.S. counties from 1980 to 1999. Given the absence of longitudinal information on gun prevalence, the authors used as a proxy of gun prevalence the proportion of suicides committed with a firearm (FS/S), an approach commonly used in the literature. They found statistically significant positive effects of gun prevalence on the total homicide rate and firearm homicide rate and no statistically significant effect of gun prevalence

Table 17.1
Studies Published in or After 2005 That Examined the Relationship Between Firearm Prevalence and Violent Crime

Study	Sample	Time Frame	Gun Prevalence Measure	Crime Measure	Result
Cook and Ludwig, 2006	200 largest U.S. counties (in 1990)	1980–1999	FS/S in county; sensitivity with FS/S by state	Total, firearm, and nonfirearm homicide rates	Firearm prevalence positively associated with total and firearm homicides
Zeoli and Webster, 2010	46 large U.S. cities	1979–2003	FS/S in the county in which the majority of city residents reside	Intimate partner homicide rate; firearm intimate partner homicide rate	No statistically significant effects
Chauhan et al., 2011	76 New York City police precincts	1990–1999	FS/S by precinct	Firearm homicide rate by race of decedent (black, white, Hispanic)	Firearm prevalence positively associated with firearm homicides of Hispanics
Parker et al., 2011	91 large U.S. cities	1984–2006	FS/S by city; data for 1990 and 2000; interpolated in other years	Homicides committed by youth aged 13–17; homicides committed by youth aged 18–24	Firearm prevalence positively associated with homicides committed by youth aged 13–17 and youth aged 18–24
Kovandzic, Schaffer, and Kleck, 2013	U.S. counties with population of 25,000 or more (in 1990)	1990	FS/S in county, averaged 1987–1993	Total, firearm, and nonfirearm homicide rates, averaged for 1987–1993	Firearm prevalence negatively associated with total and firearm homicides
Siegel, Ross, and King, 2014	50 U.S. states	1981–2010	FS/S; also FS/S combined with hunting license rate	Total, firearm, and nonfirearm homicide rates	Firearm prevalence positively associated with total and firearm homicides

on the nonfirearm homicide rate. Parker et al. (2011) used data from 91 large U.S. cities spanning 1984–2006 to study the effect of gun prevalence on homicides by two categories of young offenders (aged 13–17 and aged 18–24). The authors used FS/S, measured at the city level, as a proxy for gun prevalence. They found a positive and statistically significant effect of gun prevalence on homicides committed by both those aged 13–17 and those aged 18–24. A methodological limitation was the imputation of FS/S for most observations in the time series (other than 1990 and 2000). Using data from 76 New York City police precincts and FS/S as a proxy for gun prevalence, Chauhan et al. (2011) found a statistically significant positive effect of gun prevalence on the homicide rate of Hispanics. However, sample sizes of suicides by precinct were likely to be relatively small, affecting the precision of the proxy, and the localized nature of the data also limited the generalizability of the findings.

Zeoli and Webster (2010) used data from 46 large U.S. cities spanning 1979–2003 and found no statistically significant effect of county-level gun prevalence (proxied by FS/S) on the city-level intimate partner homicide rate. For this study, measurement of the outcome variable was affected by missing data on the characteristics of the perpetrators of violent crime—either because the perpetrator was not known or the characteristics of the perpetrator were not available (e.g., whether the perpetrator was an intimate partner). This was also true for the Parker et al. (2011) study, but the authors employed a multiple imputation approach to address the issue of missing data on offender age. Siegel, Ross, and King (2014) analyzed state-level data covering 1981–2010. As a proxy for gun prevalence, the authors used FS/S and a measure that incorporated both FS/S and the hunting license rate. They found that higher gun prevalence was associated with more total and firearm homicides. But the authors acknowledged that their methodological approach primarily relied on cross-sectional variation for identification of the effect of gun prevalence on homicide outcomes.

Instead of analyzing changes over time in gun prevalence and changes over time in homicides, Kovandzic, Schaffer, and Kleck (2013) used an instrumental-variable approach to analyzing cross-sectional data from large U.S. counties in 1990. The authors used FS/S as a proxy for gun prevalence and tested the following four instruments, as well as different combinations of these instruments:

- subscriptions per 100,000 people to *Field & Stream*, *Outdoor Life*, and *Sports Afield*
- percentage of county voting for George H. W. Bush in the 1988 presidential election
- military veterans per 100,000 people
- subscriptions per 100,000 people to *Guns & Ammo*.

The authors analyzed the fourth instrument, in part, because it was used in previous research (Duggan, 2001, 2003), but they suggested that, conceptually, it may be endogenous because “subscribers may include people who have an interest in vio-

lence more generally.” The authors’ preferred specification used a combination of the first three instruments (outdoor magazines, voting, veteran variables), although in the first-stage analysis with this combination of instruments, only the voting and magazine measures were statistically significant predictors of firearm prevalence. In the authors’ preferred specification, they found a statistically significant negative relationship between firearm prevalence and firearm homicides and the same for total homicides. In analyses that used the voting, veteran population, and outdoor magazine instruments individually (each of which was statistically significant in the first stage), the authors found no statistically significant effect of firearm prevalence on firearm homicides for two of the instruments (voting, veteran population) and a statistically significant negative relationship between firearm prevalence and firearm homicides for the third (outdoor magazine subscription rate). When the subscription rate to *Guns & Ammo* was used, the direction of the effect changed (became positive), but the effect was not statistically significant, and the authors noted that the instrument failed a statistical test for exogeneity.

With the exception of Siegel, Ross, and King (2014), none of the studies used data from the past decade. For example, Kovandzic, Schaffer, and Kleck (2013) used data from 1990, now more than 25 years old, and Cook and Ludwig (2006) used data from before 2000.

Conclusions

The NRC (2004) review found insufficient evidence to draw a conclusion about the causal relationship between gun prevalence and violent crime. We examined new evidence from U.S.-based studies since the NRC review (2005–2016) that were designed to estimate the causal effect of gun prevalence on violent crime. The six studies we identified examined total homicides, firearm-related homicides, nonfirearm-related homicides, intimate partner homicides, homicides committed by youth (aged 13–17 or 18–24), and homicides by race (of the decedent).

Four of the six studies found the prevalence of firearms to be significantly and positively associated with homicide rates, and these associations were found across reasonably independent data sets. A fifth study found no significant effect of gun prevalence on the intimate partner homicide rate and the firearm intimate partner homicide rate, and a sixth study found significant negative effects (indicating that gun prevalence reduced violent crime) in the preferred specification. While most of the new studies provide evidence consistent with the hypothesis that gun prevalence increases violent crime, the methodological weaknesses that led NRC (2004) to conclude that the causal effects of gun prevalence were not proven continue to apply. In particular, if people are more likely to acquire guns when crime rates are rising or high (as suggested by, for instance, Bice and Hemley, 2002, and Kleck and Patterson, 1993), then

the same pattern of evidence would be expected, but it would be crime rates causing gun prevalence, not the reverse.

A fundamental limitation for all of the studies is the lack of direct measures of gun prevalence. All of the authors use FS/S as a proxy for gun prevalence (with one study combining FS/S with an indicator of the hunting license rate). Moreover, in the new evidence we examined, FS/S was imputed for all but the beginning and end periods of the decade in one study, and in another, the number of suicides for the small catchment area being studied was likely to be relatively limited, affecting the precision of the proxy. Other methodological issues are specific to studies that examine specific types of homicides, such as those committed by youth or by an intimate partner. Because many homicides go unsolved, issues of missing data may be important. Finally, in studies that use an instrumental variable approach, the conceptual and empirical validity of possible instruments has been an issue. One of the six more recent studies took this approach, and the results were sensitive to specification, including which and how many of the instruments of the potential set were included.

Stronger study designs may be available to more persuasively establish the causal effects of gun ownership or gun prevalence on violent crime; however, many such study designs are currently hampered by poor information on the prevalence of gun ownership and the consequent reliance on proxy measures of availability and prevalence. For this reason, we recommend in Chapter Twenty-Five that the Centers for Disease Control and Prevention or another federal agency resume routine collection of voluntarily provided survey data on gun ownership and use.

Chapter Seventeen References

- Bice, Douglas C., and David D. Hemley, "The Market for New Handguns: An Empirical Investigation," *Journal of Law & Economics*, Vol. 45, No. 1, 2002, pp. 251–265.
- Chauhan, P., M. Cerda, S. F. Messner, M. Tracy, K. Tardiff, and S. Galea, "Race/Ethnic-Specific Homicide Rates in New York City: Evaluating the Impact of Broken Windows Policing and Crack Cocaine Markets," *Homicide Studies*, Vol. 15, No. 3, 2011, pp. 268–290.
- Cook, Philip J., and Jens Ludwig, "The Social Costs of Gun Ownership," *Journal of Public Economics*, Vol. 90, No. 1–2, 2006, pp. 379–391.
- Duggan, Mark, "More Guns, More Crime," *Journal of Political Economy*, Vol. 109, No. 5, 2001, pp. 1086–1114.
- , "Guns and Suicide," in Jens Ludwig and Philip J. Cook, eds., *Evaluating Gun Policy: Effects on Crime and Violence*, Washington, D.C.: Brookings Institution Press, 2003, pp. 41–73.
- Hoskin, Anthony, "Household Gun Prevalence and Rates of Violent Crime: A Test of Competing Gun Theories," *Criminal Justice Studies*, Vol. 24, No. 1, 2011, pp. 125–136.
- Kleck, Gary, Tomislav Kovandzic, and Mark E. Schaffer, *Gun Prevalence, Homicide Rates and Causality: A GMM Approach to Endogeneity Bias*, London: Centre for Economic Policy Research, Discussion Paper No. 5357, 2005.
- Kleck, G., and E. B. Patterson, "The Impact of Gun Control and Gun Ownership Levels on Violence Rates," *Journal of Quantitative Criminology*, Vol. 9, No. 3, 1993, pp. 249–287.
- Kovandzic, Tomislav, Mark E. Schaffer, and Gary Kleck, "Estimating the Causal Effect of Gun Prevalence on Homicide Rates: A Local Average Treatment Effect Approach," *Journal of Quantitative Criminology*, Vol. 29, No. 4, 2013, pp. 477–541.
- Miller, M., D. Azrael, and D. Hemenway, "Household Firearm Ownership and Suicide Rates in the United States," *Epidemiology*, Vol. 13, No. 5, 2002, pp. 517–524.
- Monuteaux, M. C., L. K. Lee, D. Hemenway, R. Mannix, and E. W. Fleegler, "Firearm Ownership and Violent Crime in the U.S.: An Ecologic Study," *American Journal of Preventive Medicine*, Vol. 49, No. 2, 2015, pp. 207–214.
- National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.
- NRC—See National Research Council.
- Parker, R. N., K. R. Williams, K. J. McCaffree, E. K. Acensio, A. Browne, K. J. Strom, and K. Barrick, "Alcohol Availability and Youth Homicide in the 91 Largest U.S. Cities, 1984–2006," *Drug and Alcohol Review*, Vol. 30, No. 5, 2011, pp. 505–514.
- Siegel, M., C. S. Ross, and C. King, "Examining the Relationship Between the Prevalence of Guns and Homicide Rates in the USA Using a New and Improved State-Level Gun Ownership Proxy," *Injury Prevention*, Vol. 20, No. 6, 2014, pp. 424–426.
- Swedler, D. I., M. M. Simmons, F. Dominici, and D. Hemenway, "Firearm Prevalence and Homicides of Law Enforcement Officers in the United States," *American Journal of Public Health*, Vol. 105, No. 10, 2015, pp. 2042–2048.
- Zeoli, A. M., and D. W. Webster, "Effects of Domestic Violence Policies, Alcohol Taxes and Police Staffing Levels on Intimate Partner Homicide in Large U.S. Cities," *Injury Prevention*, Vol. 16, No. 2, 2010, pp. 90–95.

CHAPTER EIGHTEEN

Firearm and Ammunition Taxes

Taxation is a policy lever frequently used as a means to influence social welfare and well-being. In this chapter, we synthesize the limited research that has been conducted on firearm and ammunition taxes in the United States. The information was collected from a targeted search of the literature separate from that described in Chapter Two of this report.

Taxation has rarely been used as a policy tool to manage risks associated with gun violence. A federal excise tax of 10–11 percent on the import and production of firearms and ammunition has been in place since 1919, but the rate has not been changed since it was first instituted. The National Firearms Act of 1934 imposed a \$200 tax on the transfer of certain firearms, but the tax applied to a very narrow set of weapons and has not been changed since initial enactment. Only two states impose special taxes on guns and ammunition over the standard sales tax: Pennsylvania adds a \$3 surcharge on firearms subject to the sales tax, and Tennessee has a \$0.10 special privilege tax for use, possession, and sales of shotgun shells of metallic cartridges (Pinho and Rappa, 2013).

Local jurisdictions have recently taken action to directly influence the prices of guns and ammunition. In January 2016, Seattle, Washington, began collecting taxes at the point of sale of \$25 for each firearm and \$0.02 to \$0.05 for each round of ammunition sold within city limits. Cook County, Illinois, which passed a \$25 tax on firearms in 2013, implemented a similar tax increase on ammunition of \$0.01 to \$0.05 per cartridge in June 2016. While these local tax increases were primarily intended as revenue-generating mechanisms, larger tax hikes have occasionally been proposed as a preventive mechanism to reduce new purchases of firearms or ammunition and limit gun violence. Most proposed state and local measures to this effect have not passed, but in April 2016, the Northern Mariana Islands (a U.S. territory) passed a provision imposing a \$1,000 tax on pistols.

Understanding the potential consequences of higher taxes on guns and ammunition is important both for policy considerations moving forward and for assessing laws that increase the effective price of legal gun purchases, such as permit-to-purchase laws (Cook and Leitzel, 1996). While opponents have voiced concern that increased local taxes will push legal consumers and suppliers to conduct business outside city limits

(Beekman, 2015), to our knowledge, no rigorous evaluations of the causal effects of taxation policy on the gun industry have been reported.

Conceptually, the societal effects of increasing taxes on firearms or ammunition will hinge on how responsive gun purchasers are to changes in price and how this varies for different types of purchasers (i.e., those using firearms for recreational, self-protection, or criminal purposes). Because guns are durable goods, there is also a need to understand price linkages between the formal and informal markets.¹ Just as the “durability” of ammunition may vary across individuals and reasons for use, policies affecting the price of firearms may have very different consequences compared with policies affecting the price of ammunition. While several studies have examined the theoretical consequences of increasing the price of firearms (e.g., McDonald, 1999; Chaudri and Geanakoplos, 1998; Cook and Leitzel, 1996), there exists little empirical evidence to inform whether taxation can be an effective policy measure to limit criminal or violent gun misuse.

Several factors complicate evaluation of the price sensitivity of demand for guns or ammunition. First, because few policy changes have substantially influenced the price of firearms or ammunition, research has faced insufficient variation to empirically estimate the price responsiveness of various participants in gun markets. Second, in the absence of exogenous price shocks, researchers cannot disentangle changes in consumer demand that are driven by changes in price from changes in price that are driven by changes in consumer demand. And third, the market for firearms and ammunition is highly differentiated, and there are no publicly available gun or ammunition price data over a sufficient period to support policy analysis (National Research Council, 2004). A few sources provided information on national average prices of guns and ammunition,² but these averages obscured notable price variation across jurisdictions and offered only a rough approximation of the retail prices facing consumers. Thus, these data have generally been used to evaluate how demand shocks influence prices and not to estimate how responsive consumers are to changes in prices (Koper and Roth, 2002).

Furthermore, because these data sources applied solely to the formal market, they provided little insight into linkages between the formal and informal markets, which limited analysis of how taxation in the formal market would affect criminal markets for firearms. Theoretically, price changes in the primary market should affect informal markets, but some evidence suggests that the informal market for firearms operates quite differently from the formal market. For instance, qualitative interviews with adult male detainees in Cook County Jail found that 40 percent of inmate respon-

¹ The *informal market* is defined here as comprising legal but unrecorded private transactions (i.e., secondary markets), as well as illegal trade in firearms (i.e., black markets), following Cook and Leitzel (1996).

² See, for example, Fjestad (2017) and *Shotgun News* (renamed *Firearm News Magazine*). AmmoSpy (undated), a relatively new website, provides web-scraped data on ammunition prices.

dents acquired firearms through means other than purchase or trade (Cook, Parker, and Pollack, 2015), most commonly through borrowing or sharing arrangements. The importance of social networks in illegal gun markets has been found in other studies (Cook et al., 2007; Kennedy, Piehl, and Braga, 1996; Sheley and Wright, 1993), but while this provides some evidence about how criminal markets for firearms function, there exist no reliable estimates of the price elasticity of demand for guns or ammunition by violent individuals or criminal organizations (Cook and Pollack, 2016). As research grows in this area and examines underground gun markets across different jurisdictions, we may gain a better understanding of whether taxation can serve as an effective measure to prevent criminal acquisition and use of firearms.

In contrast to violent or criminal offenders, there exists some empirical evidence on how responsive hunters are to changes in price. Several articles that exploited variation in hunting license fees have found hunting demand to be relatively unrelated to changes in license fees (Poudyal, Cho, and Bowker, 2008; Sun, Van Kooten, and Voss, 2005; Teisl, Boyle, and Record, 1999). While this research suggests that moderate tax increases on guns or ammunition would do little to disrupt hunting or recreational gun use, the evidence is based on changes in hunting license fees (which are a very small fraction of the total cost of hunting) and may not be congruent with the actual response to significant increases in the price of firearms or ammunition.

Conclusions

Overall, we currently have little empirical evidence to indicate how taxation would influence firearm-related outcomes, such as violent crime or suicides. Nor is there evidence establishing how taxing firearms or ammunition would affect the gun industry, defensive gun use, or recreational gun use. Given that taxation has been a standard policy lever for other potentially harmful goods (e.g., cigarettes, alcohol, and soda or sugary beverages), we may be able to derive insights from policy changes in these markets. However, understanding the costs and benefits of taxation in gun markets requires special consideration of the varied purposes for which individuals acquire and retain firearms or ammunition, the relationship between various market sources for guns and ammunition, and the political feasibility of imposing price regulations in a market for which regulations are already highly contentious.

Chapter Eighteen References

- AmmoSpy, “Trending,” web page, undated. As of June 29, 2017:
<http://www.ammospy.net/trending>
- Beekman, Daniel, “How Gun-Tax Legislation Would Affect Seattle Firearms Stores,” *Seattle Times*, July 29, 2015. As of February 20, 2017:
<http://www.seattletimes.com/seattle-news/politics/how-gun-tax-legislation-would-affect-seattle-firearms-stores/>
- Chaudri, V., and J. Geanakoplos, “A Note on the Economic Rationalization of Gun Control,” *Economics Letters*, Vol. 58, 1998, pp. 51–53.
- Cook, P. J., and J. A. Litzel, “Perversity, Futility, Jeopardy’: An Economic Analysis of the Attack on Gun Control,” *Law and Contemporary Problems*, Vol. 59, No. 1, 1996, pp. 91–118.
- Cook, P. J., J. Ludwig, S. Venkatesh, and A. A. Braga, “Underground Gun Markets,” *Economic Journal*, Vol. 117, 2007, pp. F558–F888.
- Cook, P. J., and H. A. Pollack, “Reducing Access to Guns by Violent Offenders,” presented at RSF Journal Conference: The Underground Gun Market, April 2016.
- Cook, Philip J., Susan T. Parker, and Harold A. Pollack, “Sources of Guns to Dangerous People: What We Learn by Asking Them,” *Preventive Medicine*, Vol. 79, 2015, pp. 28–36.
- Fjestad, S. P., *Blue Book of Gun Values*, 38th ed., Minneapolis, Minn.: Blue Book Publications, 2017.
- Kennedy, D. M., A. M. Piehl, and A. A. Braga, “Youth Violence in Boston: Gun Markets, Serious Youth Offenders, and a Use-Reduction Strategy,” *Law and Contemporary Problems*, Vol. 59, No. 1, 1996, pp. 147–196.
- Koper, Christopher S., and Jeffrey A. Roth, “The Impact of the 1994 Federal Assault Weapons Ban on Gun Markets: An Assessment of Short-Term Primary and Secondary Market Effects,” *Journal of Quantitative Criminology*, Vol. 18, No. 3, 2002, pp. 239–266.
- McDonald, J. F., “An Economic Analysis of Guns, Crime, and Gun Control,” *Journal of Criminal Justice*, Vol. 27, No. 1, 1999, pp. 11–20.
- National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.
- Pinho, R., and J. Rappa, *Special Taxes on Guns, Ammunition, and Gun Shows*, Hartford, Conn.: Connecticut General Assembly, Office of Legislative Research, OLR Research Report 2013-r-0034, January 10, 2013.
- Poudyal, N., S. H. Cho, and J. M. Bowker, “Demand for Resident Hunting in the Southeastern United States,” *Human Dimensions of Wildlife*, Vol. 13, No. 3, 2008, pp. 158–174.
- Sheley, J. F., and J. D. Wright, *Gun Acquisition and Possession in Selected Juvenile Samples*, Washington, D.C.: National Institute of Justice, 1993.
- Sun, L. G., C. Van Kooten, and G. M. Voss, “Demand for Wildlife Hunting in British Columbia,” *Canadian Journal of Agricultural Economics*, Vol. 53, 2005, pp. 25–46.
- Teisl, M. F., K. J. Boyle, and R. E. Record, Jr., “License-Sales Revenues: Understanding Angler and Hunter Reaction to Changes in License Prices,” *Human Dimensions of Wildlife*, Vol. 4, No. 4, 1999, pp. 1–17.

CHAPTER NINETEEN

Mental Health Care Access and Suicide

Increased access to mental health services is commonly promoted as a strategy to decrease firearm violence and suicide. Indeed, organizations on opposite sides of gun regulation debates often agree that policies designed to improve access to mental health care offer a promising approach to reducing gun violence.¹ Here, we synthesize the evidence on access to mental health care and its effects on suicide; we find that evidence regarding the relationship between the two has been mixed. The information was collected from a targeted search of the literature separate from that described in Chapter Two of this report.

Access to care can be defined in many ways. Several studies have defined access as the *availability of health care and mental health services* in a given region. Other studies focus on the *use of health and mental health services* by individuals who have a history of suicide ideation, suicide attempts, or a completed suicide. Still others focus on the *barriers to mental health care* that may preclude an individual from accessing services even when they are available. Finally, a handful of studies has focused on more-foundational *policies that may affect access* to and availability of care (e.g., health insurance laws, mental health expenditures). Our synthesis proceeds by examining the evidence for each of these definitions.

Availability of Health Care and Mental Health Services

Several studies examining the availability of health care have used state-level data on suicide rates in different regions, as well as the density of health care providers, including general practitioners, psychiatrists, and clinical psychologists. These studies have yielded some evidence that density of mental health providers is associated with lower suicide rates. For instance, one study examined the association between indexes of health care access—including proportion of state residents without health insurance and proportion of psychiatrists and nonpsychiatrist physicians per 100,000 residents—and rates of suicide at the state level. Data were obtained from the U.S. Census Bureau,

¹ See, for example, Lexington (2013) or Robbins (2014).

the Centers for Disease Control and Prevention (CDC), and the American Board of Medical Specialties, with most data collected in the early 2000s. Both the density of psychiatrists and density of nonpsychiatrist physicians were associated with lower suicide rates (Tondo, Albert, and Baldessarini, 2006), controlling for sociodemographic factors (e.g., population density, proportion of men, and proportion of racial/ethnic minorities) and economic indexes (e.g., amount of federal mental health aid received by the state). A second study focused on access to care and suicide rates at the state level using data from the CDC (Thomson Healthcare, 2007). That study found evidence that states with higher proportions of psychiatrists, psychologists, and social workers had lower suicide rates, although these conclusions were based on bivariate analyses. Both of these studies used cross-sectional designs, raising questions about whether the proportion of health care providers accounts for lower suicide rates or whether some other factor associated with both suicide and health care availability causes the observed associations.

However, if access to mental health care is an important predictor of suicide risk, we might expect that the farther individuals have to travel to access care, the higher their risk of suicide might be. McCarthy et al. (2012) examined this relationship in the population of military veterans living at a range of distances from the nearest U.S. Department of Veterans Affairs (VA) mental health provider. Among veterans who accessed outpatient or inpatient services during fiscal years 2003–2004 and 2006–2007, and controlling for sociodemographic factors and mental health diagnoses, the authors found that distance to the nearest provider was not a predictor of suicide, except among the subgroup of veterans living at extreme distances (i.e., more than 800 miles) from the nearest VA provider. However, this study focused on individuals who used VA services at least once, regardless of the distance to the nearest hospital. If distance to the nearest VA provider could discourage an initial visit, as well as follow-up visits, then this study design could fail to observe true effects of health care services on suicide risk.

Price, Mrdjenovich, and Dake (2009) examined state-level variation in firearm suicide rates in relation to state indexes of access to care, including the number of clinically active mental health professionals per 100,000 population (including psychiatrists, psychologists, social workers, and counselors per state), the number of mental health facilities and psychiatric treatment beds, the number of physicians who wrote prescriptions for psychotropic medications, and the proportion of psychiatrists to other physicians who wrote prescriptions for psychotropic medications. In bivariate analyses, states with higher numbers of physicians writing psychotropic medication prescriptions, and those with higher proportions of psychiatrists to other physicians writing these prescriptions, had lower rates of firearm suicide. However, in multivariate models, neither of these factors was associated with firearm suicide rates. Instead, the significant predictors of firearm suicide rates were

firearm ownership and state educational expenditures.² The authors did not examine total suicide rates.

Fewer studies have focused on the availability of specific services rather than the availability of practitioners. Shumway et al. (2012) examined the effect of psychiatric care capacity reductions in a large city in the United States. The primary provider of inpatient and emergency psychiatric services for the community experienced a reduction in acute inpatient capacity. However, this did not appear to impact rates of suicide among individuals who were engaged in community mental health services in the city. Because there was no comparison group for this study, it was not possible to rule out the possibility that reductions in psychiatric care capacity did affect suicide rates, but this relationship was obscured by other contemporaneous changes to suicide risk with the opposite effect.

These studies suggest that states with more mental health providers have lower rates of suicide. However, the cause of this association is not clear. It may be that mental health providers have a direct protective effect on suicide risk; however, findings that distance to providers is only weakly associated with suicide risk or that the association disappears when controlling for state-level indicators of education level and firearm ownership rates raise questions about this conclusion. Alternatively, it may be that other factors associated with both suicide risk and mental health availability explain the association.

Use of Health and Mental Health Services

Even when services are available, not all individuals with mental health treatment needs use them. For this reason, several studies have focused on use of health and mental health services by individuals who have expressed suicide ideation, attempted suicide, or completed suicide.

A systematic review conducted in 2002 examined rates of contact with mental health and primary care services among individuals who died by suicide (Luoma, Martin, and Pearson, 2002). The authors included 40 studies from the United States, Australia, and Europe from inception to 2000. On average, 19 percent (95-percent confidence interval [CI]: 7, 28) of decedents made contact with the mental health system in the month before death, and 32 percent (95-percent CI: 16, 46) made contact in the year before death. Older adults and men were generally less likely to make contact with the mental health system. Contact with primary care providers was more common: Across studies, an average of 45 percent made such contact in the month before death, and 77 percent made contact within the year before death. Older adults were more likely to make contact with primary care providers. A more recent study

² See Chapter Sixteen for more on the association between suicide and firearm ownership.

used data from 18 U.S. states to examine mental health treatment among suicide decedents (Niederkröthaler et al., 2014). Using data from the National Violent Death Reporting System from 2005 to 2010, researchers identified 57,877 suicides. This study found similar results to the previously described review: 38.5 percent of suicide decedents received mental health treatment during the two months before death. Individuals with depressed mood, substance use problems, and a history of suicide attempts were more likely to have accessed treatment, suggesting that individuals with a longer history of mental health problems may be more likely to access services.

Although these studies suggest that a large proportion of individuals who take their lives make contact with the health or mental health system prior to their deaths, the studies do not answer whether the availability and use of mental health care reduce the incidence of suicide that would exist without such care. Moreover, there are unanswered questions about the quality and appropriateness of the care received by those at risk of suicide (e.g., with respect to frequency, service type or setting, or intensity). In addition, given that these studies are generally based on record reviews or psychological autopsies, it is usually not possible to determine whether providers assessed respondents for depression or suicide risk or whether the problems elevating individuals' suicide risk were ever discussed (Simon and Gold, 2016). Moreover, there are still large numbers of individuals who do not make contact with the health care system leading up to their deaths. These factors all make it difficult to interpret the meaning of findings that individuals who take their lives have often accessed health and mental health services leading up to their deaths.

Barriers to Mental Health Care

Also relevant to these questions is a consideration of barriers to care. Even when mental health care is available, there are numerous reasons why individuals might not access services. In surveys of college students who have thought about suicide or were identified as being at elevated risk for suicide (due to current suicide ideation, history of suicide attempt, current depression, or current alcohol abuse), common barriers included beliefs that they can manage their problems without treatment or that their problems did not warrant treatment (Arria et al., 2011; Czyz et al., 2013). Some students reported preferences to seek help from family or friends, whereas others cited logistical challenges, including a lack of time to seek treatment, long waiting periods for services, and financial barriers. A study in Utah contacted the family (including parents, siblings, and other relatives) and friends of 49 youth (aged 13–21) who took their lives (Moskos et al., 2007). The most commonly endorsed barrier to mental health treatment was a belief that treatment would not help (cited as a barrier by more than 70 percent of parents, siblings, relatives, and friends), stigma toward help-seeking (endorsed by 52–79 percent of interviewees), and reluctance to admit that there was a problem

(endorsed by 58–79 percent of interviewees). Substantial proportions of family members and friends reported that the decedent did not know where to go to seek help, could not afford help, or did not have insurance coverage for mental health services. A larger-scale analysis of state-level characteristics also found that rates of suicide were higher in states in which a higher proportion of the population reported that they were unable to obtain health care because of costs (Thomson Healthcare, 2007). However, there is little evidence examining whether removing these barriers increases the likelihood of accessing needed services and what this may mean for reducing suicide risk.

Policies That May Affect Access to Services

U.S. studies have found that state mental health expenditures per capita are not associated with rates of suicide (Thomson Healthcare, 2007; Price, Mrdjenovich, and Dake, 2009). However, there is some evidence that states receiving more federal mental health aid have lower suicide rates (Tondo, Albert, and Baldessarini, 2006), and in a multivariate model, this was a stronger correlate of suicide rates than the proportion of uninsured individuals in the state, density of psychiatrists or physicians, or sociodemographic variables (specifically, male gender). Because these studies are generally based on cross-sectional state-level data, however, it is difficult to know what type of effect an increase in mental health funding or increase in the number of insured individuals would have on rates of suicide.

A recent study by Lang (2013) analyzed the implementation of mental health parity laws on suicide rates. These laws require health insurance plans to provide comparable coverage for physical and mental health (U.S. Department of Labor, 2010). Between 1990 and 2004, 29 states enacted parity laws, and this study used variation in implementation dates to explore the causal effect of parity laws on suicide. Results demonstrated that in the first year after states enacted parity laws, the suicide rate declined by 5 percent. Moreover, these effects were maintained two or more years after the laws were enacted, although the magnitude of the change decreased somewhat. Subsequent analyses demonstrated that these laws had a particular effect on adults aged 18–64 but did not seem to affect the suicide rate in older adults who were less likely to be affected by the laws. Because this study was able to examine changes in suicide rates before and after the implementation of parity laws, it provided a more rigorous test of the association between access to services and suicide.

International and Cross-National Studies

International studies provide fairly consistent evidence that the presence of psychiatrists in a region is associated with lower suicide rates. In Japan, municipalities with at

least one psychiatrist experienced lower rates of suicide (Kawaguchi and Koike, 2016), and in Slovenia, regions with a higher number of psychiatrists working in outpatient settings had lower suicide rates (Jagodič et al., 2013). In addition, a multinational study found that countries with a higher density of psychiatrists had lower suicide rates (Rajkumar et al., 2013). However, studies in other countries, such as Austria, have found no association between the density of psychiatrists and suicide standardized mortality ratios (Kapusta et al., 2010). Most of these studies were based on cross-sectional data, and when multiyear data were available, the effects of changes over time were not reported. Therefore, it is not clear that the prevalence of psychiatrists caused reductions in suicide rates, because other factors may be associated with both the presence of psychiatrists and lower suicide rates (e.g., urbanicity, gun ownership, education).

The evidence regarding nonphysician mental health providers has been more mixed. An Austrian study focused on the availability of psychotherapists—a broad category that included psychologists, psychiatrists, teachers, and social workers—and found that a larger number of psychotherapists was associated with lower rates of suicide (Kapusta et al., 2009). In contrast, other studies have found no association between the density of nonphysician psychotherapists, clinical psychologists, and general practitioners and suicide (Jagodič et al., 2013; Kapusta et al., 2010). The availability of certain types of services may also make a difference: A study in Finland found that regions with a higher ratio of outpatient to inpatient services had lower rates of suicide (Pirkola et al., 2009).

As in the United States, there have been efforts in other countries to examine suicide decedents' health care utilization prior to death. These studies share many of the same weaknesses as the U.S. studies, including an inability to directly connect use of mental health services to increased or decreased risk of suicide. However, one study in the United Kingdom highlighted the importance of identifying periods of vulnerability for individuals who are engaged with the health care system. Appleby et al. (1999) compared individuals who had inpatient psychiatric care within five years of their suicide with a comparison group of individuals who received inpatient care but did not die by suicide. Comparison participants were identified from hospitals in the same region as decedents, which were selected via block randomization and, to the extent possible, were matched on age (within five years), sex, diagnosis, and date of admission (within six months). This study focused on care received by patients after discharge. The authors found that individuals who died by suicide were more likely to have had their level of care reduced at the final appointment before their deaths. These decreases in care included reduced appointment frequency, transfer to a less supervised care location, or a lowered medication dose. For 56 percent of these cases, the death was within three months of the reduction in care. This study suggests that the period of time following a reduction in care may be particularly risky for suicidal individuals. This is an important consideration, even when a reduction in the intensity or level of care is clinically indicated.

Conclusions

Correlations have frequently been found between suicide rates and the availability of mental health care, use of mental health care, or barriers to use of care. Typically, these correlations are found in cross-sectional studies, where it is not possible to establish with confidence whether the observed associations are attributable to a causal effect of mental health care or to other factors that might be associated with both suicide risk and the availability or use of mental health care. However, two studies that use methods better designed to establish causal effects suggest that (1) mental health parity laws, which facilitate access to mental health services, may indeed reduce suicide rates and (2) suicidal individuals may be particularly at risk after experiencing reductions in their health care.

Chapter Nineteen References

Appleby, Louis, John A. Dennehy, Christopher S. Thomas, E. Brian Faragher, and Glyn Lewis, "Aftercare and Clinical Characteristics of People with Mental Illness Who Commit Suicide: A Case-Control Study," *Lancet*, Vol. 353, No. 9162, 1999, pp. 1397–1400.

Arria, Amelia M., Emily R. Winick, Laura M. Garnier-Dykstra, Kathryn B. Vincent, Kimberly M. Caldeira, Holly C. Wilcox, and Kevin E. O'Grady, "Help Seeking and Mental Health Service Utilization Among College Students with a History of Suicide Ideation," *Psychiatric Services*, Vol. 62, No. 12, 2011, pp. 1510–1513.

Czyz, Ewa K., Adam G. Horwitz, Daniel Eisenberg, Anne Kramer, and Cheryl A. King, "Self-Reported Barriers to Professional Help Seeking Among College Students at Elevated Risk for Suicide," *Journal of American College Health*, Vol. 61, No. 7, 2013, pp. 398–406.

Jagodič, Helena Korošec, Tatjana Rokavec, Mark Agius, and Peter Pregelj, "Availability of Mental Health Service Providers and Suicide Rates in Slovenia: A Nationwide Ecological Study," *Croatian Medical Journal*, Vol. 54, No. 5, 2013, pp. 444–452.

Kapusta, Nestor D., Thomas Niederkrotenthaler, Elmar Etzersdorfer, Martin Voracek, Kanita Dervic, Elisabeth Jandl-Jager, and Gernot Sonneck, "Influence of Psychotherapist Density and Antidepressant Sales on Suicide Rates," *Acta Psychiatrica Scandinavica*, Vol. 119, No. 3, 2009, pp. 236–242.

Kapusta, Nestor D., Martin Posch, Thomas Niederkrotenthaler, Melitta Fischer-Kern, Elmar Etzersdorfer, and Gernot Sonneck, "Availability of Mental Health Service Providers and Suicide Rates in Austria: A Nationwide Study," *Psychiatric Services*, Vol. 61, No. 12, 2010, pp. 1198–1203.

Kawaguchi, Hideaki, and Soichi Koike, "Association Between the Density of Physicians and Suicide Rates in Japan: Nationwide Ecological Study Using a Spatial Bayesian Model," *PLoS ONE*, Vol. 11, No. 2, 2016.

Lang, Matthew, "The Impact of Mental Health Insurance Laws on State Suicide Rates," *Health Economics*, Vol. 22, No. 1, 2013, pp. 73–88.

Lexington, "Why the NRA Keeps Talking About Mental Illness, Rather Than Guns," *Economist*, March 13, 2013. As of June 29, 2017:
<http://www.economist.com/blogs/lexington/2013/03/guns-and-mentally-ill>

Luoma, Jason B., Catherine E. Martin, and Jane L. Pearson, "Contact with Mental Health and Primary Care Providers Before Suicide: A Review of the Evidence," *American Journal of Psychiatry*, Vol. 159, No. 6, 2002, pp. 909–916.

McCarthy, John F., Frederic C. Blow, Rosalinda V. Ignacio, Mark A. Ilgen, Karen L. Austin, and Marcia Valenstein, "Suicide Among Patients in the Veterans Affairs Health System: Rural-Urban Differences in Rates, Risks, and Methods," *American Journal of Public Health*, Vol. 102, No. S1, March 2012, pp. S111–S117.

Moskos, Michelle A., Lenora Olson, Sarah R. Halbern, and Doug Gray, "Utah Youth Suicide Study: Barriers to Mental Health Treatment for Adolescents," *Suicide and Life-Threatening Behavior*, Vol. 37, No. 2, 2007, pp. 179–186.

Niederkrotenthaler, Thomas, Joseph E. Logan, Debra L. Karch, and Alex Crosby, "Characteristics of U.S. Suicide Decedents in 2005–2010 Who Had Received Mental Health Treatment," *Psychiatric Services*, Vol. 65, No. 3, 2014, pp. 387–390.

Pirkola, Sami, Reijo Sund, Eila Sailas, and Kristian Wahlbeck, "Community Mental-Health Services and Suicide Rate in Finland: A Nationwide Small-Area Analysis," *Lancet*, Vol. 373, No. 9658, 2009, pp. 147–153.

Price, James H., Adam J. Mrdjenovich, and Joseph A. Dake, "Prevalence of State Firearm Mortality and Mental Health Care Resources," *Journal of Community Health*, Vol. 34, No. 5, 2009, pp. 383–391.

Rajkumar, A. P., E. M. Brinda, A. S. Duba, P. Thangadurai, and K. S. Jacob, "National Suicide Rates and Mental Health System Indicators: An Ecological Study of 191 Countries," *International Journal of Law and Psychiatry*, Vol. 36, No. 5, 2013, pp. 339–342.

Robbins, Mel, "The Real Gun Problem Is Mental Health, Not the NRA," CNN, 2014. As of June 29, 2017:
<http://www.cnn.com/2014/06/24/opinion/robbins-mental-health>

Shumway, Martha, Jennifer Alvidrez, Mark Leary, Deborah Sherwood, Eric Woodard, Emily K. Lee, Heather Hall, Ralph A. Catalano, and James W. Dilley, "Impact of Capacity Reductions in Acute Public-Sector Inpatient Psychiatric Services," *Psychiatric Services*, Vol. 63, No. 2, 2012, pp. 135–141.

Simon, Robert I., and Liza H. Gold, "Decreasing Suicide Mortality: Clinical Risk Assessment and Firearm Management," in Liza H. Gold and Robert I. Simon, eds., *Gun Violence and Mental Illness*, Arlington, Va.: American Psychiatric Association Publishing, 2016, pp. 249–289.

Thomson Healthcare, *Ranking America's Mental Health: An Analysis of Depression Across the States*, Washington, D.C.: Mental Health America, 2007.

Tondo, Leonardo, Matthew J. Albert, and Ross J. Baldessarini, "Suicide Rates in Relation to Health Care Access in the United States: An Ecological Study," *Journal of Clinical Psychiatry*, Vol. 67, No. 4, 2006, pp. 517–523.

U.S. Department of Labor, *Fact Sheet: The Mental Health Parity and Addiction Equity Act of 2008 (MHPAEA)*, Washington, D.C., January 29, 2010. As of October 18, 2017:
<https://www.dol.gov/sites/default/files/ebsa/about-ebsa/our-activities/resource-center/fact-sheets/mhpaea.pdf>

CHAPTER TWENTY

Education Campaigns and Clinical Interventions for Promoting Safe Storage

The safe storage of firearms has been proposed by both gun advocacy groups and violence prevention groups as a means to address suicides and unintentional injuries and deaths associated with guns in the United States. In addition, safe storage is described explicitly in the Surgeon General's 2012 *National Strategy for Suicide Prevention* (Office of the Surgeon General and National Action Alliance for Suicide Prevention, 2012).

In this chapter, we briefly review the evidence on the relationship between firearm storage and both suicides and unintentional injuries and deaths. Then, we review two nonpolicy approaches: education campaigns and clinical interventions. Safe storage policy approaches—specifically, child-access prevention laws—are discussed in Chapter Ten. The information was collected from a targeted search of the literature separate from that described in Chapter Two of this report but relies heavily on a recent systematic review (Rowhani-Rahbar, Simonetti, and Rivara, 2016) that updated an earlier review (McGee, Coyne-Beasley, and Johnson, 2003).

Evidence on Safe Storage

As discussed in Chapter Sixteen (on the relationship between firearm prevalence and suicide), there is evidence that those who die by suicide have guns stored less safely than various comparison groups (Conwell et al., 2002; Shenassa et al., 2004). A study on adolescent suicides did not yield similar results but may have been underpowered (Brent et al., 1991; Brent et al., 1993b). In addition, Grossman et al. (2005) examined a combined group of fatal and nonfatal youth suicides and unintentional injuries relative to community controls. They found that, relative to controls, guns used in the injuries or deaths were less likely to be stored unloaded or locked, to have the ammunition locked, or to have the ammunition and gun stored separately and were more likely to be stored without using an extrinsic device. Research has also shown a correlation between firearm storage practices among gun owners, measured in 2004, and state-level unintentional firearm deaths aggregated between 1991 and 2000 (Miller et al., 2005).

Education Campaigns

Public health communication is a common mechanism used to inform or influence audience behaviors to produce positive health benefits to individuals and society. Decades of research on public health campaigns for a range of behaviors reveal that, over time, campaigns can produce long-term, systemic behavioral change. Communication has been a major contributor, for example, to both the increase in tobacco use (caused by advertising and promotion) and the substantial decline of smoking since the 1960s (through public health campaigns) (National Cancer Institute, 2008). Meta-analyses of how media campaigns affect behavior change provide evidence that campaigns can produce short-term effects of approximately 9 percent more people performing a desired behavior after the campaign than before (Snyder and Hamilton, 2002). When combining campaigns with enforcement strategies (for instance, the campaign combines messages designed to change behavior and to advise the public of penalties for noncompliance), effect sizes can jump to 17 percent (Snyder and Hamilton, 2002). Other meta-analyses corroborate significant effect sizes from more-specific types of campaigns. For example, Noar, Benac, and Harris (2007) examined interventions promoting messages about health behavior change and found small but significant average effects.

Gun rights advocacy organizations, violence prevention organizations, and public health advocacy organizations have implemented small- to large-scale educational campaigns to promote safe firearm storage and safe use. For instance, the National Shooting Sports Foundation (2016) promotes Project ChildSafe, a program designed to encourage safe storage of firearms. With funding from the U.S. Department of Justice, the Ad Council and the National Crime Prevention Council developed the “Lock It Up” information campaign in 2013, which included public service announcements delivered to nearly 15,000 radio stations and more than 500 cable networks in 210 markets (U.S. Department of Justice, 2013). Relatedly, the Brady Campaign to Prevent Gun Violence (undated) produces a variety of safety and education materials spanning various media (e.g., digital, print, and social media). The Brady Campaign’s approach extends beyond safe storage practices and implements campaigns targeting gun dealers to promote background checks for all gun sales, illegal dealers who supply guns used in crimes, and the general public to educate them about the dangers of guns in the home (for more about the relationship between firearm prevalence and violent crime, see Chapter Seventeen). The Everytown for Gun Safety Support Fund also has a “Be SMART” program, which promotes safely storing firearms, modeling responsible behavior around guns, asking about unsecured guns in other homes, and recognizing the risks of teen suicide (Everytown for Gun Safety Support Fund, 2017a).

There is only one rigorous evaluation of a national-level mass media campaign promoting safe firearm storage. That campaign centered on the slogan “Buy a Box for Your Gun, Not Your Kid” and included television and radio announcements,

billboards, community-distributed materials, and discount coupons for lockboxes (Sidman et al., 2005). Campaign materials contained memorable images of an empty, child-sized coffin or an unlocked cabinet containing a handgun. The campaign materials were distributed to physicians, clinics, nursing organizations, churches, schools, parent-teacher conferences, and law enforcement offices (Sidman et al., 2005). The evaluation did not find the campaign to have statistically significant effects on improving safe storage practices.

Clinical Interventions

The Surgeon General's 2012 *National Strategy for Suicide Prevention* specifically states that one of its objectives is to "encourage providers who interact with individuals at risk for suicide to routinely assess for access to lethal means" (Office of the Surgeon General and National Action Alliance for Suicide Prevention, 2012). The report states that "providers can educate individuals with suicide risk and their loved ones about safe firearm storage and access." There is recent guidance about when and how physicians can counsel their patients on firearms (Wintemute, Betz, and Ranney, 2016), but such counseling is not often performed (Butkus and Weissman, 2014).

Rowhani-Rahbar, Simonetti, and Rivara (2016) identified five randomized controlled trials or quasi-experimental studies that evaluated clinical-based interventions designed to promote safe firearm storage practices. All interventions were conducted at family medicine or pediatric clinics in the United States, in which practitioners generally counseled families with children. Two of the trials, both of which provided a free safe storage device for firearms in addition to counseling, showed that the intervention improved safe storage (Carbone, Clemons, and Ball, 2005; Barkin et al., 2008). One of the trials that did not provide a free storage device also found positive effects (Stevens et al., 2002). On the other hand, there was no evidence that an intervention that provided counseling plus economic incentives (e.g., coupons for discounted locking devices) to encourage safe storage was effective (Grossman et al., 2000).¹

Conclusions

Safe storage of firearms may prevent suicide and unintentional injuries and deaths. As described in Chapter Ten, there is comparatively strong evidence that child-access prevention laws, which require safe storage practices, can effectively reduce suicides and unintentional injuries and deaths. Interventions other than laws may also success-

¹ A sixth study was not a clinical intervention per se but installed free long storage cabinets in western Alaska. Households that received a free cabinet installation improved safe storage of guns and ammunition (Grossman et al., 2012).

fully promote safe storage. Although education campaigns have been found to produce behavior change in other domains, evidence that they have successfully promoted safe storage of firearms is limited. On the other hand, there is evidence that clinicians who counsel patients (mostly families with children) can effectively promote safe storage practices, particularly if storage devices (e.g., gun locks) are given away for free.

Chapter Twenty References

Barkin, Shari L., Stacia A. Finch, Edward H. Ip, Benjamin Scheindlin, Joseph A. Craig, Jennifer Steffes, Victoria Weiley, Eric Slora, David Altman, and Richard C. Wasserman, "Is Office-Based Counseling About Media Use, Timeouts, and Firearm Storage Effective? Results from a Cluster-Randomized, Controlled Trial," *Pediatrics*, Vol. 122, No. 1, 2008, pp. E15–E25.

Brady Campaign to Prevent Gun Violence, "About Brady," web page, undated. As of January 10, 2016:

<http://www.bradycampaign.org/about-brady>

Brent, D. A., J. A. Perper, C. J. Allman, G. M. Moritz, M. E. Wartella, and J. P. Zelenak, "The Presence and Accessibility of Firearms in the Homes of Adolescent Suicides: A Case-Control Study," *JAMA*, Vol. 266, No. 21, 1991, pp. 2989–2995.

Brent, D. A., J. A. Perper, G. Moritz, M. Baugher, J. Schweers, and C. Roth, "Firearms and Adolescent Suicide—A Community Case-Control Study," *American Journal of Diseases of Children*, Vol. 147, No. 10, 1993b, pp. 1066–1071.

Butkus, Renee, and Arlene Weissman, "Internists' Attitudes Toward Prevention of Firearm Injury," *Annals of Internal Medicine*, Vol. 160, No. 12, 2014, pp. 821–827.

Carbone, Paul S., Conrad J. Clemens, and Thomas M. Ball, "Effectiveness of Gun-Safety Counseling and a Gun Lock Giveaway in a Hispanic Community," *Archives of Pediatrics and Adolescent Medicine*, Vol. 159, No. 11, 2005, pp. 1049–1054.

Conwell, Y., P. R. Duberstein, K. Connor, S. Eberly, C. Cox, and E. D. Caine, "Access to Firearms and Risk for Suicide in Middle-Aged and Older Adults," *American Journal of Geriatric Psychiatry*, Vol. 10, No. 4, 2002, pp. 407–416.

Everytown for Gun Safety Support Fund, "Be SMART," web page, 2017a. As of May 7, 2017: <http://besmartforkids.org/>

Grossman, David C., Peter Cummings, Thomas D. Koepsell, Jean Marshall, Luann D'Ambrosio, Robert S. Thompson, and Chris Mack, "Firearm Safety Counseling in Primary Care Pediatrics: A Randomized, Controlled Trial," *Pediatrics*, Vol. 106, No. 1, 2000, pp. 22–26.

Grossman, D. C., B. A. Mueller, C. Riedy, M. D. Dowd, A. Villaveces, J. Prodzinski, J. Nakagawara, J. Howard, N. Thiersch, and R. Harruff, "Gun Storage Practices and Risk of Youth Suicide and Unintentional Firearm Injuries," *JAMA*, Vol. 293, No. 6, 2005, pp. 707–714.

Grossman, David C., Helen A. Stafford, Thomas D. Koepsell, Ryan Hill, Kyla D. Retzer, and Ward Jones, "Improving Firearm Storage in Alaska Native Villages: A Randomized Trial of Household Gun Cabinets," *American Journal of Public Health*, Vol. 102, No. S2, 2012, pp. S291–S297.

McGee, K. S., T. Coyne-Beasley, and R. M. Johnson, "Review of Evaluations of Educational Approaches to Promote Safe Storage of Firearms," *Injury Prevention*, Vol. 9, No. 2, 2003, pp. 108–111.

Miller M., D. Azrael, D. Hemenway, and M. Vriniotis, "Firearm Storage Practices and Rates of Unintentional Firearm Deaths in the United States," *Accident Analysis and Prevention*, Vol. 37, No. 4, 2005, pp. 661–667.

National Cancer Institute, *The Role of the Media in Promoting and Reducing Tobacco Use*, Washington, D.C.: U.S. Department of Health and Human Services, National Institutes of Health, No. 07-6242, 2008.

National Shooting Sports Foundation, "Project ChildSafe," web page, 2016. As of January 10, 2017: <http://www.projectchildsafe.org/>

Noar, Seth M., Christina N. Benac, and Melissa S. Harris, "Does Tailoring Matter? Meta-Analytic Review of Tailored Print Health Behavior Change Interventions," *Psychological Bulletin*, Vol. 133, No. 4, 2007, pp. 673–693.

Office of the Surgeon General and National Action Alliance for Suicide Prevention, *National Strategy for Suicide Prevention: Goals and Objectives for Action: A Report of the U.S. Surgeon General and of the National Action Alliance for Suicide Prevention*, Washington, D.C.: U.S. Department of Health and Human Services, 2012.

Rowhani-Rahbar, Ali, Joseph A. Simonetti, and Frederick P. Rivara, "Effectiveness of Interventions to Promote Safe Firearm Storage," *Epidemiologic Reviews*, Vol. 38, No. 1, 2016, pp. 111–124.

Shenassa, E. D., M. L. Rogers, K. L. Spalding, and M. B. Roberts, "Safer Storage of Firearms at Home and Risk of Suicide: A Study of Protective Factors in a Nationally Representative Sample," *Journal of Epidemiology and Community Health*, Vol. 58, No. 10, 2004, pp. 841–848.

Sidman, Elanor A., David C. Grossman, Thomas D. Koepsell, Luann D'Ambrosio, John Britt, Evan S. Simpson, Frederick P. Rivara, and Abraham B. Bergman, "Evaluation of a Community-Based Handgun Safe-Storage Campaign," *Pediatrics*, Vol. 115, No. 6, 2005, pp. E654–E661.

Snyder, L. B., and M. A. Hamilton, "A Meta-Analysis of U.S. Health Campaign Effects on Behavior: Emphasize Enforcement, Exposure, and New Information, and Beware the Secular Trend," in R. C. Hornik, ed., *Public Health Communication: Evidence for Behavior Change*, New York: Lawrence Erlbaum Associates, Inc., 2002, pp. 357–383.

Stevens, Marguerite M., Ardis L. Olson, Cecelia A. Gaffney, Tor D. Tosteson, Leila A. Mott, and Pamela Starr, "A Pediatric, Practice-Based, Randomized Trial of Drinking and Smoking Prevention and Bicycle Helmet, Gun, and Seatbelt Safety Promotion," *Pediatrics*, Vol. 109, No. 3, 2002, pp. 490–497.

U.S. Department of Justice "Department of Justice Awards \$1 Million to the National Crime Prevention Council to Support Gun Safety Campaign," press release, March 7, 2013. As of January 10, 2016:

<https://www.justice.gov/opa/pr/departement-justice-awards-1-million-national-crime-prevention-council-support-gun-safety>

Wintemute, Garen J., Marian E. Betz, and Megan L. Ranney, "Yes, You Can: Physicians, Patients, and Firearms," *Annals of Internal Medicine*, Vol. 165, No. 3, 2016, pp. 205–213.

CHAPTER TWENTY-ONE

Restricting Access to Firearms Among Individuals at Risk for or Convicted of Domestic Violence or Violent Crime

Nearly half of all women murdered in the United States are killed by a current or former intimate partner, often with a firearm (Petrosky et al., 2017). In about 10 percent of these murders, the women had already been victims of violence in the preceding month (Petrosky et al., 2017). Under some definitions of mass shootings, more than half of the mass shootings between 2009 and 2016 involved domestic violence (Everytown for Gun Safety Support Fund, 2017b). Recognizing the potential lethality of domestic violence, many states have implemented laws designed to prevent domestic violence perpetrators from acquiring or retaining firearms. Chapter Three reviews the literature on background checks, and Chapter Eleven reviews the literature on surrender of firearms by prohibited possessors. Both types of policies can be applied to persons convicted of domestic violence offenses. In this chapter, we consolidate findings from research studies of the effects of laws designed to reduce intimate partner violence, several of which were described in Part B. We review five empirical studies identified during our full-text review (described in Chapter Two) that met our review criteria—that is, at a minimum, the study included (1) time-series data that were used to establish that policies preceded their apparent effects and (2) a control group or comparison group.

The Policy Defined

In 1994, Congress enacted the Violent Crime Control and Law Enforcement Act (Pub. L. 103-322), making it illegal to possess or receive a firearm while subject to a restraining order protecting an intimate partner or the child of an intimate partner. Subsequently, in 1996, the Lautenberg Amendment (Pub. L. 104-208) to the Gun Control Act of 1968 prohibited possession of a firearm by anyone who has been convicted of a misdemeanor crime of domestic violence, although not all domestic violence misdemeanors are covered. Both before and after the 1994 and 1996 federal law changes, many states enacted additional and sometimes more-stringent legislation related to the purchase or possession of guns by those under domestic violence restraining orders or who have been convicted of a misdemeanor domestic violence offense.

These domestic violence–related “prohibited-possessor” restrictions are one form of a broad class of policy levers meant to reduce violent crime by limiting the availability of guns to individuals who are likely to use them criminally. Such requirements may result in prohibited possessors purchasing guns through other (unregulated or illegal) markets or relying more heavily on gun theft (instead of buying guns through the affected markets). On the other hand, restrictions on the legal market for gun purchase may have trickle-down effects on gun supply in illegal markets because many guns cross from legal to illegal markets. In the case of prohibited-possessor regulations related to domestic violence, these restrictions may also reduce violent crime by restricting the availability of guns to individuals who may have no criminal intent at the time of purchase and are unwilling to commit the act of illegally obtaining a gun but for whom access to a firearm may result in impulsive illegal violence.

Research Synthesis Findings

Vigdor and Mercy (2006) examined the effects on intimate partner homicide of two types of legislation: that which prohibits people under a domestic violence restraining order from purchasing or possessing a firearm and that which prohibits people who have been convicted of a misdemeanor domestic violence offense from possessing a firearm. The authors also examined laws that allow law enforcement officers to confiscate firearms at the scene of alleged domestic violence incidents. Their state-level analysis of intimate partner homicide rates from 1982 to 2002 found no effect of regulations related to domestic violence misdemeanors (or confiscation policies) but a statistically significant reduction in intimate partner violence from restraining order policies. The authors acknowledged that potentially dissimilar laws related to restraining order and misdemeanor convictions were grouped together in the analysis and that further research is needed to understand how differences in these policies and their enforcement influence their effectiveness. They also noted that the effect of federal law provisions (not estimated by Vigdor and Mercy, 2006) might dominate the effects of marginally more-restrictive state laws.

Similarly, Bridges, Tatum, and Kunselman (2008) examined the effects on intimate partner homicide of laws that prohibit people under a domestic violence restraining order from purchasing or possessing a firearm and others that prohibit people who have been convicted of a misdemeanor domestic violence offense from possessing a firearm. The authors used state-level data from 1995 to 1999 and found a reduction in family homicide rates from prohibited-possessor policies related to people under a restraining order, but they found no effect of the state policies related to misdemeanor domestic violence convictions. However, their narrow time frame means that identification of the effect of these policies came from just a handful of states that enacted relevant legislation during this period and that had both pre- and post-policy observations.

In addition to examining the effects of restricted access for those on domestic violence–related restraining orders or those convicted of misdemeanors, Zeoli and Webster (2010) studied the effects of state laws allowing police to confiscate firearms from a domestic violence incident, allowing police to make warrantless arrests for domestic violence restraining order violations, and mandating arrest for domestic violence restraining order violations. The authors analyzed data from 46 cities from 1979 to 2003 and found a reduction in intimate partner homicides from laws that restrict access to firearms for domestic violence–related restraining orders and laws that allow police to arrest restraining order violators.

Rather than estimating the effects of laws related to domestic violence restraining orders and misdemeanors, Sen and Panjamapirom (2012) examined the effect of whether a state, in its background check process, checks on restraining orders and misdemeanors. They found that the existence of these checks was associated with fewer firearm homicides.

Instead of focusing on the effects of state legislation, Raissian (2016) looked at the effect of the federal 1996 Lautenberg Amendment. She identified the effect of the federal law by exploiting variation across states in their assault statutes, which affected the applicability of the law. Specifically, at the time of the 1996 amendment, some states had only a general assault statute and others had both a general statute and a domestic violence statute. Defendants convicted under domestic violence statutes were subject to the gun ban and those convicted under a general statute were not—unless a circuit court ruling applied the ban to misdemeanor domestic violence defendants convicted of a general assault statute. This narrow interpretation of the applicability of the gun ban ended in 2009 with the Supreme Court’s *United States v. Hayes* decision. Raissian (2016) used this variation in the implementation dates of domestic violence gun bans to identify the effects of the ban on changes in intimate partner violence. The author found that intimate partner homicides and other family homicides declined when the federal law took effect barring firearm possession among those with a domestic violence misdemeanor conviction.

Conclusions

Policies that make it illegal for particular groups of people to purchase or possess guns are one form of a broad class of policy levers that attempt to reduce the incidence of criminal gun violence. Recent research evidence suggests that such laws targeting domestic violence offenders may reduce homicide rates. There is less-compelling evidence that laws permitting police to confiscate firearms at scenes of domestic violence reduce violence, although the extent to which police have used this authority is unclear.

Chapter Twenty-One References

Bridges, F. Stephen, Kimberly M. Tatum, and Julie C. Kunselman, "Domestic Violence Statutes and Rates of Intimate Partner and Family Homicide," *Criminal Justice Policy Review*, Vol. 19, No. 1, 2008, pp. 117–130.

Everytown for Gun Safety Support Fund, "Mass Shootings in the United States: 2009–2016," April 11, 2017b. As of May 3, 2017:
<http://everytownresearch.org/reports/mass-shootings-analysis/>

Petrosky, E., J. M. Blair, C. J. Betz, K. A. Fowler, S. P. Jack, and B. H. Lyons, "Racial and Ethnic Differences in Homicides of Adult Women and the Role of Intimate Partner Violence—United States, 2003–2014," *Morbidity and Mortality Weekly Report*, Vol. 66, No. 28, 2017, pp. 741–746.

Public Law 103-322, Violent Crime Control and Law Enforcement Act of 1994, 1994.

Public Law 104-208, Gun Ban for Individuals Convicted of a Misdemeanor Crime of Domestic Violence, 1996.

Raissian, Kerri M., "Hold Your Fire: Did the 1996 Federal Gun Control Act Expansion Reduce Domestic Homicides?" *Journal of Policy Analysis and Management*, Vol. 35, No. 1, Winter 2016, pp. 67–93.

Sen, B., and A. Panjamapirom, "State Background Checks for Gun Purchase and Firearm Deaths: An Exploratory Study," *Preventive Medicine*, Vol. 55, No. 4, 2012, pp. 346–350.

Vigdor, E. R., and J. A. Mercy, "Do Laws Restricting Access to Firearms by Domestic Violence Offenders Prevent Intimate Partner Homicide?" *Evaluation Review*, Vol. 30, No. 3, 2006, pp. 313–346.

Zeoli, A. M., and D. W. Webster, "Effects of Domestic Violence Policies, Alcohol Taxes and Police Staffing Levels on Intimate Partner Homicide in Large U.S. Cities," *Injury Prevention*, Vol. 16, No. 2, 2010, pp. 90–95.

CHAPTER TWENTY-TWO

Mass Shootings

In this chapter, we provide an overview of mass shootings, one of the eight outcomes examined in our research syntheses (Chapters Three through Fifteen). We first describe different approaches for defining a mass shooting and then discuss how using different definitions can influence estimates of mass shooting levels and trends. The information was collected from a targeted search of the literature separate from that described in Chapter Two of this report.

What Is a Mass Shooting?

In the 1980s, the Federal Bureau of Investigation (FBI) defined *mass murderer* as someone who “kills four or more people in a single incident (not including himself), typically in a single location” (Krouse and Richardson, 2015). However, the government has never defined *mass shooting* as a separate category, and there is not yet a universally accepted definition of the term. Thus, media outlets, academic researchers, and law enforcement agencies frequently use different definitions when discussing mass shootings, which can complicate our understanding of mass shooting trends and their relationship to gun policy. Table 22.1 provides examples of the variation in the criteria set by five of the most commonly referenced data sources on mass shootings in the United States.

Although there is no official standard for the casualty threshold that distinguishes a mass shooting from other violent crimes involving a firearm, a common approach in the literature is to adopt the FBI’s criteria for a mass murderer and set a casualty threshold of four fatalities by firearm, excluding the offender or offenders (Duwe, Kovandzic, and Moody, 2002; Krouse and Richardson, 2015; Gius, 2015c; Fox and Fridel, 2016). However, this categorization is not without controversy. It does not capture incidents in which fewer than four victims were killed but additional victims were injured, and it does not include multiple-victim homicides in which fewer than four fatalities resulted from gunshots but additional fatalities occurred by other means. Additionally, the FBI classification of mass murderer was established primarily with the aim of clarifying criminal profiling procedures, not for the purpose of data collection or statistical

Table 22.1
Variation in How Mass Shootings Are Defined and Counted

Source	Casualty Threshold (for injuries or deaths by firearm)	Location of Incident	Motivation of Shooter	Number of U.S. Mass Shootings in 2015
<i>Mother Jones</i> (see Follman, Aronsen, and Pan, 2017)	Three fatal injuries (excluding shooter) ^a	Public	Indiscriminate (excludes crimes of armed robbery, gang violence, or domestic violence)	7
Gun Violence Archive (undated)	Four fatal or nonfatal injuries (excluding shooter)	Any	Any	332
Mass Shooting Tracker (undated)	Four fatal or nonfatal injuries (including shooter)	Any	Any	371
Mass Shootings in America database (Stanford Geospatial Center, undated)	Three fatal or nonfatal injuries (excluding shooter)	Any	Not identifiably related to gangs, drugs, or organized crime	65
Supplementary Homicide Reports (FBI) (see Puzzanhera, Chamberlin, and Kang, 2017)	The FBI's Supplementary Homicide Reports do not define <i>mass shooting</i> but do provide information on the number of victims, and the reports have been used by researchers in conjunction with news reports or other data sources.			

^a Before January 2013, the casualty threshold for *Mother Jones* was four fatal injuries (excluding the shooter).

analysis (Ressler, Burgess, and Douglas, 1988). Thus, many have chosen alternative definitions of casualty thresholds for mass shootings. For instance, Lott and Landes (2000) adopted the definition of two or more injured victims, the Gun Violence Archive (undated) defined *mass shooting* as an incident in which four or more victims (excluding the shooter) are injured or killed, and Mass Shooting Tracker (undated) set a criterion of four or more people injured or killed (including the shooter).

Another definitional disagreement is whether to include multiple-victim shooting incidents that occur in connection with some other crime or domestic dispute. Because mass shootings that stem from domestic and gang violence are contextually distinct from high-fatality indiscriminate killings in public venues, some have argued that they should be treated separately. In their analyses of “mass public shootings,” Lott and Landes (2000) excluded any felony-related shooting, and Duwe, Kovandzic, and Moody (2002) excluded incidents where “both the victims and offender(s) were involved in unlawful activities, such as organized crime, gang activity, and drug deals” (p. 276). Similarly, Gius (2015c) restricted analysis to events that occurred in a relatively public area and in which victims appeared to have been selected randomly. However, others have claimed that this narrow definition ignores a substantial proportion

of gun-related violence from family- or felony-related murder (Fox and Levin, 2015). Data collection efforts by Mass Shooting Tracker and the Gun Violence Archive thus counted all incidents that met their designated casualty threshold as mass shootings, regardless of the circumstances that led to the event.

These definitions matter. Depending on which data source is referenced, there were seven, 65, 332, or 371 mass shootings in the United States in 2015 (see Table 22.1), and those are just some examples. More-restrictive definitions (e.g., *Mother Jones*) focus on the prevalence of higher-profile events motivated by mass murder, but they omit more-common incidents occurring in connection with domestic violence or criminal activity, which make up about 80 percent of mass shooting incidents with four or more fatally injured victims (Krouse and Richardson, 2015). Broader definitions (e.g., Mass Shooting Tracker) provide a more comprehensive depiction of the prevalence of gun violence, but they obscure the variety of circumstances in which these incidents take place and their associated policy implications. Furthermore, if the effects of a firearm policy are expected to affect only public mass shooting incidents, then analysis that includes domestic violence mass shootings in the outcome measure could obscure identification of significant effects that would be found in a more targeted analysis of public mass shootings alone. There is thus value in having multiple measurements of mass shootings—but only if their definitions are clearly and precisely explained and they are used by researchers in a manner appropriate to the analysis.

Are Mass Shootings on the Rise?

In 2014, the FBI released a study showing that “active shooting incidents” had increased at an average annual rate of 16 percent between 2000 and 2013 (Blair and Schweit, 2014). In contrast to the varied definitions for mass shootings, there is an agreed-upon definition among government agencies for *active shooter*: “an individual actively engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearm(s) and there is no pattern or method to their selection of victims” (U.S. Department of Homeland Security, 2008, p. 2). Using a modified version of this definition to include incidents that had multiple offenders or occurred in confined spaces, Blair and Schweit (2014) found that active shootings had increased from only one incident in 2000 to 17 in 2013.

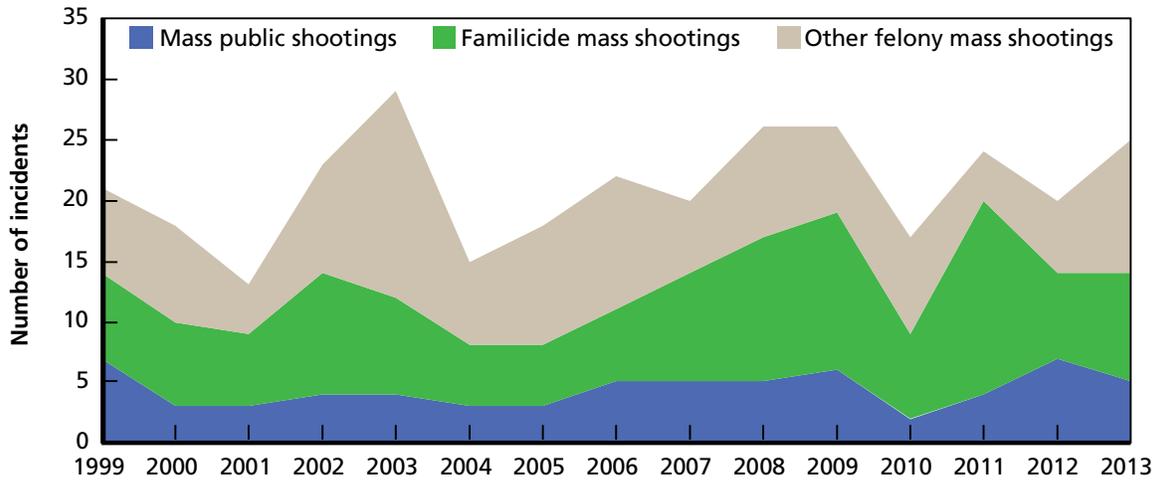
The FBI study (Blair and Schweit, 2014) highlighted several key issues in determining trends in mass shootings. First, the absence of a systematic definition of mass shootings can lead to misinterpretation of reported evidence. While the study explicitly stated, “This is not a study of mass killings or mass shootings” (p. 5), extensive media coverage cited the study as evidence of a sharp rise in mass shootings and mass shooting fatalities (Lott, 2015). However, the definition of an *active-shooter incident* is broader than any of the commonly used criteria for mass shootings (see Table 22.1) because it

does not set any casualty threshold. Of the 160 active-shooter incidents included in the FBI's analysis, 7 percent resulted in zero casualties, 20 percent resulted in zero fatalities, and 22 percent resulted in a single fatality (Lott, 2015). Setting a threshold of zero victims increases the potential for measurement error, because shooting incidents with no casualties are more difficult to identify from police records and are less likely to receive media coverage (Duwe, Kovandzic, and Moody, 2002). Additionally, because it should be relatively easier to identify more-recent shootings with few fatalities, a low casualty threshold will tend to systematically bias estimates of the number of shootings upward over time. For example, the Stanford Mass Shootings in America database, which relies solely on online media sources to identify mass shooting events, cautions its users, "Data in the [database] spans a time period that includes the transition from traditional media to digital media in reporting. Numbers of incidents per year should at least in part be assumed to reflect this collection methodology and not just changes in incident frequency." Thus, the more than threefold surge in mass shooting incidents from 2014 to 2015 shown in the Stanford data likely reflects increased online reporting and not necessarily a true increase in the rate of mass shootings.

Even when a more restrictive casualty threshold of four or more fatally injured victims (excluding the shooter) is imposed, empirical evidence on trends in these incidents varies depending on whether the motivation of the shooter is included as a criterion for considering an event a mass shooting. In their analysis of mass shooting trends from 1999 to 2013, Krouse and Richardson (2015) distinguished between mass shootings occurring in public locations that are indiscriminate in nature ("mass public shootings"), mass shootings in which the majority of victims are members of the offender's family and that are not attributable to other criminal activity ("familicide mass shootings"), and mass shootings that occur in connection to some other criminal activity ("other felony mass shootings"). Figures 22.1 and 22.2 show trends in these types of mass shooting incidents and fatalities, respectively, using the data provided in Krouse and Richardson (2015). Extending the data back to the 1970s, two studies found evidence of a slight increase in the frequency of mass public shootings over the past three decades (Cohen, Azrael, and Miller, 2014; Krouse and Richardson, 2015). However, using an expanded definition that includes domestic- or felony-related killings, there is little evidence to suggest that mass shooting incidents or fatalities have increased (Cohen, Azrael, and Miller, 2014; Krouse and Richardson, 2015; Fox and Fridel, 2016). Thus, different choices about how to define a mass shooting result in different findings for both the prevalence of these events at a given time and whether their frequency has changed over time.

Definitional issues aside, the relative rarity of mass shooting events makes analysis of trends particularly difficult. Chance variability in the annual number of mass shooting incidents makes it challenging to discern a clear trend, and trend estimates will be sensitive to outliers and to the time frame chosen for analysis. For example, while Krouse and Richardson (2015) found evidence of an upward trend in mass public

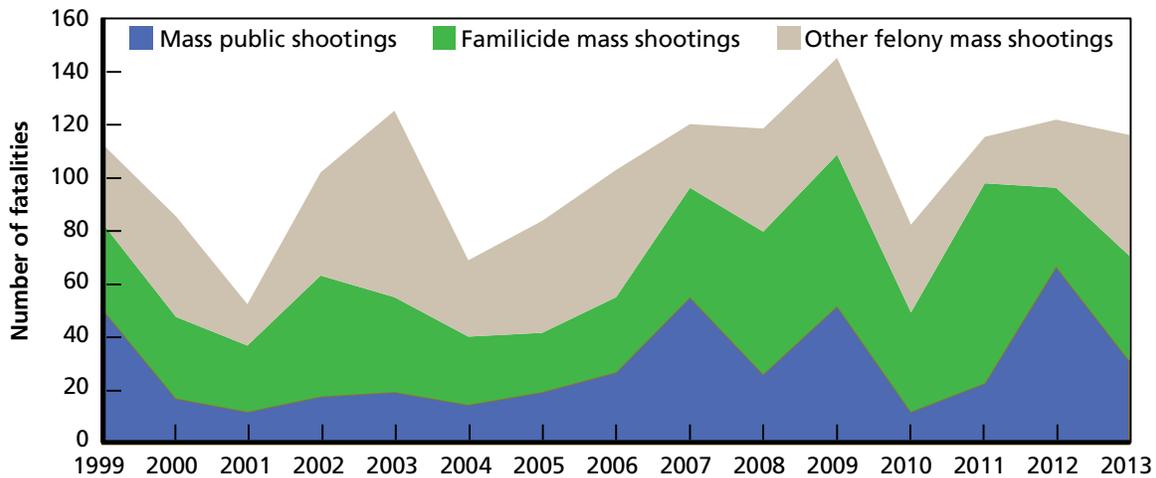
Figure 22.1
Trends in Mass Shooting Incidents, by Type of Incident



SOURCE: Adapted from data in Krouse and Richardson, 2015.

RAND RR2088-22.1

Figure 22.2
Trends in Mass Shooting Fatalities, by Type of Incident



SOURCE: Adapted from data in Krouse and Richardson, 2015.

RAND RR2088-22.2

shootings from 1999 to 2013, they noted that the increase was driven largely by 2012, which had an unusually high number of mass public shooting incidents. Additionally, Lott (2015) showed that the FBI study’s estimate of a dramatic increase in active-shooter incidents was largely driven by the choice of 2000 as the starting date, because that year had an unusually low number of shooting incidents; extending the analysis to cover 1977 onward and adjusting the data to exclude events with fewer than two

fatalities, Lott (2015) found a much smaller and statistically insignificant increase (less than 1 percent annually) in mass shooting fatalities over time.

Conclusions

While different choices about how to define a mass shooting and the period over which to calculate mass shooting trends have resulted in disagreement about whether the frequency of mass shootings has risen, there is clear evidence that the media's use of the term *mass shooting* has increased significantly over recent decades (Roeder, 2016). Unfortunately, the ambiguity in how mass shootings are defined and counted may result in increased media coverage influencing public perception without better informing our understanding of the prevalence of mass shootings or their determinants, trends, social costs, or policy implications.

Chapter Twenty-Two References

- Blair, J. Pete, and Katherine W. Schweit, *A Study of Active Shooter Incidents, 2000–2013*, Washington, D.C.: Texas State University and Federal Bureau of Investigation, U.S. Department of Justice, 2014.
- Cohen, Amy P., Deborah Azrael, and Matthew Miller, “Rate of Mass Shootings Has Tripled Since 2011, Harvard Research Shows,” *Mother Jones*, October 15, 2014.
- Duwe, Grant, Tomislav Kovandzic, and Carlisle E. Moody, “The Impact of Right-to-Carry Concealed Firearm Laws on Mass Public Shootings,” *Homicide Studies*, Vol. 6, No. 4, 2002, pp. 271–296.
- Follman, Mark, Gavin Aronsen, and Deanna Pan, “U.S. Mass Shootings, 1982–2017: Data from *Mother Jones’* Investigation,” *Mother Jones*, June 14, 2017. As of August 25, 2017: <http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data/>
- Fox, James A., and Emma E. Fridel, “The Tenuous Connections Involving Mass Shootings, Mental Illness, and Gun Laws,” *Violence and Gender*, Vol. 3, No. 1, 2016, pp. 14–19.
- Fox, James A., and Jack Levin, *Extreme Killing: Understanding Serial and Mass Murder*, 3rd ed., Thousand Oaks, Calif.: Sage Publications, 2015.
- Gius, Mark, “The Impact of State and Federal Assault Weapons Bans on Public Mass Shootings,” *Applied Economics Letters*, Vol. 22, No. 4, 2015c, pp. 281–284.
- Gun Violence Archive, homepage, undated. As of October 20, 2016: <http://www.gunviolencearchive.org/>
- Krouse, William J., and Daniel J. Richardson, *Mass Murder with Firearms: Incidents and Victims, 1999–2013*, Washington, D.C.: Congressional Research Service, R44126, 2015.
- Lott, John R., Jr., “The FBI’s Misinterpretation of the Change in Mass Public Shootings,” *ACJS Today*, Vol. 40, No. 2, 2015, pp. 18–29.
- Lott, John R., Jr., and William Landes, “Multiple Victim Public Shootings,” 2000 (unpublished). As of June 29, 2017: http://www.shack.co.nz/pistoltaupo/SSRN_ID272929_code010610560.pdf
- Mass Shooting Tracker, homepage, undated. As of October 20, 2016: <https://www.massshootingtracker.org>
- Puzzanchera, C., G. Chamberlin, and W. Kang, “Easy Access to the FBI’s Supplementary Homicide Reports: 1980–2014,” Office of Juvenile Justice and Delinquency Prevention, 2017. As of March 22, 2017: <https://www.ojjdp.gov/ojstatbb/ezashr/>
- Ressler, Robert K., Ann W. Burgess, and John E. Douglas, *Sexual Homicide: Patterns and Motives*, New York: Simon and Schuster, 1988.
- Roeder, Oliver, “The Phrase ‘Mass Shooting’ Belongs to the 21st Century,” *FiveThirtyEight*, January 21, 2016. As of January 12, 2017: <http://fivethirtyeight.com/features/we-didnt-call-them-mass-shootings-until-the-21st-century/>
- Stanford Geospatial Center, “Mass Shootings in America,” Stanford, Calif.: Stanford University Libraries, undated. As of October 20, 2016: <https://library.stanford.edu/projects/mass-shootings-america>
- U.S. Department of Homeland Security, *Active Shooter: How to Respond*, Washington, D.C., October 2008.

CHAPTER TWENTY-THREE

Defensive Gun Use

In the United States, self-protection is a predominant reason that many people choose to own a gun (Masters, 2016). For some gun owners, the self-defense utility they derive from ownership is *potential* in nature; that is, gun ownership provides them with comfort in knowing that they will be able to defend themselves in the face of some future possible criminal threat. For others, the self-defense utility is *realized*—they have used their guns defensively in the context of an actual criminal threat. In this chapter, we focus on, and provide an overview of, the latter outcome—the realized utility of gun ownership through defensive gun use (DGU).

Unlike other outcomes that we analyze, such as suicide and homicide, DGU is not itself an outcome of interest. Rather, DGU is important because it is a mechanism through which gun owners hope to reduce harms to themselves or others, such as through a reduction in the probability of victimization; the probability of injury, conditional on a crime being committed; or the severity of injury, conditional on both a crime being committed and an injury occurring.

In this chapter, our focus is on reviewing the literature that examines the effect of DGU on these outcomes of interest. We note that one overarching challenge in this literature is defining the appropriate counterfactual. When we estimate the effect of DGU on the probability of being a victim of a crime or on the probability of injury or severity of injury, are we interested in the estimate of DGU compared with an alternative outcome resulting from *no action* by the intended victim, compared with resistance but without any weapon, or compared with resistance but with a different weapon? Differences in counterfactuals are important for understanding differences in results across studies in the effect of DGU.

A second overarching issue—and one that affects not only the literature examining how DGU affects victimization and injury but also studies on the effect of gun policies on DGU—is determining *what is meant by DGU*. Different conceptualizations of DGU abound. Consequently, measures of DGU vary tremendously, depending on the conceptualization being used. Additionally, as in many cases in the literature on gun policy, measurement is complicated and limited by data availability, even for a given DGU definition.

In this chapter, we summarize the literature and evidence on these issues. First, we describe definitional challenges related to DGU. Second, we describe challenges related to measuring DGU. Third, we examine the literature that estimates the effect of DGU on outcomes, such as victimization and injury. The information in this chapter was collected from a targeted search of the literature separate from that described in Chapter Two of this report.

What Is Defensive Gun Use?

It is difficult to start a narrative on the prevalence of DGU without first defining the term, but defining DGU is no simple task. The 2004 National Research Council (NRC) report on firearms and violence explains the difficulties:

Self-defense is an ambiguous term that involves both objective components about ownership and use and subjective features about intent (National Research Council, 1993). Whether one is a defender (of oneself or others) or a perpetrator, for example, may depend on perspective. Some reports of defensive gun use may involve illegal carrying and possession (Kleck and Gertz, 1995; [Kleck, 2001]), and some uses against supposed criminals may legally amount to aggravated assault (Duncan, 2000a, 2000b; [McDowall, Loftin, and Presser, 2000; Hemenway, Azrael, and Miller, 2000]; Hemenway and Azrael, 2000). Likewise, protecting oneself against possible or perceived harm may be different from protecting oneself while being victimized. (NRC, 2004, p. 106)

Understanding the ambiguity is critical because the same factors that complicate defining DGU present difficulties in measuring its prevalence. DGU has primarily been defined in the empirical literature through the use of surveys. Within these surveys, DGUs are often defined as incidents that involve protection against humans (i.e., not animals); gun use by civilians (e.g., not military, police, or security personnel); contact between persons rather than suspicious circumstances only; specific crimes; and actual use of a gun, at least as a visual or verbal threat. There is, of course, some variation even within these parameters. For example, some surveys define DGU only within the context of certain crimes having been committed, while others include a broader set of crimes, as well as suspected and averted crimes. Perceptions about the incident and an individual's role are important because much of the literature relies on self-reports: The respondent must have perceived there to have been a crime (or, in some surveys, a suspected or averted crime) and must consider himself or herself a victim rather than a mutual combatant. Even such stringent definitions, however, may not be sufficient to determine whether the event was lawful, legitimate, or desirable from a social perspective.

What Are the Challenges in Measuring Defensive Gun Use?

The extensive and conflicting literature on the prevalence of DGU was summarized by the NRC (2004) report:

Over the past decade, a number of researchers have conducted studies to measure the prevalence of defensive gun use in the population. However, disagreement over the definition of defensive gun use and uncertainty over the accuracy of survey responses to sensitive questions and the methods of data collection have resulted in estimated prevalence rates that differ by a factor of 20 or more. These differences in the estimated prevalence rates indicate either that each survey is measuring something different or that some or most of them are in error. (pp. 6–7)

The NRC report summarized the major methodological challenges to studying DGU, and these challenges have received limited attention since then. Given the preponderance of survey evidence in this literature, we focus on the major methodological concerns regarding survey-based measurement. We highlight differences between the National Crime Victimization Survey (NCVS)—a national survey that is administered twice per year by the Bureau of Justice Statistics and that provides among the most-conservative estimates of DGU—and private gun surveys that have been conducted at only one point in time, such as the National Self Defense Survey (NSDS; Kleck and Gertz, 1995) conducted in 1993 or the National Survey of Private Ownership of Firearms (NSPOF; Cook and Ludwig, 1996) conducted in 1994, which provide among the least-conservative estimates. As NRC (2004) describes, definitional differences and survey differences have resulted in wide-ranging estimates. For example, McDowall, Loftin, and Wiersema (1998) estimated that there were 116,000 DGU incidents annually using the NCVS, while Kleck and Gertz (1995) estimated between 2.2 million and 2.5 million DGUs annually, of which between 1.5 million and 1.9 million involved handguns. In this section, we summarize key factors that underlie these large differences in DGU estimates, including the scope of included incidents, survey sample size and response rates, and challenges related to estimating the prevalence of rare events.

Scope of Included Incidents

A major difference between the NCVS and private surveys is the scope of included events. In the NCVS, questions about defensive or self-protective actions are asked only of those who first reported that they had been the victims of certain personal contact crimes—even if those crimes had not been completed. These personal contact crimes include rape, assault, burglary, personal and household larceny, and car theft. As a result, respondents in several other categories are not given the opportunity to report defensive action. Among the potentially excluded respondents are those reporting incidents involving other crimes (e.g., trespassing, commercial crimes), victims of

crimes in the included categories but who did not report those crimes earlier in the interview,¹ and those reporting incidents that were not completed crimes (e.g., suspected crimes). Also, it is important to note that the NCVS does not ask directly about gun use. Rather, it simply asks the respondents to indicate what, if anything, they did in response to the crime. By not asking directly about gun use, it is possible that some respondents may fail to report a gun-related event, especially one that did not result in harm. Relatedly, there is concern that the NCVS may undercount individuals involved in criminal or other deviant behaviors—a group that may have higher rates of victimization and DGU (McDowall and Wiersema, 1994).

On the other hand, private gun surveys, such as the NSDS and the NSPOF, generally ask all respondents directly about DGU, which allows the respondents to determine which incidents to report regardless of whether the incident involved a crime or not. This approach may allow for a more comprehensive assessment of the prevalence and nature of DGU but also may count as DGU events that are more ambiguous. For example, respondents may include such events as the use of a weapon (1) while investigating a suspicious noise but not actually seeing an individual or (2) to deter someone suspected of thinking about committing a crime. While the former may be eliminated by specifying in the survey question that the incident must involve contact with another person, the latter is based solely on the perception of the survey respondent.

Survey Samples and Response Rates

The NCVS provides a large sample of the noninstitutionalized U.S. population aged 12 or older (approximately 50,000 households and 100,000 individuals). Private surveys are typically much smaller. By comparison, the NSDS sample comprised 4,977 individuals aged 18 or older.² This is a stark difference considering that the NSDS is among the larger private gun surveys. The private NSPOF included 2,568 respondents.

The representativeness of the samples may also differ. The NCVS typically has a very high response rate—up to 95 percent of eligible households. Private gun surveys tend to have lower response rates. For the NSDS, 61 percent of eligible phone numbers answered by a human completed a survey. Lower response rates may influence the representativeness of the sample and the validity of the findings. Because we often do not know very much about the individuals who did not respond, it is difficult to infer how their absence affects the findings. But the higher the response rate, the fewer individuals for whom there is no information and the less likely that there are differences between those who opted to participate in a survey about gun use and those who did not.

¹ There is some evidence that the NCVS underestimates the count of rapes, certain types of assaults, and even gunshot woundings (Cook, 1985; Loftin and MacKenzie, 1990; McDowall and Wiersema, 1994; NRC, 2014).

² The NSDS is a random digit-dialing survey and, hence, limited to individuals with phones.

It is important to note that all surveys may miss some components of the population and outcomes of interest. An obvious limitation is that surveys exclude those who suffer fatal injuries and thus cannot participate. Therefore, whether fatally injured persons engaged in a DGU and whether that played a role in their deaths cannot be addressed with survey data. That said, omission of those who died after DGU could result only in underestimates of the true rate of DGU.

Inaccuracies in Survey Estimates

There are compelling reasons to suspect that the true number of DGU events are exaggerated in surveys like the NSPOF and the NSDS. There are many implications of the especially high rates of DGU those surveys report that do not appear to be consistent with more-trusted sources of information. For instance, the NSDS estimates suggest that, while using a firearm for self-defense, U.S. residents likely injured or killed an opponent 207,000 times per year, but only about 100,000 people die or are treated for gunshot injuries in hospitals each year, most of whom either shot themselves or were victims of criminal assaults (Hemenway, 1997). Similarly improbable numbers of injuries are implied by self-reports of DGU in the NSPOF survey (Cook, Ludwig, and Hemenway, 1997).

Furthermore, the implied rates of DGU in response to specific crime types appear to be inconsistent with known rates of those crimes. For instance, Hemenway (1997) calculates that the 845,000 DGUs during burglaries implied by the NSDS exceeds the total estimate of burglaries that occurred against victims who owned guns, were home, and were awake when the crime occurred.

Kleck (1999) has defended the high DGU estimates, suggesting that there is greater reason to believe they represent underestimates than overestimates, because of survey respondents' reluctance to discuss their own potentially illegal behavior. He argued that all apparent inconsistencies are illusory. For instance, he suggests that the NSDS was underpowered for reliable estimates of the number of U.S. residents likely killed or injured and that analysis of such a rare subset of the DGU phenomena will naturally be less reliable than the overall DGU estimates. This is a reasonable argument, but the apparently extreme overestimate of DGU injuries raises the question of whether the confidence intervals for the estimate of 207,000 injuries and deaths could span any plausible values. This cannot, however, be calculated from the information provided in the NSDS report. If the confidence interval does not span plausible figures, this would reinforce the view that the NSDS and NSPOF yield overestimates. Kleck (1999) also argues that many gunshot injury victims avoid hospital treatment because they fear it may expose them to legal jeopardy. If, however, the number of such injuries were 207,000 per year, this would entail an implausibly large number and proportion of all injured parties foregoing medical treatment.

In response to the apparently implausible number of crimes of specific types at which DGUs were reported, Kleck (1999) notes that estimates of the number of

burglaries, rapes, and other crimes are known to be underestimates—and sometimes large underestimates, as with sexual assaults and domestic violence. Therefore, because we do not know the true number of burglaries and other crimes, “we cannot possibly know if any given DGU estimate is implausibly large relative to these unknown (and possibly unknowable) quantities” (Kleck, 1999, p. 115). Concluding that the estimated number of DGUs in response to burglaries is implausibly high requires, as Kleck notes, some assumptions about the plausible magnitude of underreporting of burglaries. As with the estimate of 207,000 DGU injuries and deaths, the assumptions required to reconcile the apparent inconsistencies are sufficiently extreme that we take such comparisons as evidence that the NSDS and NSPOF produce overestimates of the prevalence of DGU and associated phenomena, although the magnitude of this overestimate is not clear.

DGUs are rare events. In the NSDS sample of 4,977 individuals, which oversampled those most likely to be involved in DGU (e.g., men in southern and western states), 222 respondents reported DGU during the five-year recall and 66 during the past year. When events are rare, small errors in reporting can be problematic. Even a small false positive response rate can substantially influence prevalence measures. Moreover, for relatively rare events, equivalent rates of false negatives do not cancel out the inflationary effect of the false positives. For instance, if the true prevalence is 1 percent, and 1 percent of those who either experienced or did not experience a DGU incorrectly report their DGU experience, the resulting estimate will suggest that DGUs occur with twice the true prevalence.³ The fact that private gun surveys tend to ask everyone (rather than just crime victims, as in the NCVS) about DGU may cause such errors to be magnified (e.g., Ludwig, 2000). Indeed, some authors caution against extrapolating prevalence estimates from their own survey results because small reporting errors can lead to very large errors in prevalence estimates (e.g., Hemenway, Azrael, and Miller, 2000). Because private gun surveys question respondents only once, they can contribute to false positives due to telescoping—that is, individuals may report incidents that do not fall within the appropriate recall period (e.g., 12 months). Telescoping may substantially inflate the number of events (Andersen, Frankel, and Kasper, 1979; Cantor, 1989; Lehn and Skogan, 1984). The NCVS, on the other hand, interviews the same individuals every six months, which is a strategy to guard against telescoping because responses are checked against the individuals’ previous responses to avoid the same event being reported multiple times.

In response to concerns about false positives, some have argued that false negatives in the NCVS are also a concern. The NCVS is conducted face to face by someone working for a government agency rather than via the anonymous random digit-dialing

³ If true prevalence is t and the error rate is e , then the estimated prevalence will be the true prevalence minus the false negatives, plus the false positives: $t - et + e(1-t)$. If $t = 0.01$ and $e = 0.01$, estimated prevalence will be 1.98 times, or approximately twice, the true prevalence.

used by many private survey firms. The NCVS approach could yield more-accurate responses if individuals are less likely to exaggerate events that they believe are socially desirable in a nonanonymous, face-to-face interview (Ludwig, 2000; Hemenway, 1997). On the other hand, this approach may lead to underreporting if respondents are concerned about the legitimacy or legality of their gun use and the lack of anonymity. Indeed, there is evidence that a substantial share of those reporting DGU did not own a legal gun or have one in the household at the time of the incident, and many DGU incidents occurred outside the home, thereby implying gun-carrying. Furthermore, judicial review suggests that many DGU incidents may be illegal or socially undesirable (even if the individual was permitted or licensed and the incident truthfully reported) (see, for example, Kleck and Gertz, 1995; Cook and Ludwig, 1996, 1997, 1998; Hemenway, Azrael, and Miller, 2000).

As noted earlier, however, there are also good reasons to suspect that the NCVS underestimates the true number of DGUs. The NCVS provides an opportunity for respondents to describe DGUs only in the context of certain types of crimes. DGUs resulting from crimes not covered by the NCVS will likely be undercounted. DGUs may occur in the context of suspected crimes that respondents on the NCVS might not judge to qualify as events in which they were a victim of a crime, in which case those DGUs would be undercounted. At the time research on DGUs was being conducted, the NCVS did not explicitly ask crime victims whether they used a firearm to defend themselves. Thus, some DGUs might go uncounted if respondents choose not to volunteer their use of a gun when asked whether they attempted to resist the perpetrator (Kleck, 1999). Finally, NCVS respondents victimized while engaging in illegal activity may not volunteer these experiences, meaning any associated DGUs would not be counted (McDowall and Wiersema, 1994).

NCVS and NSDS estimates of the prevalence of DGU differ by an order of magnitude. In an effort to understand these differences, McDowall, Loftin, and Presser (2000) fielded both surveys in an experimental design to determine whether “survey methods account for the divergent results” or “the questions cover unrelated activities.” The goal was to compare across surveys rather than provide prevalence estimates, so the authors selected individuals to contact from commercial gun lists. Half the sample ($n = 1,522$) responded to the NCVS first and then the NSDS, while the other half ($n = 1,484$) completed the surveys in reverse order. Certain questions were standardized between surveys (e.g., one-year recall, specific question about gun use, only self-reports versus household reports) to eliminate them as sources of diverging results.

The conclusion was that the NCVS measures a particular dimension of DGU (self-protective behaviors in response to crime) while the NSDS measures a wider array of behaviors, which may include preemptive action in response to what may or may not have been an intended crime. DGU cases were more common in the NSDS even after excluding items that were clearly not self-defense (e.g., practice for self-defense). The NCVS identified 24 cases, and the NSDS identified between 48 and 72 cases (with

24 cases defined as ambiguous⁴). Regression analyses suggested that, even after standardizing some questions across surveys, the differences were not entirely attributable to their different scope but that other methods also contributed. Interviews with individuals who differed in their reports between surveys indicated that questions were not well understood, respondents were not clear on why they did not report an incident, or the incident did not involve serious harm.

Conclusions

Estimates for the prevalence of DGU span wide ranges and include high-end estimates—for instance, 2.5 million DGUs per year—that are not plausible given other information that is more trustworthy, such as the total number of U.S. residents who are injured or killed by guns each year. At the other extreme, the NCVS estimate of 116,000 DGU incidents per year almost certainly underestimates the true number. There have been few substantive advances in measuring prevalence counts or rates since the NRC (2004) report. The fundamental issues of how to define DGU and what method for obtaining and assessing those measurements is the most unbiased have not been resolved. As a result, there is still considerable uncertainty about the prevalence of DGU. Efforts to resolve the uncertainty provide insight into some, but not all, aspects of DGU measurement, which may drive the large differences in prevalence estimates. The difficulties of defining and measuring DGU have implications for understanding not only the prevalence of DGU but also the relationship between DGU and outcomes of interest, such as the probability of victimization and injury. We turn to the evidence on this question in the next section.

Does Defensive Gun Use Reduce Harm?

In theory, DGU provides individuals with additional means to protect themselves, their families, their property, and others from crimes. Police officers are issued firearms because society believes that they will be able to use those weapons effectively to produce similar defensive and protective benefits. The extent to which DGU actually reduces harm for individuals or society is controversial. NRC (2004) summarized what was known then about the effects of DGU:

The results suggest interesting associations: victims who use guns defensively are less likely to be harmed than those using other forms of self-protection. Whether these findings reflect underlying causal relationships or spurious correlations remains uncertain. Much of the existing evidence reports simple bivariate correlations, without controlling for any confounding factors. Kleck and DeLone (1993) rely on multivariate linear regression methods that implicitly assume that firearms

⁴ Ambiguous cases included incidents in which the respondent failed to provide sufficient details.

use, conditional on observed factors, is statistically independent of the unobserved factors influencing the outcomes, as would be the case in a classical randomized experiment. Is this exogenous selection assumption reasonable? Arguably, the decisions to own, carry, and use a firearm for self-defense are very complex, involving both individual and environmental factors that are related to whether a crime is attempted, as well as the outcomes of interest. The ability of a person to defend himself or herself, attitudes toward violence and crime, emotional well-being, and neighborhood characteristics may all influence whether a person uses a firearm and the resulting injury and crime. Thus, in general, it is difficult to be confident that the control variables account for the numerous confounding factors that may result in spurious correlations. Furthermore, the committee is not aware of any research that considers whether the finding is robust to a variety of methodological adjustments. Without an established body of research assessing whether the findings are robust to the choice of covariates, functional form, and other modeling assumptions, it is difficult to assess the credibility of the research to date.

Similar to the literature on the prevalence of DGU (see earlier discussion), there has been little additional work on this question since the NRC (2004) report.

Methods

When researching this topic, we included studies that provided an empirical estimate of whether DGU reduces harm, which is operationalized as perceptions of whether DGU affected crime completion, injury, level of injury, or property loss.

Findings

Using multivariate logistic regression with extensive controls to analyze the NCVS, Kleck and DeLone (1993) found that self-defense was associated with a lower probability of robbery completion and victim injury. However, the results were not always statistically significantly different from other forms of resistance. The results also indicated that victim resistance was significantly and negatively associated with the offender's choice of weapon. Offender gun use reduced the likelihood of the victims engaging in resistance (of any kind), which raises concerns that the decision to resist may not be independent. That is, the apparent relationship between DGU and improved outcomes may reflect the fact that DGUs are more likely to occur when offenders are not using guns, rather than because DGUs themselves produce better outcomes.

Examining robberies and assaults in NCVS data from 1992 to 1999, Schnebly (2002) used multinomial logit regression to examine whether DGU influences the likelihood of being injured and the severity of injury. DGU was associated with significantly lower odds of severe injury (odds ratio [OR] = 0.61; $p < 0.05$) and mild injury (OR = 0.49; $p < 0.05$) but not significantly associated with severe versus mild injury. The benefits of DGU were primarily found among men, in urban settings, and among higher-income respondents. However, the analyses did not account for the specifics of

other action taken by comparing DGU with no action or any other action combined, did not differentiate whether the injury occurred before or after the DGU, and could not control for other factors that might influence the decision to use a gun defensively. Moreover, assaults might be considered somewhat controversial in that they may involve mutual combat (albeit the respondent may perceive himself or herself to be the victim), whereas robberies have more clearly defined roles.

A later study by Tark and Kleck (2004) examined the association between DGU and property loss and between DGU and injury using NCVS data from 1992 to 2001. Multivariate logistic regression models found that when the victim attacked the offender with a gun, there was a lower risk of property loss for robberies, and when the victim threatened the offender with a gun, there was a lower risk of property loss for all included property crimes. These associations were generally not statistically significantly different from those of some other protective actions, such as the victim attacking or threatening the offender with a nongun weapon.

Tark and Kleck (2004) found that crime victims who resist attackers by any means are rarely injured after they initiate some form of active resistance. Considering just those confrontations in which victims initiate resistance before having been injured, the authors found no statistically significant reduction in injuries among those who threatened or attacked the assailant with a gun compared with those who called the police. Indeed, the only form of resistance that was significantly better than calling the police was running or hiding. There were no significant differences in victim injuries and whether victims threatened with or attacked with a gun.

There may be important differences between crimes in which victims are able to resist or resist before being injured and those in which they are not. Similarly, crimes in which victims are armed may differ systematically from those in which they are not. These differences raise questions about what causal effects of resistance, armed or otherwise, can be drawn from Tark and Kleck (2004)'s models. The authors acknowledged these challenges and responded by including a host of controls describing the offender, victim, and incident,⁵ but they acknowledged that the results could not necessarily be interpreted causally because of the lack of clear insight into how the decisions to resist and means of resistance were made, including the decisions on whether to own and to carry a gun.

⁵ Covariates included 16 self-protective actions, proxies for power differences (number of offenders, male offender, offender aged 15–29 while victim is under age 15 or over age 30, offender weapon [gun, knife, sharp object], and whether offender attacked victim), victim characteristics (owned the house, had a job last week or for two weeks in the past six months, aged 65 or older, married, high school diploma or higher, black, Asian, Hispanic, and number of victimizations in the past six months), offender characteristics (gang member, substance at time of incident, sexual partner of victim, acquaintance of victim, work acquaintance of victim, black, white, and repeat offender), and incident characteristics (urban, home, near home, public place [may have security], and others present).

Most recently, Hemenway and Solnick (2015b) provided additional evidence using NCVS data from 2007 to 2011. Among personal contact crimes, DGU was not uniquely beneficial in reducing injury or property loss, implying that it did not necessarily improve outcomes over other forms of resistance. With respect to injury, cross-tabulations indicated that victims who engaged in DGU were less likely to be injured (10.9 percent) relative to other self-protective action, but injury rates were similar to those who took no self-protective action (11 percent). And multivariate analyses controlling for a host of covariates indicated that DGU did not significantly improve the odds of no injury overall (OR = 0.67; not significant) relative to all incidents. Further, taking advantage of the chronology of results suggests that DGU did not improve the odds of no injury after self-protective action (OR = 1.28; not significant) relative to all incidents involving self-protective action.⁶ These findings suggest that DGU incidents may be intrinsically different from incidents that do not involve DGUs; for example, the incidents with DGU may involve escalating violence so that the defender has a greater opportunity to respond with a gun or is more aware or more able to respond quickly. With respect to property loss, individuals who took action were less likely to experience loss.⁷ DGU improved the odds of no property loss in robbery, larceny, and personal contact larceny relative to not taking that defensive action (OR range = 0.26 to 0.30; significant) but not necessarily relative to other defensive action.⁸ While this work is a recent and substantive contribution to the literature, there remain concerns about relying on self-reports and the difficulty of assessing situational differences between events that involved DGU and those that did not.

An important concern with survey reports is that the assessment of the outcome is provided by the same respondent who decided to engage in a particular action. Another fundamental concern is that the individuals who suffered the most harm are, by definition, excluded; that is, those who were fatally injured cannot self-report, so the extent to which DGU or other actions played a role cannot be explored.

Branas et al. (2009) took an entirely different approach to assessing the perceived benefits of DGU. They considered whether gun possession increased the likelihood that an individual was shot or killed in an assault. They assessed the circumstances surrounding 677 individuals shot in Philadelphia. The police determined that, in 6 percent of these cases, the victims had a gun in their possession at the time they were shot. The authors compared these cases with controls recruited by a survey firm via random digit-dialing and asked about gun possession at the time when matched cases had been shot; about 7 percent of controls had a gun in their possession. Comparing cases and

⁶ Control variables included defender (age, gender, urban/rural), incident (at home/away), and offender (male, had gun) characteristics.

⁷ The chronology of events was not available for property loss.

⁸ Some non-DGU protective actions produced similar and significant ORs, suggesting that DGU is not uniquely beneficial.

controls, Branas et al. (2009) found that when victims had a gun in their possession, they had 4.46 times higher odds of being shot compared with victims who had no gun. The authors' second set of results incorporated whether victims had a chance to defend themselves. Among those who had the opportunity to resist, those with a gun were even more likely to be shot than those without a gun. The authors noted, "Case participants with at least some chance to resist were typically either 2-sided, mutual combat situations precipitated by a prior argument or 1-sided attacks where a victim was face-to-face with an offender who had targeted him or her for money, drugs, or property." That is, an opportunity to resist does not necessarily mean that it was not mutual combat (versus defensive only).

The results suggest that gun possession may not be an effective way to ensure safety. But the decision to carry a gun is not random, which raises similar concerns about inferring causality as are present with survey-based studies: Individuals who decide to carry at a particular time or to use a gun within a specific circumstance may have considered themselves at greater risk for reasons that may be unobservable to the researcher.

Hemenway, Azrael, and Miller (2000) broadened the assessment of the benefits of DGU incidents by examining whether they represent legal and socially desirable events. The authors summarized DGU incidents in the Harvard Injury Control Research Center surveys and then sent these descriptions to five criminal court judges from California, Pennsylvania, and Massachusetts. Approximately half of the incidents were deemed potentially illegal and contrary to interests of society, even under the assumptions that the individual had a permit to own and carry and had characterized the situation honestly. Given that survey reports are already one-sided (e.g., incidents may involve mutual combat even though the individual perceives himself or herself as the victim) and that additional DGU incidents could not be summarized and evaluated because respondents refused details, the authors concluded that the majority of reported DGUs were likely illegal and contrary to society's interests.

Conclusions

There has been little empirical work since the NRC (2004) report, so the serious limitations in the literature remain largely unresolved. At first glance, individuals engaged in DGU appear less likely to lose property and suffer injury and more likely to report that their action helped the outcome. However, several important caveats emerge. First, it is not clear that DGU is uniquely beneficial relative to other actions. Second, given that the literature is largely based on cross-tabulations and relatively basic multivariate analyses, when associations are found between DGU and reduced injury, for instance, it is not clear whether this is due to a causal effect of the DGUs on reduced injury or whether the circumstances that make a DGU possible also make injury less likely. In the latter case, it may not be DGUs that reduce the likelihood of injury but rather unique features of the circumstances in which DGUs occur. For instance, individuals may be more likely to defend themselves with a weapon when they feel that they have

a greater opportunity to be successful in that defense, which may bias estimates toward a beneficial impact of gun use. Statistical models designed to identify the causal effect of DGUs on various outcomes have not yet been reported.

Survey-based analyses of the effects of DGU suffer from more-general limitations. For example, individuals reporting the outcomes were also the ones who made the decision to engage in DGU, which may influence their assessment. Furthermore, survey data cannot be used to assess the relationship between DGU and fatalities, because those killed during incidents cannot be included. And more broadly, it is unclear whether this literature, which rests largely on the NCVS, suffers from the limited generalizability of DGU events within its scope. It has been widely noted that DGUs not involving an included crime category are less likely to be captured by the NCVS. To the extent that these incidents have different outcomes or different characteristics, NCVS-based findings may not be generalizable. Efforts to use other sources of data, however, have encountered similar limitations regarding the size and representativeness of samples and the ability to identify the causal effects of DGU.

Finally, even if DGUs have a positive causal effect on such outcomes as injuries and property loss, it may still be the case that DGUs do not provide net societal benefits if many or most involve illegal use of firearms. Whether any net social harms outweigh the benefits to those individuals who succeed with legitimate or just DGU in protecting their own or others' well-being is a value judgment that society must make. Having better data on the frequency of legitimate and illegitimate DGU, and on the magnitude of harms and benefits associated with those events, would assist in making that judgment.

For these reasons, we conclude that the existing evidence for any causal effect of DGU on reducing harm to individuals or society is inconclusive.

Chapter Twenty-Three References

Andersen, Ronald, Martin R. Frankel, and Judith Kasper, *Total Survey Error: Applications to Improve Health Surveys*, San Francisco, Calif.: Jossey-Bass, 1979.

Branas, C. C., T. S. Richmond, D. P. Culhane, T. R. Ten Have, and D. J. Wiebe, "Investigating the Link Between Gun Possession and Gun Assault," *American Journal of Public Health*, Vol. 99, No. 11, 2009, pp. 2034–2040.

Cantor, D., "Substantive Implications of Longitudinal Design Features: The National Crime Survey as a Case Study," in D. Kasprzyk, G. Duncan, G. Kalton, and M. P. Singh, eds., *Panel Surveys*, New York: John Wiley, 1989, pp. 25–51.

Cook, Philip J., "The Case of the Missing Victims: Gunshot Woundings in the National Crime Survey," *Journal of Quantitative Criminology*, Vol. 1, No. 1, March 1985, pp. 91–102.

Cook, Philip J., and Jens Ludwig, *Guns in America: Results of a Comprehensive National Survey on Firearms Ownership and Use*, Washington, D.C.: Police Foundation, 1996.

———, *Guns in America: National Survey on Private Ownership and Use of Firearms: Research in Brief*, Rockville, Md.: National Institute of Justice, 1997.

———, "Defensive Gun Uses: New Evidence from a National Survey," *Journal of Quantitative Criminology*, Vol. 14, No. 2, 1998, pp. 111–131.

Cook, Philip J., Jens Ludwig, and David Hemenway, "The Gun Debate's New Mythical Number: How Many Defensive Uses Per Year?" *Journal of Policy Analysis and Management*, Vol. 16, No. 3, 1997, pp. 463–469.

Duncan, O. D., *As Compared to What? Offensive and Defensive Gun Use Surveys, 1973–1994*, Rockville, Md.: National Institute of Justice, working paper 185056, 2000a.

———, "Gun Use Surveys: In Numbers We Trust?" *Criminologist*, Vol. 25, No. 1, 2000b, pp. 1–6.

Hemenway, David, "Survey Research and Self-Defense Gun Use: An Explanation of Extreme Overestimates," *Journal of Criminal Law and Criminology*, Vol. 87, No. 4, 1997, pp. 1430–1445.

Hemenway, David, and Deborah Azrael, "The Relative Frequency of Offensive and Defensive Gun Uses: Results from a National Survey," *Violence and Victims*, Vol. 15, No. 3, 2000, pp. 257–272.

Hemenway, David, Deborah Azrael, and Matthew Miller, "Gun Use in the United States: Results from Two National Surveys," *Injury Prevention*, Vol. 6, No. 4, 2000, pp. 263–267.

Hemenway, David, and Sara J. Solnick, "The Epidemiology of Self-Defense Gun Use: Evidence from the National Crime Victimization Surveys 2007–2011," *Preventive Medicine*, Vol. 79, 2015b, pp. 22–27.

Kleck, Gary, "Degrading Scientific Standards to Get the Defensive Gun Use Estimate Down," *Journal on Firearms and Public Policy*, Vol. 11, 1999, pp. 77–138.

———, "The Nature and Effectiveness of Owning, Carrying and Using Guns for Self-Protection," in G. Kleck and D. B. Kates, eds., *Armed: New Perspectives on Gun Control*, New York: Prometheus Books, 2001.

Kleck, G., and M. A. DeLone, "Victim Resistance and Offender Weapon Effects in Robbery," *Journal of Quantitative Criminology*, Vol. 9, No. 1, 1993, pp. 55–81.

Kleck, Gary, and Marc G. Gertz, "Armed Resistance to Crime: The Prevalence and Nature of Self-Defense with a Gun," *Journal of Criminal Law and Criminology*, Vol. 86, No. 1, 1995, pp. 150–187.

Lehnen, R., and W. Skogan, *The National Crime Survey: Working Papers, Vol. 2: Methodological Studies*, Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics, 1984.

Loftin, Colin, and Ellen J. MacKenzie, "Building National Estimates of Violent Victimization," paper presented at the National Research Council Symposium on the Understanding and Control of Violent Behavior, Destin, Fla., April 1–6, 1990.

Ludwig, Jens, "Gun Self-Defense and Deterrence," *Crime and Justice: A Review of Research*, Vol. 27, 2000, pp. 363–417.

Masters, Kate, "Fear of Other People Is Now the Primary Motivation for American Gun Ownership, a Landmark Survey Finds," *The Trace*, September 19, 2016. As of October 13, 2017: <https://www.thetrace.org/2016/09/harvard-gun-ownership-study-self-defense/>

McDowall, D., C. Loftin, and S. Presser, "Measuring Civilian Defensive Firearm Use: A Methodological Experiment," *Journal of Quantitative Criminology*, Vol. 16, No. 1, 2000, pp. 1–19.

McDowall, D., C. Loftin, and B. Wiersema, "Estimates of the Frequency of Firearm Self Defense from the National Crime Victimization Survey," Albany, N.Y.: State University of New York, School of Criminal Justice, Violence Research Group Discussion Paper 20, 1998 (unpublished).

McDowall, D., and B. Wiersema, "The Incidence of Defensive Firearm Use by U.S. Crime Victims, 1987 Through 1990," *American Journal of Public Health*, Vol. 84, No. 12, 1994, pp. 1982–1984.

National Research Council, *Understanding and Preventing Violence*, A. J. Reiss and J. Roth, eds., Washington, D.C.: National Academies Press, 1993.

———, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

———, *Estimating the Incidence of Rape and Sexual Assault*, Washington, D.C.: National Academies Press, 2014.

NRC—See National Research Council.

Schnebly, Stephen M., "An Examination of the Impact of Victim, Offender, and Situational Attributes on the Deterrent Effect of Defensive Gun Use: A Research Note," *Justice Quarterly*, Vol. 19, No. 2, 2002, pp. 377–398.

Tark, Jongyeon, and Gary Kleck, "Resisting Crime: The Effects of Victim Action on the Outcomes of Crimes," *Criminology*, Vol. 42, No. 4, 2004, pp. 861–909.

CHAPTER TWENTY-FOUR

The Effects of the 1996 National Firearms Agreement in Australia on Suicide, Violent Crime, and Mass Shootings

Following a 1996 mass shooting in which 35 people in Tasmania, Australia, were killed, Australian states and territories reached the National Firearms Agreement (NFA) to adopt “a consistent set of firearm management principles into their own legislation and regulation” (McPhedran, 2016, p. 65). The principle features of the agreement, as described in a study on regulatory reform, were as follows:

- Ban on importation, ownership, sale, resale, transfer, possession, manufacture, or use of all self loading centre rifles, all self loading and pump action shotguns, and all self-loading rimfire rifles (some exemptions allowable to primary producers and clay target shooters)
- Compensatory buyback scheme through which firearm owners would be paid the market value for prohibited firearms handed in during a 12-month amnesty
- Registration of all firearms as part of integrated shooter licensing scheme
- Shooter licensing based on requirement to prove “genuine reason” for owning a firearm, including occupational use, demonstrated membership of an authorized target shooting club, or hunting (with proof of permission from a rural landowner)
- Licensing scheme based on five categories of firearms, minimum age of 18 years, and criteria for a “fit and proper person”
- New licence applicant required to undertake accredited training course in firearm safety
- As well as licence to own a firearm, separate permit required for each purchase of a firearm subject to a 28-day waiting period
- Uniform and strict firearm storage requirements
- Firearms sales to be conducted only through licensed firearm dealers and all records of sale to be provided to the police
- Sale of ammunition only for firearms for which purchaser is licensed and limitations on quantities purchased within time period. (Ozanne-Smith et al., 2004, pp. 282–283)

During the 12-month amnesty (the second principle in the list), Australia purchased back 695,940 newly prohibited firearms as of August 2001, and during a

second buyback, in 2003, 68,727 handguns were destroyed (Chapman, Alpers, and Jones, 2016).¹

The 2004 National Research Council (NRC) review of gun policies did not comment extensively on the Australian reform. The report referenced a 2003 study (Reuter and Mouzos, 2003) that estimated that approximately 20 percent of Australia's firearms were retrieved during the buyback but that these weapons did not account for a significant share of the prior homicides or violent crimes. Whereas Reuter and Mouzos (2003) found no evidence of a decline in homicides, violent crime, or total suicides after the buyback, they noted that, during the six post-law years, there “were no mass murders with firearms and fewer mass murders than in the previous period,” findings that NRC (2004) called “weak tests given the small numbers of such incidents annually.”

Methods

In our review, the available evidence of the effect of the NFA on mass shootings, homicides, and suicides all derives from the same preliminary source. McPhedran (2016) reviewed the effect of the NFA on homicide. Studies that were included had to meet the following criteria:

- Contain original quantitative data analysis (i.e., the author excluded summaries, representations, or replications of previously published work; letters to the editor; opinion pieces; literature reviews; legal analyses; media analyses; and the like).
- Focus specifically on firearm homicide in Australia.
- Include time-series data.
- Use formal statistical methods to detect legislative impacts or change over time.

Although McPhedran's review was limited to homicide, the five studies that were included in the review also examined suicide. Thus, we use the same five articles to examine these outcomes.

We also include additional studies for mass shootings and suicide identified in our search for U.S. policy effects (described in earlier chapters). Two studies—Chapman, Alpers, and Jones (2016) and Baker and McPhedran (2015)—are also relevant to homicide but were published the same year as or shortly before McPhedran (2016) and thus were not included in her review but are referenced here.

Because NFA principles were applied universally throughout Australia, researchers are generally unable to conduct case-control analyses, such as comparing outcomes

¹ The National Handgun Buyback Bill of 2003 prohibited handguns with (1) a barrel length of less than 100 mm for revolvers and 120 mm for semiautomatics, (2) a caliber in excess of .38 (except for specially accredited events), and (3) a shot capacity in excess of ten rounds.

in one Australian state that enacted a law with outcomes in another state that did not (McPhedran, 2016; Chapman et al., 2006). As a result, most researchers exploited changes over time to assess the effects of the law, although one examined changes in mass shootings in Australia versus New Zealand (McPhedran and Baker, 2011) and two examined regional variation: Ozanne-Smith et al. (2004) examined one Australian state (Victoria), which had firearm legislation in place prior to the NFA, relative to the rest of Australia, and Leigh and Neill (2010) examined variation in the number of guns in each state that were reportedly “bought back” and the association with suicide and homicide rates in those states.

Research Synthesis Findings

Suicide

McPhedran (2016) produced an evidence table, and we created a modified version of it that focuses on suicide (Table 24.1). Six of the studies found statistically significant evidence that suicide rates declined more rapidly after implementation of the NFA in 1996 than before. In addition, Leigh and Neill (2010) found that Australian states with the highest per capita rates of turning in banned guns also had greater declines in firearm suicides. These findings are consistent with the claim that the NFA reduced suicides in Australia (Baker and McPhedran, 2007; Baker and McPhedran, 2015; Chapman, Alpers, and Jones, 2016; Chapman et al., 2006; Klieve, Sveticic, and De Leo, 2009; Ozanne-Smith et al., 2004).

Two sets of findings, however, raise questions about whether these observed associations are attributable to a causal effect of the NFA. First, two models (McPhedran and Baker, 2012; Lee and Suardi, 2010) that used similar methods examined changes in suicide rates over time and failed to find evidence of a break at the time of the NFA, with one exception: McPhedran and Baker (2012) examined trends in population subgroups and found some evidence of a break in 1997 in firearm suicide trends among those aged 35–44, but the evidence was not robust across statistical tests.

Perhaps more importantly, three studies that did find reductions in firearm suicides also found statistically significant reductions in nonfirearm suicides (Chapman et al., 2006; Chapman, Alpers, and Jones, 2016; Baker and McPhedran, 2015). McPhedran and Baker (2012) also found significant breaks in the time series of hanging suicides in 1997 among those aged 15–24 and 25–34, and in 1998 among those aged 35–44. Although it is possible that the NFA caused reductions in firearm and nonfirearm suicides, the mechanism by which it may have had an effect on nonfirearm suicides was not obvious, nor would most public health experts predict such an effect. An alternative explanation for these findings is that factors other than the NFA led to changes in nonfirearm suicide rates around 1996, and these factors might also have had an effect on firearm suicide that was independent of the NFA’s effects. Another study found only

Table 24.1
Summary of Studies Examining the Effects of the National Firearms Agreement on Suicide in Australia

Study	Geographic Coverage	Statistical Method	Research Focus	Period	Available Statistical Information and Main Findings			
					Firearm Suicide	Nonfirearm Suicide	Total Suicide	
Ozanne-Smith et al., 2004	Focus on one Australian state (Victoria); comparisons performed against the rest of Australia	Poisson regression	Did trends differ between the different periods?	1979–2000	<ul style="list-style-type: none"> –31.7-percent change (a reduction) between 1979–1987 and 1988–1996 ($p = 0.008$) No statistical information provided for 1988–1996 and 1997–2000 or for 1979–1987 and 1997–2000 	Not available	Not available	
Chapman et al., 2006	Whole of Australia	Negative binomial regression	Did trends differ before and after 1997?	1979–2003	<ul style="list-style-type: none"> Trend before 1997: IRR = 0.970 (95% CI: 0.964, 0.977) Trend after 1997: IRR = 0.926 (95% CI: 0.892, 0.961) Ratio of slopes: IRR = 0.954 (95% CI: 0.922, 0.987); $p = 0.007$ (sig.) 	<ul style="list-style-type: none"> Trend before 1997: IRR = 1.023 (95% CI: 1.018, 1.029) Trend after 1997: IRR = 0.959 (95% CI: 0.951, 0.968) Ratio of slopes: IRR = 0.938 (95% CI: 0.920, 0.956); $p < 0.001$ (sig.) 	<ul style="list-style-type: none"> Trend before 1997: IRR = 1.010 (95% CI: 1.005, 1.015) Trend after 1997: IRR = 0.956 (95% CI: 0.948, 0.964) Ratio of slopes: IRR = 0.946 (95% CI: 0.930, 0.963); $p < 0.001$ (sig.) 	
Baker and McPhedran, 2007	Whole of Australia	Autoregressive integrated moving average (ARIMA), paired sample t -tests	Did trends differ before and after 1996?	1979–2004	<ul style="list-style-type: none"> Mean predicted rate (per 100,000) after 1996: 1.85 Mean observed rate (per 100,000) after 1996: 1.22 	<ul style="list-style-type: none"> Mean predicted rate (per 100,000) after 1996: 11.82 Mean observed rate (per 100,000) after 1996: 11.31 	Not available	<ul style="list-style-type: none"> $p < 0.001$ (sig.) $p = 0.21$ (n.s.)

Table 24.1—Continued

Study	Geographic Coverage	Statistical Method	Research Focus	Period	Available Statistical Information and Main Findings		
					Firearm Suicide	Nonfirearm Suicide	Total Suicide
Klieve, Svetlic, and De Leo, 2009	Queensland	Negative binomial regression	Did trends differ before and after 1996?	1988–2004	<ul style="list-style-type: none"> Queensland ratio of trends (1990–2004): 1.0072; $p = 0.7794$ (n.s.) Australia ratio of trends: 0.9672; $p = 0.0102$ (sig.) 	Not available	Not available
Lee and Suardi, 2010	Whole of Australia	ARIMA, Quandt (Chow), Bai and Perron	Were there changes in the time-series structure?	1915–2004	<ul style="list-style-type: none"> Quandt: no sig. break Bai and Perron: <ul style="list-style-type: none"> UDmax = 10.45; critical value = 8.88 ($p < 0.05$) WDmax = 10.68; critical value = 9.91 ($p < 0.05$)^a Estimated break date: 1987 (90% CI: 1978, 2001) 	<ul style="list-style-type: none"> Quandt: no sig. break Bai and Perron: <ul style="list-style-type: none"> UDmax = 3.97; critical value = 8.88 (n.s.) WDmax = 4.72; critical value = 9.91 (n.s.) 	Not available
Leigh and Neill, 2010	Whole of Australia, based on jurisdiction-level data	Linear regression Difference between averages for 1990–1995 and 1998–2003	What was the estimated effect of the number of guns handed in on firearm, nonfirearm, and total suicides?	1990–2003	<ul style="list-style-type: none"> 1990–1995 average death rate (per million) = 2.55 Implied change in death rate 1998–2003 (per million) = -1.9 (95% CI: -2.9, -0.8); $p = 0.004$ (sig.) 	<ul style="list-style-type: none"> 1990–1995 average death rate (per million) = 10.2 Implied change in death rate 1998–2003 (per million) = 1.7 (95% CI: -4.7, 8.2); $p = 0.532$ (n.s.) 	<ul style="list-style-type: none"> 1990–1995 average death rate (per million) = 12.7 Implied change in death rate 1998–2003 (per million) = -0.01 (95% CI: -6.2, 5.9); $p = 0.956$ (n.s.)

Table 24.1—Continued

Study	Geographic Coverage	Statistical Method	Research Focus	Period	Available Statistical Information and Main Findings		
					Firearm Suicide	Nonfirearm Suicide	Total Suicide
McPhedran and Baker, 2012	Whole of Australia	Zivot-Andrews, Quandt	Were there changes in the time-series structure?	1907–2007	<p>Zivot-Andrews:</p> <ul style="list-style-type: none"> • Estimated break date, ages 25–34: <ul style="list-style-type: none"> ◦ 1994 (intercept only, 1979–2007; $p < 0.05$) ◦ 1994 (intercept and trend, 1979–2007; $p < 0.05$) • Estimated break date, ages 35–44: <ul style="list-style-type: none"> ◦ 1993 (intercept only, 1979–2007; $p < 0.05$) ◦ 1997 (intercept and trend, 1979–2007; $p < 0.05$) <p>Quandt:</p> <ul style="list-style-type: none"> • Estimated break date 1997, ages 35–44 (1979–2007): Max F statistic = 3.90 (n.s.) 	<p>Results for suicide by hanging:</p> <p>Zivot-Andrews:</p> <ul style="list-style-type: none"> • Estimated break date, ages 15–24: <ul style="list-style-type: none"> ◦ 1987 (intercept only, 1907–2007; $p < 0.05$) ◦ 1997 (intercept and trend, 1979–2007; $p < 0.10$) • Estimated break date, ages 25–34: 1998 (intercept and trend, 1979–2007; $p < 0.01$) • Estimated break date, ages 35–44: 1998 (intercept and trend, 1979–2007; $p < 0.05$) <p>Quandt:</p> <ul style="list-style-type: none"> • Estimated break date 1987, ages 15–24 (1979–2007): Max F statistic = 176.38; $p < 0.01$ • Estimated break date 1987, ages 15–24 (1979–2007): Max F statistic = 63.20; $p < 0.01$ • Estimated break date 1987, ages 25–34 (1979–2007): Max F statistic = 54.90; $p < 0.01$ • Estimated break date 1988, ages 25–34 (1979–2007): Max F statistic = 14.20; $p < 0.01$ 	Not available

Table 24.1—Continued

Study	Geographic Coverage	Statistical Method	Research Focus	Period	Available Statistical Information and Main Findings		
					Firearm Suicide	Nonfirearm Suicide	Total Suicide
Baker and McPhedran, 2015	Whole of Australia	ARIMA	Did trends differ before and after 1996?	1979–2010	<ul style="list-style-type: none"> Mean predicted rate (per 100,000) after 1996: 1.50 Mean observed rate (per 100,000) after 1996: 1.05 	<ul style="list-style-type: none"> Mean predicted rate (per 100,000) after 1996: 12.35 Mean observed rate (per 100,000) after 1996: 10.64 	Not available
Chapman, Alpers, and Jones, 2016	Whole of Australia	Negative binomial regression	Did trends differ before and after 1996?	1979–2013	<ul style="list-style-type: none"> $p < 0.001$ (sig.) Ratio of trends = 0.981 (95% CI: 0.970, 0.993); $p = 0.001$ (sig.) Step change = 0.652 (95% CI: 0.582, 0.731); $p < 0.001$ (sig.) 	<ul style="list-style-type: none"> $p < 0.0.1$ (sig.) Ratio of trends = 0.981 (95% CI: 0.958, 0.973); $p < 0.001$ (sig.) Step change = 1.070 (95% CI: 0.988, 1.159); $p = 0.10$ (n.s.) 	<ul style="list-style-type: none"> Ratio of trends = 0.975 (95% CI: 0.968, 0.982); $p < 0.001$ (sig.) Step change = 1.004 (95% CI: 0.931, 1.083); $p = 0.90$ (n.s.)

NOTE: CI = confidence interval; IRR = incidence rate ratio; sig. = significant; n.s. = not significant.
 a UDmax and WDMmax are test statistics evaluating whether there is evidence that time-series data show a departure from their expected trendline.

nonsignificant declines in nonfirearm suicide rates after passage of the NFA, despite finding significant decreases in firearm suicides associated with the number of banned guns turned in across Australia's provinces and states (Leigh and Neill, 2010). The study did not show, however, that the declines in firearm suicide rates associated with turning in guns were significantly greater than the nonsignificant declines in nonfirearm suicides. Thus, although there is some evidence that the 1996 agreement reduced firearm suicides in Australia, studies also found significant reductions in nonfirearm suicides at the same time, calling into question whether it was the NFA or some other concurrent events that led to reductions in gun and nongun suicides.

Violent Crime

Australia's homicide rate was decreasing prior to the 1996 NFA. Thus, as reviewed by McPhedran (2016), the research focus has largely investigated whether the rate at which homicides were declining changed after the NFA was implemented (Baker and McPhedran, 2007; Chapman et al., 2006; Ozanne-Smith et al., 2004; Baker and McPhedran, 2015; Chapman, Alpers, and Jones, 2016). Other lines of research have examined the relationship between the number of firearms turned in during the buy-back period and firearm homicides (Leigh and Neill, 2010) and for any structural breaks in the rate of firearm homicides between 1915 and 2004 (Lee and Suardi, 2010). No study found statistically significant evidence that trends in firearm homicides changed from before to after implementation of the NFA.² However, Chapman, Alpers, and Jones (2016) found that the ratio of pre-law to post-law trends was statistically significant and less than one (suggesting a more rapid decline in the post-law period) for total homicide, nonfirearm homicide, and total firearm deaths (suicide and homicide). The greater declines in nonfirearm homicides led the authors to doubt whether any changes can be attributed to the NFA.

Mass Shootings

Two studies examined the impact of the NFA on mass shootings. Both studies indicated that there were mass shootings in Australia prior to enactment of the law, but there were none thereafter. Specifically, Chapman, Alpers, and Jones (2016)—which defined *mass shootings* as those in which five or more people, excluding the shooter, were killed by gunshot—found that there were 13 mass shooting incidents in Australia between 1979 and the NFA's implementation in 1996 but none between 1997 and May 2016. Using the broader definition of four or more people killed, McPhedran and Baker (2011) reported that there were 12 such incidents from 1980 to 1996 and none between 1997 and 2009. McPhedran and Baker (2011) also reported that there have been no mass shootings in New Zealand since 1997 (though three between 1980

² The relationship between number of guns returned in Leigh and Neill (2010) was also not statistically significant.

and 1996 and one in February 1997 while the gun buyback provisions of the NFA were being implemented in Australia), even though New Zealand did not introduce a similar ban on certain firearms. On the basis of this analysis, the authors suggest that reductions in mass shootings in Australia are not likely to be attributable to the NFA, because similar reductions were seen elsewhere without laws like the NFA. However, New Zealand did pass a law in 1992 (though not subsequently) tightening its regulation of guns. In other words, mass shootings in New Zealand declined from four in the years prior to and during implementation of the NFA in Australia to zero thereafter, and that reduction occurred shortly after imposing stricter gun legislation in New Zealand. Therefore, we do not view the McPhedran and Baker (2011) results as offering a strong refutation of the possibility that the NFA caused a reduction in mass shootings in Australia.

Conclusions

Analyses of the effects of Australia's NFA are limited by the lack of a comparison group—the exceptions being Leigh and Neill (2010) and McPhedran and Baker (2011). Attributing reductions in suicide and homicide rates to the NFA is complicated by the fact that these rates were decreasing even before the NFA was enacted. There is more evidence consistent with the claim that the NFA caused reductions in firearm suicides and mass shootings than reductions in violent crime, but there is also evidence that raises questions about whether those changes can be attributed to the NFA or to other factors that influenced suicide and mass shooting rates around the time the NFA was implemented.

Chapter Twenty-Four References

- Baker, Jeanine, and Samara McPhedran, "Gun Laws and Sudden Death: Did the Australian Firearms Legislation of 1996 Make a Difference?" *British Journal of Criminology*, Vol. 47, No. 3, 2007, pp. 455–469.
- , "Australian Firearm Related Deaths: New Findings and Implications for Crime Prevention and Health Policies Following Revisions to Official Death Count Data," *International Journal of Criminal Justice Sciences*, Vol. 10, No. 1, 2015, pp. 1–9.
- Chapman, S., P. Alpers, K. Agho, and M. Jones, "Australia's 1996 Gun Law Reforms: Faster Falls in Firearm Deaths, Firearm Suicides, and a Decade Without Mass Shootings," *Injury Prevention*, Vol. 12, No. 6, 2006, pp. 365–372.
- Chapman, Simon, Philip Alpers, and Michael Jones, "Association Between Gun Law Reforms and Intentional Firearm Deaths in Australia, 1979–2013," *JAMA*, Vol. 316, No. 3, 2016, pp. 291–299.
- Klieve, H., J. Svetcic, and D. De Leo, "Who Uses Firearms as a Means of Suicide? A Population Study Exploring Firearm Accessibility and Method Choice," *BMC Medicine*, Vol. 7, 2009.
- Lee, Wang-Sheng, and Sandy Suardi, "The Australian Firearms Buyback and Its Effect on Gun Deaths," *Contemporary Economic Policy*, Vol. 28, No. 1, 2010, pp. 65–79.
- Leigh, Andrew, and Christine Neill, "Do Gun Buybacks Save Lives? Evidence from Panel Data," *American Law and Economics Review*, Vol. 12, No. 2, 2010, pp. 462–508.
- McPhedran, Samara, "A Systematic Review of Quantitative Evidence About the Impacts of Australian Legislative Reform on Firearm Homicide," *Aggression and Violent Behavior*, Vol. 28, 2016, pp. 64–72.
- McPhedran, Samara, and Jeanine Baker, "Mass Shootings in Australia and New Zealand: A Descriptive Study of Incidence," *Justice Policy Journal*, Vol. 8, No. 1, 2011.
- , "Lethal and Non-Lethal Violence Against Women in Australia: Measurement Challenges, Conceptual Frameworks, and Limitations in Knowledge," *Violence Against Women*, Vol. 18, No. 8, 2012, pp. 958–972.
- National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.
- NRC—See National Research Council.
- Ozanne-Smith, J., K. Ashby, S. Newstead, V. Z. Stathakis, and A. Clapperton, "Firearm Related Deaths: The Impact of Regulatory Reform," *Injury Prevention*, Vol. 10, No. 5, 2004, pp. 280–286.
- Reuter, Peter, and Jenny Mouzos, "Australia: A Massive Buyback of Low-Risk Guns," in Jens Ludwig and Philip J. Cook, eds., *Evaluating Gun Policy: Effects on Crime and Violence*, Washington, D.C.: Brookings Institution Press, 2003, pp. 121–156.

PART D

Summary of Findings and Recommendations

CHAPTER TWENTY-FIVE

Summary and Conclusions

Although large majorities of Americans agree on the merits of some gun policies, gun policy is divisive in the United States. In this report, we have attempted to provide a rigorous and balanced assessment of what current scientific knowledge can tell the public and policymakers about the true effects of many gun policies that are frequently discussed in state legislatures. The most recent of such comprehensive attempts, conducted more than a dozen years ago, found the research base too thin to draw any conclusions about the effects of gun laws. Specifically, a committee of the National Research Council (NRC) found that the evidence was so weak and contradictory that no causal associations between the laws it examined and crime or violence could be determined (NRC, 2004). Separately, the Community Preventive Services Task Force “found the evidence available from identified studies was insufficient to determine the effectiveness of any of the firearms laws reviewed singly or in combination” (Hahn et al., 2005).

We have thoroughly updated and expanded on the findings in NRC (2004) and Hahn et al. (2005) with studies published between 2003 and spring 2016. We systematically reviewed all empirical research that examined the effects of 13 types of state gun policies on eight outcomes, including outcomes related to public health and safety and outcomes of interest to sport shooters, hunters, and those who work in the gun industry. We restricted our analysis to only those studies using methods designed to identify plausibly causal effects of the policies. After reviewing many thousands of candidate studies, we identified just 63 meeting our inclusion criteria (described in Chapter Two), of which 54 were published since 2003.

There is a need for a factual basis on which to make policy. This does not mean basing decisions just on facts about which policies will reduce homicides or suicides the most; it means basing decisions on an accurate understanding of the trade-offs that policies entail. To make fair and effective gun policies, we need to know more about their implementation challenges, whom they affect most or least, what their unintended consequences might be, how they can be revised for better effect, what they cost society in general and gun owners in particular, and other issues central to the acceptability of any policy. These scientific questions about what is true and knowable do not supersede questions of individual rights or Second Amendment rights. Both should be central considerations in policymaking.

Facts have never dictated policy, but they can inform it. The relevance of research to inform gun policy has been tarnished by deeply held assumptions about “true” policy effects, measurement error associated with key variables (such as gun ownership), skepticism about research methods, and mistrust of researchers’ motives when they draw unwelcome conclusions or focus on just one aspect of what is a complex phenomenon affecting multiple stakeholders with diverse interests. We have attempted to address these concerns through the rigor and transparency of our methods and through our organizational commitment to nonpartisan, objective policy analysis. We hope, therefore, that all stakeholders in gun policy debates give our analysis of the available science a fair hearing and our recommendations careful consideration.

In this chapter, we summarize our judgments about the strength of evidence available for the effects of gun policies on outcomes of interest. We then outline our conclusions and recommendations, which are organized into two sections: What can we conclude about the effects of gun policies, and why don’t we know more?

Summarizing the Strength of Evidence

We categorized all policy and outcome pairings as having supportive, moderate, limited, inconclusive, or no evidence. We never conclude that evidence suggests that a policy has no effect. Even when multiple studies fail to find a significant effect, it is not correct that this implies the policy has no effect. Instead, the effects may simply be too small to reliably detect, or the data available to assess the policy’s effects may not be sufficiently specific to the intended effects of the law. More generally, it seems reasonable to suspect that every policy has some effect on each outcome, however small or unintended. Therefore, the failure to detect a law’s effects reveals more about the weakness of the analytic methods than about the possibility that a policy truly has no effect.

We categorized evidence as *inconclusive* when studies with comparable methodological rigor identified inconsistent evidence for the policy’s effect on an outcome or when a single study found only uncertain or suggestive effects. We categorized evidence as *limited* when at least one study meeting our inclusion criteria and not otherwise compromised by serious methodological problems reported a significant effect of the policy on the outcome. Effects for which there is *moderate* evidence are those for which two or more studies found significant effects in the same direction and contradictory evidence was not found in other studies with equivalent or strong methods. Our finding of *supportive* evidence of an effect is limited to cases for which at least three studies found suggestive or significant effects in the same direction, and the effect was found in at least two data sets that were reasonably independent of each other (e.g., firearm suicides and hospital admissions for self-inflicted firearm injuries).

Our ratings, therefore, reflect the relative strength of evidence, not, for instance, whether the evidence is strong enough that we can be highly confident that observed effects would be generalizable to future implementations of a particular law. Rather, evidence for these effects is strong relative to evidence for other gun policy effects and not necessarily strong relative to the quality and quantity of evidence available in other fields of study. For instance, the evidence that cigarette smoking causes cancer is vastly stronger than the evidence concerning any gun policy's effect on any outcome.

Table 25.1 summarizes our judgments for all 13 classes of policies across the eight outcomes. Several outcomes show multiple judgments, and these correspond to different characterizations of the specific policy-outcome association. For instance, we identified limited evidence that background checks reduce *total suicides* and moderate evidence that they reduce *firearm suicides*. Looking down the columns, it is apparent that research into four outcomes is essentially unavailable. It is noteworthy that three of these four outcomes—defensive gun use, hunting and recreation, and the gun industry—are issues of particular concern to gun owners or gun industry stakeholders, including firearm manufacturers, firearm dealers, hunting outfitters, firing ranges, and others. That there is no empirical research examining these outcomes limits the ability for policymakers to use evidence to consider how laws are likely to affect different interests.

Table 25.1—Continued

	Gun-Free Zones	Waiting Periods	Concealed-Carry Laws		Minimum Age Requirements	Surrender of Firearms by Prohibited Possessors	Child-Access Prevention Laws	Firearm Sales Reporting and Recording Requirements	Licensing and Permitting Requirements	Lost or Stolen Firearm Reporting Requirements	Prohibitions Associated with Mental Illness	Stand-Your-Ground Laws	Bans on the Sale of Assault Weapons and High-Capacity Magazines	Background Checks
			Permitless Carry	Shall Issue										
Gun industry														
Gun ownership				I										
Prices of banned firearms in the short term													↑ L	

NOTE: I = inconclusive; L = limited; M = moderate; S = supportive. When we identified no studies meeting eligibility criteria, cells are blank. ↑ = the policy increases the outcome; ↓ = the policy decreases the outcome.

^a We concluded that there is moderate evidence that dealer background checks decrease firearm homicides, and there is inconclusive evidence for the effect of private-seller background checks on firearm homicides.

What Can We Conclude About the Effects of Gun Policies?

Our first set of conclusions and recommendations describes the policy-outcome combinations with the strongest available evidence as identified through our review of the existing literature, as well as recommendations for policy based on this evidence.

Conclusion 1. Available evidence supports the conclusion that child-access prevention (CAP) laws, or safe storage laws, reduce self-inflicted fatal or nonfatal firearm injuries among youth. There is moderate evidence that these laws reduce firearm suicides among youth and limited evidence that the laws reduce total (i.e., firearm and nonfirearm) suicides among youth.

Conclusion 2. Available evidence supports the conclusion that CAP laws, or safe storage laws, reduce unintentional firearm injuries or unintentional firearm deaths among children. In addition, there is limited evidence that these laws may reduce unintentional firearm injuries among adults.

In the available literature examining CAP laws, self-inflicted injuries represent an ambiguous outcome because not all self-inflicted firearm injuries are the result of a suicide attempt. Some are unintentional injuries. But with case fatality rates for suicide attempts with a firearm at around 82.5 percent (Spicer and Miller, 2000), a substantial number of self-inflicted firearm injuries are likely the result of a suicide attempt. Furthermore, there is a clear pattern of CAP laws appearing to reduce a range of related firearm injuries to youth, ranging from unintentional injuries to suicides. That they also reduce the more ambiguous “self-inflicted injuries” fits squarely within that pattern and contributes to our confidence that the evidence currently supports a conclusion that CAP laws reduce these injuries and fatalities.

Across all of the 13 classes of policies that we studied, only CAP laws had any evidence that we classified as *supportive* for a particular conclusion. CAP laws differ from many of the other policies we considered in this report. Most of the others affect the acquisition of new firearms (e.g., background checks or waiting periods), or they are designed to affect a relatively small proportion of gun owners (e.g., prohibitions that target the mentally ill; firearm surrender laws, which have usually targeted domestic violence offenders). Thus, the other laws generally concern either the small proportion of guns that are newly acquired every year or a small proportion of the gun-owning population. CAP laws, in contrast, are designed to influence how all guns in a state are stored when children could be expected to encounter them. This likely represents a large proportion of all guns because one-third of all households in the country have children under age 18 (Vespa, Lewis, and Kreider, 2013), and many more have children as occasional visitors. With such large numbers of guns potentially affected, even imperfect compliance with CAP laws may have a greater chance than other types of laws of producing observable effects in population-level outcome statistics.

Recommendation 1. States without CAP laws should consider adopting them as a strategy to reduce firearm suicides and unintentional firearm injuries and deaths.

We note, however, that scientific research cannot, at present, address whether these laws might increase or decrease crime or rates of legal defensive gun use.

Recommendation 2. When considering adopting or refining CAP laws, states should consider making child access to firearms a felony; there is some evidence that felony laws may have the greatest effects on unintentional firearm deaths.

Gun industry and gun-owner organizations have promoted voluntary and educational programs to promote the safe storage of firearms. Our conclusions and recommendations should not be interpreted to suggest that only CAP laws can reduce firearm deaths. As we discussed in Chapter Twenty, scientific evaluations of education campaigns have found that they can produce behavior change in domains other than gun storage, but rigorous evidence that they have successfully promoted safe storage of firearms is limited. On the other hand, there is evidence that clinicians who counsel patients (mostly families with children) can effectively promote safe storage practices, particularly if storage devices (e.g., gun locks) are provided along with the counseling.

Conclusion 3. There is moderate evidence that background checks reduce firearm suicides and firearm homicides, as well as limited evidence that these policies can reduce overall suicide and violent crime rates.

Most available studies have examined the effects of dealer background checks or the combined effects of dealer and private-seller background checks when both are required by a state. Therefore, the evidence base for universal background checks compared with the dealer background checks required under federal law is quite limited. Logically, however, if there is moderate evidence that dealer background checks reduce firearm suicides and homicides, it seems likely that extending those same background checks to private sales of firearms could further reduce firearm suicides and homicides. We emphasize, though, that the available research on this question is limited and inconclusive.

Conclusion 4. There is moderate evidence that stand-your-ground laws may increase state homicide rates and limited evidence that the laws increase firearm homicides in particular.

Conclusion 5. There is moderate evidence that laws prohibiting the purchase or possession of guns by individuals with some forms of mental illness reduce violent crime, and there is limited evidence that such laws reduce homicides in particular. There is also limited evidence these laws may reduce total suicides and firearm suicides.

Federal law prohibits some people who have been adjudicated as mentally ill from purchasing or possessing firearms, but this prohibition is not uniformly enforced across the nation. States maintain mental health records, but many have been reluctant to share those records for use in the Federal Bureau of Investigation (FBI)'s National Instant Criminal Background Check System (NICS), the federal database used for background checks. Although most states have laws allowing for the voluntary shar-

ing of some mental health records with NICS, there is considerable variation in which classes of individuals prohibited under federal law are shared with NICS. Thus, by the end of 2016, there were large differences in the number of active mental health records in NICS across states; for example, Alaska, Montana, New Hampshire, Rhode Island, and Wyoming had contributed less than 500 records, whereas most other states had tens of thousands or hundreds of thousands of active mental health records in the database (Criminal Justice Information Services Division, 2016).

Our finding that there is limited evidence that some mental health–related background checks can reduce gun violence should be of interest to states that currently share only partial or limited mental health data with NICS and that do not have a comprehensive in-state database that is reliably used for background checks for firearm sales. It is likely that many individuals with mental health histories making them prohibited possessors under federal law can nevertheless purchase firearms in these states. Moreover, states that do check state databases but do not share information on all individuals with disqualifying mental health histories with NICS create opportunities for prohibited possessors to purchase firearms out of state. Establishing procedures to prevent these people from purchasing firearms appears to yield small but appreciable reductions in suicides, homicides, and other violent crimes after implementing mental health checks.

Recommendation 3. States that currently do not require a background check investigating all types of mental health histories that lead to federal prohibitions on firearm purchase or possession should consider implementing robust mental illness checks, which appear to reduce rates of gun violence. The most robust procedures involve sharing data on all prohibited possessors with NICS.

Conclusion 6. There is limited evidence that before implementation of a ban on the sale of assault weapons and high-capacity magazines, there is an increase in the sales and prices of the products that the ban will prohibit.

This finding is based on persuasive evidence from a single case, the implementation of the Violent Crime Control and Law Enforcement Act of 1994, which banned the sale of certain semiautomatic weapons designated in the law as assault weapons. Therefore, this finding may not generalize well to other instances of assault weapon bans. For instance, the 1994 law grandfathered banned weapons sold before the law's implementation date. This likely created a market for speculators who drove up sales and prices in the months preceding the ban (Koper, 2004).

Conclusion 7. There is limited evidence that a minimum age of 21 for purchasing firearms may reduce firearm suicides among youth.

Conclusion 8. No studies meeting our inclusion criteria have examined required reporting of lost or stolen firearms, required reporting and recording of firearm sales, or gun-free zones.

Why Don't We Know More?

Based on our review of the existing literature on the effects of firearm policy changes, we offer the following conclusions and recommendations for improving the evidence base on the effects of gun laws.

Conclusion 9. The modest growth in knowledge about the effects of gun policy over the past dozen years reflects, in part, the reluctance of the U.S. government to sponsor work in this area at levels comparable to its investment in other areas of public safety and health, such as transportation safety.

Of the 54 studies meeting our inclusion criteria that have been published since 2003, just seven (13 percent) reported receiving any federal funding. Two studies listed funding from the National Science Foundation, and one study each listed funding from the National Institute of Justice; National Institute on Drug Abuse; National Institute on Alcohol Abuse and Alcoholism; National Heart, Lung, and Blood Institute; and the Centers for Disease Control and Prevention (CDC). Ten studies received some foundation support, with the Robert Wood Johnson Foundation and the Joyce Foundation each supporting four. Of studies since 2003 that met our inclusion criteria, the large majority (40 studies, or 74 percent) reported no sources of external support.

While most of the 54 studies focused on public safety or health outcomes (e.g., suicide and homicide), the number of high-quality quasi-experimental studies on which to base estimates of the effects of policies was surprisingly small compared with the literatures that evaluate the effects of many other policies, such as those designed to improve traffic safety, a problem that claims about as many lives each year as are lost in firearm suicides and homicides.

Federal funding for research on gun-related mortality is far below the levels for other sources of mortality in the United States. Stark and Shah (2017), for instance, found that federal gun violence research funding is just 1.6 percent the amount predicted based on federal funding for other leading causes of death. With this federal inattention comes a corresponding deficit in research: Stark and Shah (2017) also found that the volume of research publications on gun mortality was just 4.5 percent of what would be expected based on publication volume for other leading causes of mortality.

The federal government previously supported a more robust program of research examining firearm violence and policy. In the 1990s, the CDC was sponsoring millions of dollars of research on firearm violence, until researchers found that having a gun in the home was associated with an elevated risk of firearm homicide for members of the household. This finding was viewed by some as a one-sided attempt to manipulate the gun policy debate.

In an effort led by the National Rifle Association (Cagle and Martinez, 2004), a sufficient proportion of Congress was persuaded to adopt the Dickey Amendment in 1996, cutting \$2.6 million of funding from the CDC, an amount equal to what its injury prevention center had been spending on gun violence research. The Dickey

Amendment also introduced new language forbidding the CDC from advocating or promoting gun control. This language did not explicitly prohibit all research on gun violence or gun policy, but concern that any gun research could be viewed as advocacy has led the CDC to avoid supporting gun policy research lest it invite a budget adjustment like that in 1996 (Kellermann and Rivara, 2013).

Congress has included Dickey Amendment language in each CDC appropriations bill since 1996. Moreover, in 2012, similar language was added to an appropriations bill for the National Institutes of Health in the Consolidated Appropriations Act of 2012 (Pub. L. 112-74).

Research on firearm policy and violence prevention has since declined dramatically. According to a report by the advocacy organization Mayors Against Illegal Guns, by 2012, CDC funding of gun violence research had declined 96 percent since the mid-1990s, and academic publishing on gun violence fell 64 percent from 1998 to 2012 (Mayors Against Illegal Guns, 2013; Alcorn, 2016). Although comparable numbers of people die in car crashes and by firearm suicides and homicides, federal investment in traffic safety research funding is more than 270 times greater than in firearm violence research (Mayors Against Illegal Guns, 2013).

As suggested in a 2015 joint statement by Jay Dickey, the sponsor of the Dickey Amendment, and Mark Rosenberg, who ran the CDC's injury center when the amendment first passed, a gun violence research agenda should be developed with the dual goals of protecting citizens' and gun owners' rights and making our homes and communities safer:

Our nation does not have to choose between reducing gun-violence injuries and safeguarding gun ownership. Indeed, scientific research helped reduce the motor vehicle death rate in the United States and save hundreds of thousands of lives—all without getting rid of cars. For example, research led to the development of simple four-foot barricades dividing oncoming traffic that are preventing injuries and saving many lives. We can do the same with respect to firearm-related deaths, reducing their numbers while preserving the rights of gun owners. (Dickey and Rosenberg, 2015).

The science on which to base gun policy has advanced slowly since 2004, when the NRC panel concluded, "If policy makers are to have a solid empirical and research base for decisions about firearms and violence, the federal government needs to support a systematic program of data collection and research that specifically addresses that issue." Unfortunately, federal support for research that could help states and communities reduce firearm crime, violence, and suicide remains virtually nonexistent, and the state and federal surveys describing gun ownership and use, on which a better understanding of state policies could be built, have not lived up to the optimism expressed in NRC (2004) and Hahn et al. (2005). In some important respects, such federal support has deteriorated since then.

Recommendation 4. To improve understanding of the real effects of gun policies, Congress should consider whether to lift current restrictions in appropriations legislation, and the administration should invest in firearm research portfolios at the CDC, the National Institutes of Health, and the National Institute of Justice at levels comparable to its current investment in other threats to public safety and health.

Recommendation 5. Given current limitations in the availability of federal support for gun policy research, private foundations should take further steps to help fill this funding gap by supporting efforts to improve and expand data collection and research on gun policies.

Conclusion 10. Research examining the effects of gun policies on officer-involved shootings, defensive gun use, hunting and recreation, and the gun industry is virtually nonexistent.

The lack of rigorous studies examining the effects of gun policies on these outcomes is problematic because many stakeholders in gun policy debates are especially concerned about the effects laws could have on these matters. The desire to protect oneself, for instance, is self-reported as one of the primary reasons for gun ownership among 63 percent of all U.S. gun owners and among 76 percent of all U.S. handgun owners (Azrael et al., 2017), yet rigorous studies of the effects of laws on this outcome have rarely been conducted. As we discuss in Chapter Twenty-Three, on defensive gun use, the lack of research in this area stems, to some extent, from difficulties defining and measuring legal defensive gun use. In some—perhaps most—such cases, guns may contribute to an individual’s self-defense by deterring crimes that would otherwise occur. For this reason and others, it has proven difficult to estimate the frequency with which guns are used defensively.

Nevertheless, opportunities for understanding how policies affect defensive gun use exist and should be pursued. For instance, it may be possible to examine whether policies change the rate at which gun owners are the victims of crime or are injured during a crime. Similarly, FBI records of justifiable homicides, although imperfect as a proxy for defensive gun use, may nevertheless be useful for examining one aspect of a policy’s effects on defensive gun use, as demonstrated by Cheng and Hoekstra (2013). Given the strength of evidence of CAP laws on self-inflicted and unintentional injuries, studying the impact of these policies on defensive gun use can help inform the trade-offs between this outcome and the potential public safety benefits.

The dearth of research examining how policies affect the gun industry is a particularly significant shortcoming in the available scientific literature. Data from the U.S. Bureau of Labor Statistics (2017) suggest that more than 47,000 people in the United States are employed just in the manufacture of small arms and ammunition. The National Sports Shooting Foundation, a gun industry trade association, estimates

that an additional 250,000 may be employed in the distribution and sale of firearms and hunting supplies or in ancillary services, such as operating gun ranges or providing supplies or services to manufacturers and retailers (National Sports Shooting Foundation, 2017). The National Survey of Fishing, Hunting, and Wildlife-Associated Recreation Survey in 2011 found that more than 12 million people used firearms for hunting, with total expenditures on firearms exceeding \$3 billion and expenditures on ammunition exceeding \$1.2 billion (U.S. Fish and Wildlife Service, U.S. Department of the Interior, and U.S. Department of Commerce, 2012). In addition, more than 50 percent of all hunters participated in target shooting, and 22 percent of hunters visited shooting ranges (U.S. Fish and Wildlife Service, U.S. Department of the Interior, and U.S. Department of Commerce, 2012). As important as the concerns of this industry may be to the fate of proposed gun policies, there is, at present, little scientific evidence available to the public on this topic.

Recommendation 6. To improve understanding of outcomes of critical concern to many in gun policy debates, the U.S. government and private research sponsors should support research examining the effects of gun laws on a wider set of outcomes, including crime, defensive gun use, hunting and sport shooting, officer-involved shootings, and the gun industry.

Conclusion 11. The lack of data on gun ownership and availability and on guns in legal and illegal markets severely limits the quality of existing research.

There are no regularly collected data series that describe gun ownership or use at the state level since the CDC suspended its collection of this information on the Behavioral Risk Factor Surveillance System more than a decade ago. Most gun laws are designed to specify who can own guns or to change the ways that gun owners store and use their weapons. Therefore, gun ownership and use are the behaviors through which laws may affect such outcomes as suicide, homicide, hunting and recreation, and firearm sales. In the absence of reliable state-level information about gun ownership and use, researchers cannot assess the most-direct intended effects of policies—that is, the effects on gun ownership and use—which may otherwise be easier to detect than the downstream effects of such policies on comparatively rare outcomes, such as suicide and homicide. Is it the case that gun laws cannot have their intended effect because the stock of guns is so great in the United States that anyone who wants a gun can easily obtain one, whether or not they are prohibited? This is a question that cannot easily be answered with available data on gun ownership and use.

Recommendation 7. To make important advances in understanding the effects of gun laws, the CDC or another federal agency should resume collecting voluntarily provided survey data on gun ownership and use.

Additionally, the federal government no longer collects or shares with researchers data on illegal gun markets, which investigators could use to examine how policies change the availability of firearms. This is a problem that has also worsened since NRC (2004) identified it as a critical shortcoming for research on gun policy. Specifically, the Tiahrt Amendments (a series of provisions attached to Bureau of Alcohol, Tobacco, Firearms and Explosives appropriations bills since 2003) block researchers and others from studying gun trace data and gun purchaser data. When trace data were available to researchers prior to 2003, the information provided important insights into how criminals obtain their weapons (Kennedy, Piehl, and Braga, 1996; Bureau of Alcohol, Tobacco, and Firearms, 1997); whether states with more-restrictive gun laws create shortages of guns for those who may be prohibited from purchasing them (Weil and Knox, 1996; Cook and Braga, 2001); how guns move between states with less- and more-restrictive gun laws (Cook and Braga, 2001; Webster, Vernick, and Hepburn, 2001); the characteristics of gun sales likely to be associated with diversion to prohibited possessors (Pierce et al., 2003); and other valuable, actionable, policy-relevant information (for further discussion, see Braga et al., 2012).

Trace data and purchaser data have significant limitations that can make inferences about gun markets and crime difficult or uncertain. That is a caveat that applies to most data used in evaluating gun policies, but it should not be a reason for prohibiting access to trace data for research purposes.

Recommendation 8. To foster a more robust research program on gun policy, Congress should consider whether to eliminate the restrictions it has imposed on the use of gun trace data for research purposes.

Conclusion 12. Crime and victimization monitoring systems are incomplete and not yet fulfilling their promise of supporting high-quality gun policy research in the areas we investigated.

NRC (2004) and Hahn et al. (2005) each expressed optimism about new sources of data that had only recently begun and that could, in theory, be used to improve the study of gun policy. These included the National Violent Death Reporting System (NVDRS) and the National Incident-Based Reporting System (NIBRS).

The NVDRS was designed to provide unprecedented detail on the circumstances of violent deaths in participating states, such as information on the victim's life stresses, the relationship between the victim and the offender, and other crimes that were committed at the time of the suicide or homicide. Despite the richness of the information available through the NVDRS, not one of the quasi-experimental studies meeting the inclusion criteria for this report used NVDRS data. It could be that there have not been enough states participating in the NVDRS collection process for long enough to permit the use of strong causal models. State participation in the NVDRS is voluntary

and has been growing slowly but steadily. Currently, 42 states participate, but data are available from only 18, and not from some large states, such as California and Texas.

The NIBRS was designed to collect more-detailed information on incidents of crime in the United States than has been available through the FBI's Uniform Crime Reporting system. Whereas the FBI system collects summary or aggregate statistics on serious violent and property crimes reported to law enforcement agencies, NIBRS was designed to collect incident-level information about crimes reported to police. It officially launched in the mid-1980s, but by the time of the NRC review, only 16 percent of the U.S. population was served by a law enforcement agency that reported crime information to NIBRS (NRC, 2004, p. 33). Because the NIBRS program is voluntary and can be costly for law enforcement agencies to adopt, participation rates have not improved as rapidly as the NRC reviewers may have expected. By 2012, the proportion of U.S. residents served by a participating law enforcement agency had risen to just 30 percent (Bureau of Justice Statistics [BJS], 2017a). Perhaps for this reason, none of the studies meeting the inclusion criteria for this report used NIBRS data.

Although the current NIBRS data are of limited use for the kind of research we have reviewed, a new BJS initiative offers hope that this could soon change. The National Crime Statistics Exchange is an attempt to recruit and facilitate the participation of a representative sample of 400 law enforcement agencies to participate in NIBRS. With this sampling approach and data from the more than 6,000 agencies already participating, BJS expects to be able to begin generating reliable national crime trend information based on NIBRS data.

Recommendation 9. To improve the quality of evidence used to evaluate gun policies, the NVDRS should be expanded to include all states with rigorous quality control standards.

Recommendation 10. BJS should examine the cost and feasibility of expanding its existing programs to generate state-level crime data.

Another potentially valuable source of information on crimes is the National Crime Victimization Survey (NCVS), which collects detailed information on crime from a panel of U.S. residents selected to be representative of the nation. This survey provides critically important information about crimes that may never be reported to the police, as well as credible information on how victims and potential crime victims have been able to use guns defensively. But NCVS cannot readily be used to understand the effects of state gun laws on crime because it does not generate state-level estimates. Therefore, the studies meeting our eligibility criteria primarily used data from the Uniform Crime Reporting program (or its Supplemental Homicide Report) when examining crimes, meaning they worked with data that had few details about

individual crimes and, thus, could examine only the subset of crimes reported to law enforcement.

Recognizing the need for state-level victimization data, BJS has explored options for generating such estimates through NCVS (BJS, 2017b). BJS is conducting a pilot program that expands the survey panel with the intention of eventually generating reliable estimates for 22 states. In addition, the bureau has published model-based state estimates for some types of crime over three-year periods from 1999 to 2013 (Fay and Diallo, 2015).

Recommendation 11. BJS should continue to pursue its efforts to generate state-level victimization estimates. The current goal of generating such estimates for 22 states is a reasonable compromise between cost and the public's need for more-detailed information. However, the bureau should continue to expand its development of model-based victimization rates for all states and for a wider set of victimization experiences (including, for instance, crimes involving firearm use by an assailant or victim).

Conclusion 13. The methodological quality of research on firearms can be significantly improved.

Over the past several decades, studies have offered a great deal of information about how to use what data are available to generate reliable and credible estimates of the effects of gun policies on various outcomes, and the computing power that researchers need to implement the increasingly demanding modeling requirements has more than kept pace with the diffusion of knowledge about appropriate statistical methods. Nevertheless, the scientific literature we reviewed shows that many of the best recent studies suffer from important limitations that should be addressed in future research. These shortcomings concern the following:

- Interpreting effects generated in models that lack the statistical power to have any reasonable chance of detecting the likely effects of policies. This problem can result in a high likelihood that statistically significant effects are in the opposite direction of the true effects or that the statistically significant effects grossly exaggerate the magnitude of the true effects.
- Estimating too many parameters for the number of available observations. This problem can result in statistically significant effects that tell virtually nothing about the true generalizable effects of the policies.
- Poorly calibrated tests for whether the effects of policies are statistically significant. This problem can result in many discoveries of effects that reject the null hypothesis that the policy had no effect when, in fact, under proper inferential procedures, the discoveries would be consistent with the law having no effect (or a small effect in the opposite direction).

- Poorly justified selections of statistical models or covariates. This problem can result in estimates of a policy's effects that are in the wrong direction or that badly misconstrue the magnitude or statistical significance of their effects.
- Presenting the results of exploratory statistical modeling as though they reflect findings from a confirmatory analysis. When dozens of hypothesis tests are conducted, about 5 percent would be expected to achieve statistical significance at the $p < 0.05$ level even if the law had no effect. Failure to acknowledge that findings are the result of exploratory analysis can lead to overconfident interpretations of effect estimates that may not reflect the true effects of a policy.
- Undisclosed categorization of which states had which laws and when they were implemented. Gun policy analysts need reliable and shared databases of state laws. Correct coding of state laws is challenging, and when researchers have disclosed their state law codings, those codings have often been found to contain errors that could affect results.
- Poorly justified models of the time course of a policy's effects. Statistical models of the effects of a policy impose assumptions about the period over which the effects of the policy will build. Often, the implicit assumption is that the full effect of the policy will be observed instantaneously in the first year after the date it is scheduled for implementation. At best, this can lead to underestimates of the effects of policies.
- The use of spline and hybrid models that do not estimate coherent causal effects.
- Inadequate attention to threats of reciprocal causation or simultaneity biases in effect estimation.

These are technical points of interest chiefly to researchers, so we relegate our detailed discussion of each point to Appendix A. However, our final recommendations are for other researchers interested in the analysis of the effects of gun policies.

Recommendation 12. As part of the Gun Policy in America initiative, we have published a database containing a subset of state gun laws from 1979 to 2016 (Cherney, Morral, and Schell, 2018). We ask that others with expertise on state gun laws help us improve the database by notifying us of its errors, proposing more-useful categorizations of laws, or submitting information on laws not yet incorporated into the database. With such help, we hope to make the database a resource beneficial to all analysts.

Recommendation 13. Researchers, reviewers, academics, and science reporters should expect new analyses of the effects of gun policies to improve on earlier studies by persuasively addressing the methodological limitations of earlier studies, including problems with statistical power, model overfitting, covariate selection, poorly calibrated standard errors, multiple testing, undisclosed state varia-

tion in law implementation, and unjustified assumptions about the time course of each policy's effects.

In conclusion, with a few exceptions, there is a surprisingly limited base of rigorous scientific evidence concerning the effects of many commonly discussed gun policies. This does not mean that these policies are ineffective; they might well be quite effective. Instead, it reflects shortcomings in the contributions that scientific study can currently offer to policy debates in these areas. It also reflects, in part, the policies we chose to investigate, all of which have been implemented in some U.S. states and, therefore, have proven to be politically and legally feasible, at least in some states. This decision meant that none of the policies we examined would dramatically increase or decrease the stock of guns or gun ownership rates in ways that would produce more readily detectable effects on public safety, health, and industry outcomes. The United States has a large stock of privately owned guns in circulation—estimated in 2014 to be somewhere between 200 million and 300 million firearms (Cook and Goss, 2014). Laws designed to change who may buy new weapons, what weapons they may buy, or how gun sales occur will predictably have only a small effect on, for example, homicides or participation in sport shooting, which are affected much more by the existing stock of firearms. Although small effects are especially difficult to identify with the statistical methods common in this field, they may be important. Even a 1-percent reduction in homicides corresponds to more than 1,500 fewer deaths over a decade.

By highlighting where scientific evidence is accumulating, we hope to build consensus around a shared set of facts that have been established through a transparent, nonpartisan, and impartial review process. In so doing, we also mean to highlight areas where more and better information could make important contributions to establishing fair and effective gun policies.

Chapter Twenty-Five References

- Alcorn, Ted, "Trends in Research Publications About Gun Violence in the United States, 1960 to 2014," *JAMA Internal Medicine*, Vol. 177, No. 1, 2016, pp. 124–126.
- Azrael, Deborah, Lisa Hepburn, David Hemenway, and Matthew Miller, "The Stock and Flow of U.S. Firearms: Results from the 2015 National Firearms Survey," *Russell Sage Foundation Journal of the Social Sciences*, Vol. 3, No. 5, 2017, pp. 38–57.
- BJS—See Bureau of Justice Statistics.
- Braga, Anthony A., Garen J. Wintemute, Glenn L. Pierce, Philip J. Cook, and Greg Ridgeway, "Interpreting the Empirical Evidence on Illegal Gun Market Dynamics," *Journal of Urban Health*, Vol. 89, No. 5, 2012, pp. 779–793.
- Bureau of Alcohol, Tobacco, and Firearms, *Crime Gun Trace Analysis Reports: The Illegal Youth Firearms Market in Seventeen Communities*, Washington, D.C.: U.S. Department of the Treasury, 1997.
- Bureau of Justice Statistics, "Data Collection: National Incident-Based Reporting System (NIBRS)," web page, 2017a. As of May 12, 2017:
<https://www.bjs.gov/index.cfm?ty=dcdetail&iid=301>
- , "NCVS Redesign: Subnational," web page, 2017b. As of May 12, 2017:
<https://www.bjs.gov/index.cfm?ty=tp&tid=911>
- Cagle, M. Christine, and J. Michael Martinez, "Have Gun, Will Travel: The Dispute Between the CDC and the NRA on Firearm Violence as a Public Health Problem," *Politics & Policy*, Vol. 32, No. 2, 2004, pp. 278–310.
- Cheng, Cheng, and Mark Hoekstra, "Does Strengthening Self-Defense Law Deter Crime or Escalate Violence? Evidence From Expansions to Castle Doctrine," *Journal of Human Resources*, Vol. 48, No. 3, 2013, pp. 821–853.
- Cherney, Samantha, Andrew R. Morral, and Terry L. Schell, *RAND State Firearm Law Database*, Santa Monica, Calif.: RAND Corporation, TL-283-RC, 2018. As of March 2, 2018:
<https://www.rand.org/pubs/tools/TL283.html>
- Cook, Philip J., and Anthony A. Braga, "Comprehensive Firearms Tracing: Strategic and Investigative Uses of New Data on Firearms Markets," *Arizona Law Review*, Vol. 43, No. 2, 2001, pp. 277–309.
- Cook, Philip J., and Kristin A. Goss, *The Gun Debate: What Everyone Needs to Know*, New York: Oxford University Press, 2014.
- Criminal Justice Information Services Division, "National Instant Criminal Background Check System (NICS) Section Active Records in the NICS Index," Washington, D.C.: U.S. Department of Justice, Federal Bureau of Investigation, December 31, 2016. As of March 31, 2017:
<https://www.fbi.gov/file-repository/active-records-in-the-nics-index-by-state.pdf/view>
- Dickey, Jay, and Mark Rosenberg, "How to Protect Gun Rights While Reducing the Toll of Gun Violence," *Washington Post*, December 25, 2015.
- Fay, Robert E., and Mamadou S. Diallo, *Developmental Estimates of Subnational Crime Rates Based on the National Crime Victimization Survey*, Washington, D.C.: Westat, 2015. As of May 12, 2017:
<https://www.bjs.gov/index.cfm?ty=pbdetail&iid=5499>
- Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.

Kellermann, Arthur L., and Frederick P. Rivara, "Silencing the Science on Gun Policy," *JAMA*, Vol. 309, No. 6, 2013, pp. 549–550.

Kennedy, D. M., A. M. Piehl, and A. A. Braga, "Youth Violence in Boston: Gun Markets, Serious Youth Offenders, and a Use-Reduction Strategy," *Law and Contemporary Problems*, Vol. 59, No. 1, 1996, pp. 147–196.

Koper, Christopher S., *Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence 1994–2003*, Washington, D.C.: National Institute of Justice, U.S. Department of Justice, 2004.

Mayors Against Illegal Guns, "Access Denied: How the Gun Lobby Is Depriving Police, Policy Makers, and the Public of the Data We Need to Prevent Gun Violence," Everytown for Gun Safety Support Fund, 2013. As of May 12, 2017:
<http://everytownresearch.org/reports/access-denied/>

National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.

National Shooting Sports Foundation, *Firearms and Ammunition Industry Economic Impact Report*, Newtown, Conn., 2017. As of October 18, 2017:
<https://d3aya7xwz8momx.cloudfront.net/wp-content/uploads/2017/07/EconomicImpactofIndustry2017.pdf>

NRC—See National Research Council.

Pierce, Glenn L., Anthony A. Braga, Christopher Koper, Jack McDevitt, David Carlson, Jeffrey Roth, Alan Saiz, Raymond Hyatt, and Roberta E. Griffith, *The Characteristics and Dynamics of Crime Gun Markets: Implications for Supply-Side Focused Enforcement Strategies*, Boston, Mass.: National Institute of Justice, 2003.

Public Law 112-74, Consolidated Appropriations Act, 2012, December 23, 2011.

Spicer, R. S., and T. R. Miller, "Suicide Acts in 8 States: Incidence and Case Fatality Rates by Demographics and Method," *American Journal of Public Health*, Vol. 90, No. 12, 2000, pp. 1885–1891.

Stark, David E., and Nigam H. Shah, "Funding and Publication of Research on Gun Violence and Other Leading Causes of Death," *JAMA*, Vol. 317, No. 1, January 3, 2017, pp. 84–86.

U.S. Bureau of Labor Statistics, "Current Employment Statistics (National)," 2017. As of May 15, 2017:
<https://www.bls.gov/web/empsit/ceseeb1a.htm>

U.S. Fish and Wildlife Service, U.S. Department of the Interior, and U.S. Department of Commerce, *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*, Washington, D.C., FH2/11-NAT, 2012.

Vespa, Jonathan, Jamie M. Lewis, and Rose M. Kreider, *America's Families and Living Arrangements: 2012, Current Population Reports*, Washington, D.C.: U.S. Census Bureau, P20-570, 2013.

Webster, Daniel W., Jon S. Vernick, and Lisa M. Hepburn, "Relationship Between Licensing, Registration, and Other Gun Sales Laws and the Source State of Crime Guns," *Injury Prevention*, Vol. 7, 2001, pp. 184–189.

Weil, Douglas S., and Rebecca C. Knox, "Effects of Limiting Handgun Purchase on Interstate Transfer of Firearms," *JAMA*, Vol. 275, No. 22, 1996, pp. 1759–1761.

Appendixes

APPENDIX A

Methodological Challenges to Identifying the Effects of Gun Policies

A review by the National Research Council (NRC) (2004) highlighted important problems with the methods used in many studies examining the effects of gun policies. Since then, the literature has grown, often in a series of critiques and counter-critiques of the statistical methods used by different sets of researchers. Having carefully reviewed, discussed, and debated among our own project team the relative merits of different methods used in this literature, we offer here our assessment of the principal methodological challenges that future research on gun policy should seek to overcome.

Power

Statistical models using variation in state policies to identify causal effects of gun policies sometimes face serious problems with statistical power, meaning that the models may have little chance to detect effects even when they exist, and any statistically significant effects the models detect are likely to have greatly exaggerated magnitudes and may often get the direction of the effect wrong. These serious problems are common when effects of interest are small relative to other sources of variation in the outcomes (Gelman and Carlin, 2014). This is likely the case for the effects of gun policies (like those we examined in this report) that might affect new purchases of firearms but not the much larger stock of firearms available for use or that might have a modest effect on a small number of firearm incidents.

Nevertheless, even small effects may be important. For example, a 3-percent reduction in firearm deaths corresponds to 1,000 fewer deaths per year nationally. But a 3-percent effect, or an incidence rate ratio (IRR) of 0.97, is small relative to the much larger variation in firearm death rates over time or across U.S. states. Many observations (for instance, years of data for each state) may be required before a model has sufficient power to detect such an effect. Moreover, power is diminished as large numbers of covariates are added to the model.

To illustrate, consider the preferred model reported by one set of researchers reviewed here. The reported effect for one policy was an IRR of 0.97 (confidence interval [CI]: 0.72, 1.15). We can infer from these statistics that such a model could detect

a realistically small 3-percent reduction in the outcome at the $p < 0.05$ level of significance with a power of just 6 percent, well below the 80-percent level researchers typically seek when designing research.¹ Moreover, there is a nearly one in four chance that any statistically significant effect identified is in the wrong direction, and any statistically significant effect the model identifies will necessarily describe an effect size vastly greater than the true effect size. In the present example in which the true effect has an IRR of 0.97, the model would not identify a statistically significant effect any smaller in magnitude than an IRR of about 0.74. That is, the true 3-percent reduction would be found to be significant only if the model estimates it to actually be a 26-percent reduction in the outcome.

In other words, models like some that we find in the existing literature have almost no chance of detecting realistically small effects of firearm policies, and any significant effects the models do discover are likely to be grossly exaggerated in their magnitude and almost equally likely to be in the wrong direction as the right one. While this problem is by no means universally true in this literature, it is common enough that we present it as a general concern rather than citing by name the article from which we drew our example.

Overfitting

The problem of poorly powered models is exacerbated when, as is common in this field, investigators include many covariates and fixed effects in their models of the effects of policies. Most guidance on reliable regression modeling emphasizes that models should have at least ten or 15 times as many observations as parameters being estimated (Cavanaugh, 1997; Draper and Smith, 1998; Good and Hardin, 2012). However, with fixed effects for each year in time-series data; fixed effects for each state; and a wide range of demographic, social, and economic covariates, models in this field frequently violate such recommendations, sometimes falling below even five observations per parameter (Schell and Morral, 2016). Such models are likely to be overfit, meaning, among other things, that their estimates are unreliable or unlikely to describe generalizable relationships between covariates of interest (such as policies) and the modeled outcomes.

Although problems with statistical power are common in this literature, they may not be inevitable. Models that do a good job explaining sources of variance across time or among states will have more statistical power than those that explain less of this variance. In a separate line of work, RAND's Gun Policy in America project has examined the performance (power, bias, and error rates) for many gun policy model specifications

¹ The inferences about power in this paragraph rely on power calculations and calculations of the probability of an error in the sign of the estimate and the magnitude of the estimate using methods described in Gelman and Carlin (2014). We assume that the standard error of the (unexponentiated) model estimate is $(\log(\text{IRR}) - \log(\text{LB}))/1.96$, where IRR is the reported effect size, and LB is the lower (or higher) bound of the 95-percent CI reported for the estimate.

using simulations for which the true effect of policies is known. This work demonstrates that many statistical models commonly used in gun policy research have quite poor performance in terms of type 1 error, power, and bias but that there are modeling approaches with comparatively good characteristics on these and other criteria.²

Standard Errors

Most of the studies meeting our inclusion criteria identified the effects of policies by examining state-level changes in an outcome (such as homicides) over time. In many such models, there is a strong correlation within states among the error terms over time. Whether this clustering of error components mandates some adjustment to ensure that standard errors and even parameter estimates are unbiased has been a source of contention and confusion in the field. According to NRC (2004), cluster adjustments for fixed-effects models like many we reviewed in this report were unnecessary and produced misleadingly large CIs.

As Aneja, Donohue, and Zhang (2014) have argued, however, NRC did not properly consider how serial correlations in panel data can produce misleading standard errors when no adjustments are made for state-level clustering within the data. The authors provided compelling evidence that, without adjustment, standard errors are so severely underestimated that two-thirds or more of effects known to have no systematic association with the outcome variable appear to be statistically significant, a proportion far higher than the 5 percent expected for significance levels set at the $p < 0.05$ level. They further showed that even a common cluster adjustment procedure does not fully correct the underestimation of standard errors. Although state-level cluster adjustment vastly improves upon unadjusted estimates, standard errors are still inflated, frequently leading to statistically significant null effects at rates between 10 percent and 15 percent where a properly calibrated standard error would produce such errors in only 5 percent of cases.

Longitudinal analyses of state firearm policies that take no steps to address clustering continue to be published, although there is good evidence that the kinds of serial correlation found in state panel data used in gun policy research can result in large biases in estimated standard errors (Aneja, Donohue, and Zhang, 2014). The significance of the effects that these studies report should be regarded with deep skepticism. Similarly, studies frequently use robust standard error corrections or weight the regression models by state or county populations, but neither approach is likely to satisfactorily account for bias resulting from serial correlation, and population weighting could make it worse (Aneja, Donohue, and Zhang, 2014; Durlauf, Navarro, and Rivers, 2016). Further challenges for estimating standard errors arise for studies that

² A report on this effort is forthcoming and will be available on the Gun Policy in America project website.

use difference-in-differences approaches in which policy effects are identified from only a small number of states (or jurisdictions), because inference based on clustered standard errors has been shown to severely over-reject in these cases (Conley and Taber, 2011; MacKinnon and Webb, 2017).

Multiple Testing

Among studies examining the effects of firearm policies, it is common to present multiple model specifications, each with multiple effect estimates and sometimes run on multiple subsets of the population (e.g., deaths of those under age 19 or over age 55). In some cases, additional models may have been explored using alternative covariates or design characteristics. This type of exploratory modeling is valuable. It clarifies how robust findings are to different aspects of model specification, and it can detect associations or effects that are important but might otherwise have been overlooked.

In the context of such exploratory modeling, however, conventional interpretations of statistical significance erode. Whereas a significant effect at the $p < 0.05$ level is designed to occur in only one of 20 tests where there is, in fact, no effect, a study that conducts 20 such tests stands a good chance of identifying at least one statistically significant effect, even when no true effects are present. Such accidental statistically significant effects could contribute to the confusing and sometimes contradictory findings reported in the literature.

There are procedures for adjusting levels of statistical significance in the presence of multiple hypotheses testing that could help to reduce erroneous findings (Shaffer, 1995), but these were rarely used in the studies we examined. Moreover, these procedures would not address all sources of questionable findings that can occur in exploratory analysis. Instead, we believe that studies of the effects of state policies should be explicitly treated as exploratory rather than as testing a specific hypothesis. Therefore, strong conclusions about the apparent effects of policies should almost never be made. Instead, effects should be regarded with suspicion until they have been confirmed through independent studies. Because results in this field tend to be sensitive to details of the model specification and covariates, we propose that anyone undertaking such confirmatory analyses preregister the details of their models and data before assembling an analytic data set. Such preregistration does not prevent investigators from making changes to the analytic plan that may become necessary once results become available, but departing from the preregistered plan should signal to the researchers that their analysis should be considered exploratory rather than confirmatory.

Coding State Laws

Gun policy analysts need a reliable and shared database of state laws. There are many well-known problems associated with the coding of state laws. As noted by NRC (2004) and Hahn et al. (2005), there are frequently inconsistencies across studies in the specification of which states or jurisdictions have which laws and when they took effect. In some cases, researchers have used the year in which bills were passed into law as the year the law was implemented; in others, researchers have used the year the law was designed to take effect or the first full year after the law took effect. Although some researchers (e.g., Aneja, Donohue, and Zhang, 2014; Lott and Mustard, 1997; Rosengart et al., 2005; Vernick and Hepburn, 2003) have published or shared their coding of laws, which allows for debate and improvement of the coding schemes, such coding often is not transparent and cannot be reviewed for accuracy or to understand what assumptions about laws were made. More generally, public databases of gun laws over time are unavailable for many laws. Because of the cost and complexity of constructing such data sets, researchers interested in the effectiveness of gun laws have often favored weak, cross-sectional study designs or have collected proprietary data sets of laws that are not shared.

One important assumption that all such efforts necessarily must make concerns the features of different laws that make them sufficiently similar to be grouped together under a broad class of laws. For instance, as we described in Chapter Ten, on child-access prevention laws, states differ in whether penalties for violating the law result in criminal, misdemeanor, or civil penalties, and there is evidence (albeit inconclusive) that criminal penalties may have different and stronger effects than other approaches. Such variation in laws and their associated effects means that combining them within a particular class of laws, such as child-access prevention laws, may obscure important effects that some variants of the law have (Alcorn and Burris, 2016). On the other hand, distinguishing each variant of a law reduces the number of jurisdictions implementing any particular version of the law, which reduces the statistical power of most models used to identify the causal effects of the law. Therefore, specification of a homogenous set of laws could increase the average effect size, but it also can reduce the statistical power that models have to detect the larger effects. Rarely, however, have published analyses explicitly addressed this conflict or the choices and assumptions made to address it.

We believe that the science of gun policy will be substantially advanced with the public release of comprehensive state law time-series data, and we have made that one of the goals of the Gun Policy in America project. Specifically, we have assembled a state law database for 1979–2016 that codes our 13 broad classes of state gun policies and many subcategories (see Cherney, Morral, and Schell, 2018). As noted, this database is available for use and further improvement by the scientific community.

Coding the Time Course of a Policy's Effects

Even with a reliable database of state laws, however, investigators of gun policy effects face a further complication in coding the time course over which gun laws exert their effects. Frequently, investigators assume that a policy's full effects occur in the year it is implemented or the first full year after the year of implementation. This coding implies that all of a policy's effect is observed shortly after its implementation, which may be reasonable for some types of policies. Others, however, might accumulate their effects over longer periods. For instance, laws that expand the class of prohibited possessors will primarily affect those members of the class who are seeking to buy new firearms but not those who already own firearms. Indeed, it may be many years before such a law affects firearm ownership of a sizable proportion of the population. The proper coding of this type of effect might involve additive or multiplicative effects over several years.

Similarly, the effects of some policies, such as child-access prevention laws, may not be fully realized until a large proportion of gun owners become aware of them, meaning that the time course of the effect may depend on media campaigns to raise awareness or high-profile prosecutions under the law. Unfortunately, however, unless investigators know when these effects occur, their effect estimates will underestimate the policy's true effects. For this reason, we believe that researchers modeling the effects of policies should carefully consider when effects are likely to appear and should make these assumptions and the corresponding model specifications explicit in their analyses.

Spline and Hybrid Effect Coding

Several studies investigating the effects of concealed-carry policies (see Chapter Thirteen) and studies of Australia's 1996 National Firearms Agreement (see Chapter Twenty-Four) have used model specifications referred to as *spline* or *hybrid* models within this field. In most models investigating the causal effects of a policy on an outcome, the effect is assumed to produce a shift in the level of the outcome; for example, a policy may result in a lower homicide rate after implementation relative to before. The type of spline models used in this field differ from standard causal effect models because the policy is assumed to modify the trajectory of the outcome over time rather than the level or in addition to a change in the level. More specifically, these models assume that the states or counties that implement the policy will diverge from the national trend at a constant rate for an indefinite period.³

³ Typically in gun policy models, a spline will be entered as a predictor in a regression equation that takes on values of zero before the policy was implemented (as well as in states that never implemented) and then takes on values that increase linearly in time for a given state once the policy is implemented in that state. For the models used in this field, these state-specific trends are estimated while controlling for national trends by including year

Although we discuss the reported results of these models, for practical and theoretical reasons, we do not present effect sizes from these spline models (or from spline and dummy hybrid models), even when the authors preferred those models. The practical reason is that the effect size is assumed to vary over time, so there is no single effect size to report. In fact, at a date sufficiently long after implementation, these models often assume that the states that implemented the policy will have extremely large or small effects on the outcome. In such cases, the effect size one presents is based entirely on a relatively arbitrary decision about the length of time over which to compute the effect. Moreover, even if we had arbitrarily selected a specific time interval over which to compute the effect, the research articles do not contain the information necessary to assess the CIs around those estimates.

Furthermore, two features of these spline models make them difficult to interpret as the causal effects of a gun policy. First, the spline coefficient is highly sensitive to the timing of any shifts in the outcome, and it responds to the timing in the opposite way as would standard methods for causal inference. A large increase in crime that does not occur until many years after a policy has been implemented will yield a large positive spline coefficient, suggesting that the policy is harmful. However, a similarly large increase in crime that occurs immediately after the policy is implemented will yield a negative spline coefficient, suggesting that the policy is beneficial even though it was followed immediately by an increase in crime.⁴ Standard frameworks for inferring causality from observations (e.g., Mill, 1843) would suggest that an increase in crime immediately after the policy was implemented is the strongest evidence that the policy was harmful, and if a similar increase did not occur until years after implementation, it would constitute weaker evidence of a harmful effect of the policy. However, inferring causation from the spline coefficient leads to the opposite inferences, with an immediate increase in the outcome interpreted as the policy causing a decrease in the outcome but a delayed increase interpreted as evidence that the policy caused the outcome to increase. It is important to note that this interpretational challenge occurs in models that use only the spline to indicate the causal effect, as well as in hybrid models that use both a dummy variable and a spline (i.e., a step and a slope). (For more information, see the box on the next page.)

fixed effects in the same model. Thus, the splines are state trends that should be interpreted as deviations from the national trend.

⁴ More technically, the spline predictor in the regression equation has a mean value that corresponds to a specific time after implementation. This spline's mean typically falls a few years after implementation, but precisely when it occurs depends on the number of states that implemented the law and how long the study follows the states. Any increase in crime that occurs before this mean spline creates a more negative spline coefficient. An increase in crime, no matter how large, that occurs at that mean has no effect on the spline coefficient. Any increase in crime that occurs after that mean results in a more positive spline coefficient, with progressively greater leverage over the coefficient occurring with greater time.

The Interpretational Problem with Spline and Hybrid Models

To illustrate the problem discussed here, consider a hypothetical state that would have shown a constant linear trend in crime (slope = 1) from 1980 to 2001 (see Table A.1). However, a policy went into effect in 1991 that raised the crime rate by 1 point in that year. If one fits a linear trend and standard spline effect to these data, it yields a spline coefficient of -0.04 . If one fits a hybrid effect to these data, it yields a spline coefficient of -0.05 and a dummy effect of 0.36 . Thus, although everyone who views this data series would conclude that it is inconsistent with the conclusion that the policy caused a decline in crime, the spline coefficient is negative in both models.

Table A.1. Illustrative Data, with Spline and Dummy-Coded Effect Variables

Year	Crime Rate	Spline	Dummy
1980	10	0	0
1981	11	0	0
1982	12	0	0
1983	13	0	0
1984	14	0	0
1985	15	0	0
1986	16	0	0
1987	17	0	0
1988	18	0	0
1989	19	0	0
1990	20	0	0
1991	22	1	1
1992	22	2	1
1993	23	3	1
1994	24	4	1
1995	25	5	1
1996	26	6	1
1997	27	7	1
1998	28	8	1
1999	29	9	1
2000	30	10	1
2001	31	11	1

Stated more generally, the direction and size of the spline coefficient serves as an unbiased estimator of the causal effect if, and only if, the duration of the spline's slope corresponds to the actual period over which the policy's effects are increasing in magnitude. If the true effect phases in earlier than assumed by the chosen spline function, the spline coefficient will be biased away from the true direction of the causal effect, possibly even reversing the sign of the true effect. Thus, researchers should probably avoid using splines that assume that the effect of the policy increases linearly into perpetuity. Such an assumption makes it likely that the true effect of the policy is in the opposite direction of the spline coefficient.

The second challenge in the interpretation of the spline coefficient as a causal effect comes from the null hypothesis that is typically used when testing the spline coefficient. Specifically, the state-specific linear slope in the outcome with respect to time after the implementation of the policy is compared with the state-specific linear slope over the years prior to implementation. The null hypothesis in this case is that a given state's deviation from a national trend in the pre-policy period should be expected to continue in a linear manner, absent any intervention, indefinitely. Thus, the null hypothesis being tested is derived from a time trend that has been extrapolated, often many years into the future. This assumption has not been justified within this field, neither with a theory about an underlying data-generating mechanism for which the assumption is appropriate nor by showing that it is a good fit to the available data. In contrast, our analysis of U.S. crime data suggests that the data do not show the pattern predicted by this assumption.⁵ Moreover, making an assumption of constant state-specific trends in crime can result in obvious research artifacts. Many types of data show regression to the mean, which describes a pattern of data generated by a random process in which an extreme observation is more likely to be followed by a less extreme observation than a more extreme observation. Failure to account for regression to the mean can result in spurious research conclusions. For example, if legislators pass gun legislation as a response to rising crime rates, any tendency for crime rates to return toward more-typical levels due to regression to the mean may be misinterpreted as evidence that the legislation lowered crime.

The risk of this type of error is much greater in spline models because the assumption used to generate the null hypothesis is that the data display regression away from the mean. Essentially, these models assume a process in which extreme observations are likely to be followed by observations that become progressively more extreme in the same direction—the opposite of regression to the mean. In contrast, in data showing regression to the mean, the null hypothesis that the trend before a given date equals

⁵ Specifically, the assumption predicts that state trends that deviate from the national trend in a positive direction (increasing crime rates relative to the nation) will continue to get progressively higher over time, while those states that deviate negatively (decreasing crime rates relative to the nation) will continue to decrease indefinitely. This predicts a “fan” pattern in crime trends in which the divergence in crime rates across states perpetually increases over time. Actual crime data do not show any consistent divergence of trends across states.

the trend after the date is routinely rejected. That is, the null hypothesis that state-specific deviations from the national crime trend will continue to grow indefinitely can often be rejected in the states that implemented the policy of interest, as well as many of those that did not.⁶ Rejecting this implausible null hypothesis is not evidence of a causal effect of any policy.

In spite of clear statistical problems with inferring causal effects of policy on crime data using these methods, some researchers advocate this approach. In our view, their arguments misinterpret conventional effects identified by a shift in the mean (e.g., dummy-coded effects) and spline effects based on changes in slope. For example, Lott, Moody, and Whitley (2016) stated,

The problems with using the dummy variable can be illustrated using results of 3 other papers. Santaella-Tenorio et al. [2016] reported the dummy model from Table 8b of the article by Ayres and Donohue [2003a]. Had they reported the other specification in Table 8b (or other tables) that showed the trends before and after implementation of the law (specifications that reject the assumptions behind the simple dummy approach), they would have shown the statistically significant downward trend in murder rates that indicated that the longer the right-to-carry laws were in effect, the greater the drop in murder rates was.

That is, the three papers interpret the spline coefficient as a “statistically significant downward trend in murder rates.” This is incorrect; the negative spline term indicates that the slope coefficient is of lower value after implementation than before, but it does not imply that rates are actually declining over time either in absolute terms or relative to the other states that did not implement *shall-issue* (or right-to-carry) laws (see Chapter Thirteen). It is quite possible to get a negative spline coefficient even if shall-issue laws cause a large and immediate spike in murder. Similarly, such a negative coefficient could occur even if the law has no effect on murder, because it is not reasonable to extrapolate a pre-implementation trend of increasing murder rates indefinitely into the future. Historically, state-specific increases in murder have been followed by later reversion to more-typical values, even without passage of shall-issue laws. Indeed, if the authors’ descriptions of the data as showing progressively larger drops in murder rates over time had been correct, there would have been a lower murder rate after implementation than before. That is, if their descriptions of the data were correct, there

⁶ For example, imagine that the states that implemented a given policy had an aggregate firearm homicide rate of eight homicides per 100,000 population in the year leading up to implementation and nine homicides per 100,000 in the year prior to that. The null hypothesis based on extrapolating this trend is that the rate of homicides will be seven per 100,000 the year after implementation and will decline to exactly zero homicides within eight years in all of the states that implemented the policy. It is likely that the null hypothesis will be correctly rejected because the states do not actually have zero homicides after eight years, but it would also be rejected because it incorrectly assumed that preexisting trends would continue, unchanged and indefinitely. The null would be rejected for reasons that have nothing to do with any causal effect of firearm policy.

would have been a significant negative coefficient on the dummy variable that they dismissed as unimportant, but there may or may not have been a significant negative spline coefficient.

It is important to note that our critique of how spline models have been used in this field is not, in any way, a critique of the use of splines more generally. Splines are extremely general regression tools to allow variations in slopes across a predictor variable. It is entirely reasonable to assume, for example, that the effects of a policy on crime phase in over several years. In such a case, a simple dummy-coded effect may underestimate the true effect size, while using a spline that is designed for that particular phase-in period would not. In our view, using these types of splines to identify a causal effect of policy on some crime outcome would require the following three things:

1. The model would need to be constructed so that the researchers would not conclude that increases in crime immediately after policy implementation are evidence that the policy lowers crime. This is a typical feature of spline models, particularly when the change in slope is modeled as persisting for a long period. This problem can be limited by using splines whose slopes operate over a narrow time frame, which can be justified as the phase-in period of the policy's effect (e.g., as used in the preferred specifications in Donohue, 2004). Such splines are similar to dummy-coded variables but with a gradual transition between 0 and 1 rather than an abrupt transition. If the phase-in period is hypothesized to last more than a few years, it may be necessary to estimate a more complex function to avoid making the wrong causal inference.
2. The null hypothesis that is interpreted as no causal effect must be something that is reasonably true in the absence of the policy in question. The null should be a hypothesis that would not be routinely rejected if tested within states that never implemented the policy or if tested using randomized implementation dates. In practice, this usually requires a null hypothesis that does not extrapolate pre-policy crime trends indefinitely into the future. Instead, the null should be based on deviations from the pre-policy average crime level or on deviations from a state-specific trend that is identified by both pre-implementation and post-implementation crime rates (i.e., based on deviations from an interpolated rather than extrapolated trend).
3. When regression models contain multiple effects of the policy, such as hybrid models that contain a spline and a dummy variable, the various effects cannot be tested or interpreted independently. The effect size and statistical significance can be assessed only by integrating all of the ways in which the policy influences the outcome within the model. For example, researchers should not claim that a policy is associated with a reduction in crime based on a significant negative spline coefficient when the model includes another effect that simultaneously predicts increased crime following implementation of the policy. Despite the

significant negative spline, the model may still predict that the policy is associated with a subsequent increase in crime in all years represented in the data. Thus, while hybrid models can avoid some of the interpretational problems of spline models, any conclusions about the effect of the policy on crime must reflect all of the modeled effects relating the policy to the outcome within the model. Ideally, this analysis would test the effect at some point after the policy is hypothesized to be fully phased in but well within the period that states were typically followed in the data set. This requirement applies to the direction, size, and statistical significance of the joint effect.

Our view of the existing literature is that none of the available studies presents a spline or hybrid model that meets these three requirements for interpreting the effects. Some of the models in the literature meet some of these requirements, but none is readily interpreted as estimating a causal effect of gun policies. For this reason, we generally present the simple dummy-coded causal effect when it is provided by the authors, although we do discuss the authors' preferred specification in the text.

Simultaneity and Reciprocal Causation

To obtain an unbiased estimate for the causal effect of firearm policy changes, the ideal research design would be akin to a randomized trial in which policies were randomly assigned across states and over time (Aneja, Donohue, and Zhang, 2014; Donohue, 2003). This type of experimental design is infeasible in the context of gun policies, so researchers have had to rely on quasi-experimental methods in which the implicit assumptions require that state adoption of a given firearm policy is unconfounded by omitted factors that influence both law passage and the outcome of interest (i.e., omitted variables bias) and that changes in firearm policy are not themselves driven by changes in the outcome of interest (i.e., simultaneity bias). These issues are not unique to the study of firearm policies and merit consideration across a broad range of program and policy evaluations.

Potential issues of simultaneity have been discussed primarily in the research on shall-issue laws and crime (for a discussion of shall-issue and other concealed-carry laws, see Chapter Thirteen). Specifically, many studies have noted the potential for reciprocal causation—that is, that state legislatures pass shall-issue laws as a response to high or rising rates of violent crime (Aneja, Donohue, and Zhang, 2014; Grambsch, 2008; Kovandzic, Marvell, and Vieraitis, 2005; Ayres and Donohue, 2003a; Donohue, 2003; Manning, 2003; Kovandzic and Marvell, 2003; Plassman and Whitley, 2003; Lott and Mustard, 1997). Indeed, Grossman and Lee (2008) found that the percentage change in the violent crime rate over the preceding five years had a statistically significant positive effect on the likelihood that states with may-issue laws switch to

shall-issue laws; Luca, Deepak, and Poliquin (2016) found that the occurrence of a public mass shooting significantly increased the number of firearm bills introduced within a state one year later. If such reciprocal causation exists, the estimated effects of firearm policies on crime rates from the difference-in-differences strategy employed by most of the qualifying studies we identified may be inconsistent and biased, although the direction of such bias is ambiguous. While some studies have tested for potential reciprocal causation and found little evidence of bias driven by differential pre-trends in law-enacting states (Rosengart et al., 2005; Plassman and Whitley 2003), other studies have found this to be an issue of concern for shall-issue laws (Aneja, Donohue, and Zhang, 2014; Grambsch, 2008; Donohue, 2003).

The presence of reciprocal causation complicates causal identification of the true effects of firearm policy changes and requires alternative approaches to those used most commonly in the literature we identified. Unfortunately, some of the existing methods for handling simultaneity problems may not be feasible or may face other limitations. For instance, Lott and Mustard (1997) and Gius (2015a) employ instrumental variables techniques, but the instruments chosen are questionable and neither study provides sufficient evidence to assess instrument validity (Manning, 2003). Synthetic control methods (Abadie, Diamond, and Hainmueller, 2010) have been used to construct a counterfactual “control state” that matches the pre-trend of the law-passing state (Crifasi et al., 2015; Rudolph et al., 2015), but these methods do not readily accommodate inferential statistics and provide estimated effects that are often identified from a policy change in only one state or one state-year, meaning the observed effect is confounded with many other changes in the state that might equally explain any observed differences between the state and its synthetic controls.

More research and methodological innovation is required to address simultaneity and reciprocal causation challenges to causal inference in this and other fields of research. In particular, it would be useful to understand better the factors leading to state or municipal decisions to pass different types of policies. Studies estimating the effects of laws should explore and report whether states that passed the laws differed systematically from those that did not, in terms of their recent gun use or violence trends. In some cases, explorations of the possible effects of reciprocal causation on effect estimates may provide useful insights.

Appendix A References

- Abadie, Alberto, Alexis Diamond, and Jens Hainmueller, “Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California’s Tobacco Control Program,” *Journal of the American Statistical Association*, Vol. 105, No. 490, 2010, pp. 493–505.
- Alcorn, Ted, and Scott Burris, “Gun Violence Prevention,” *Lancet*, Vol. 388, No. 10041, 2016, p. 233.
- Aneja, Abhay, John J. Donohue III, and Alexandria Zhang, *The Impact of Right to Carry Laws and the NRC Report: Lessons for the Empirical Evaluation of Law and Policy*, Stanford, Calif.: Stanford Law School, Olin Working Paper No. 461, December 1, 2014. As of May 21, 2017: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2443681
- Ayres, Ian, and John J. Donohue III, “Shooting Down the More Guns, Less Crime Hypothesis,” *Stanford Law Review*, Vol. 55, No. 4, 2003a, pp. 1193–1312.
- Cavanaugh, Joseph E., “Unifying the Derivations for the Akaike and Corrected Akaike Information Criteria,” *Statistics and Probability Letters*, Vol. 33, No. 2, April 1997, pp. 201–208.
- Cherney, Samantha, Andrew R. Morral, and Terry L. Schell, *RAND State Firearm Law Database*, Santa Monica, Calif.: RAND Corporation, TL-283-RC, 2018. As of March 2, 2018: <https://www.rand.org/pubs/tools/TL283.html>
- Conley, Timothy G., and Christopher R. Taber, “Inference with ‘Difference in Differences’ with a Small Number of Policy Changes,” *Review of Economics and Statistics*, Vol. 93, No. 1, 2011, pp. 113–125.
- Crifasi, C. K., J. S. Meyers, J. S. Vernick, and D. W. Webster, “Effects of Changes in Permit-to-Purchase Handgun Laws in Connecticut and Missouri on Suicide Rates,” *Preventive Medicine*, Vol. 79, 2015, pp. 43–49.
- Donohue, John J. “The Impact of Concealed-Carry Laws,” in Jens Ludwig and Philip J. Cook, eds., *Evaluating Gun Policy: Effects on Crime and Violence*, Washington D.C.: Brookings Institution Press, 2003, pp. 287–324.
- , “Guns, Crime, and the Impact of State Right-to-Carry Laws,” *Fordham Law Review*, Vol. 73, No. 2, 2004, pp. 623–652.
- Draper, Norman R., and Harry Smith, *Applied Regression Analysis*, 3rd ed., New York: John Wiley and Sons, 1998.
- Durlauf, Steven, Salvador Navarro, and David Rivers, “Model Uncertainty and the Effect of Shall-Issue Right-to-Carry Laws on Crime,” *European Economic Review*, Vol. 81, 2016, pp. 32–67.
- Gelman, Andrew, and John Carlin, “Power Calculations: Assessing Type S (Sign) and Type M (Magnitude) Errors,” *Perspectives on Psychological Science*, Vol. 9, No. 6, 2014, pp. 641–651.
- Gius, Mark, “The Effects of State and Federal Background Checks on State-Level Gun-Related Murder Rates,” *Applied Economics*, Vol. 47, No. 38, 2015a, pp. 4090–4101.
- Good, Phillip I., and James W. Hardin, *Common Errors in Statistics (And How to Avoid Them)*, 4th ed., New York: John Wiley and Sons, 2012.
- Grambsch, Patricia, “Regression to the Mean, Murder Rates, and Shall-Issue Laws,” *American Statistician*, Vol. 62, No. 4, 2008, pp. 289–295.
- Grossman, Richard S., and Stephen A. Lee, “May Issue Versus Shall Issue: Explaining the Pattern of Concealed-Carry Handgun Laws, 1960–2001,” *Contemporary Economic Policy*, Vol. 26, No. 2, 2008, pp. 198–206.

- Hahn, Robert A., Oleg Bilukha, Alex Crosby, Mindy T. Fullilove, Akiva Liberman, Eve Moscicki, Susan Snyder, Farris Tuma, and Peter A. Briss, "Firearms Laws and the Reduction of Violence: A Systematic Review," *American Journal of Preventive Medicine*, Vol. 28, No. 2, 2005, pp. 40–71.
- Kovandzic, Tomislav V., and Thomas B. Marvell, "Right-to-Carry Concealed Handguns and Violent Crime: Crime Control Through Gun Decontrol," *Criminology and Public Policy*, Vol. 2, No. 3, 2003, pp. 363–396.
- Kovandzic, Tomislav V., Thomas B. Marvell, and Lynne M. Vieraitis, "The Impact of 'Shall-Issue' Concealed Handgun Laws on Violent Crime Rates," *Homicide Studies*, Vol. 9, No. 4, 2005, pp. 292–323.
- Lott, John R., Jr., Carlisle E. Moody, and John E. Whitley, "Re: 'What Do We Know About the Association Between Firearm Legislation and Firearm-Related Injuries?'" *American Journal of Epidemiology*, Vol. 184, No. 1, 2016, pp. 81–82.
- Lott, J. R., and D. B. Mustard, "Crime, Deterrence, and Right-to-Carry Concealed Handguns," *Journal of Legal Studies*, Vol. 26, No. 1, 1997, pp. 1–68.
- Luca, Michael, Lahotra Deepak, and Christopher Poliquin, *The Impact of Mass Shootings on Gun Policy*, working paper, Boston, Mass.: Harvard Business School, 2016.
- MacKinnon, James G., and Matthew D. Webb, "Wild Bootstrap Inference for Wildly Different Cluster Sizes," *Journal of Applied Econometrics*, Vol. 32, No. 2, 2017, pp. 233–254.
- Manning, Willard, "Comment: The Impact of Concealed-Carry Laws," in Jens Ludwig and Philip J. Cook, eds., *Evaluating Gun Policy: Effects on Crime and Violence*, Washington, D.C.: Brookings Institution Press, 2003, pp. 331–341.
- Mill, John Stuart, *A System of Logic*, London: Parker, 1843.
- National Research Council, *Firearms and Violence: A Critical Review*, Washington, D.C.: National Academies Press, 2004.
- NRC—See National Research Council.
- Plassman, Florenz, and John Whitley, "Confirming 'More Guns, Less Crime,'" *Stanford Law Review*, Vol. 55, No. 4, 2003, pp. 1313–1369.
- Rosengart, M., P. Cummings, A. Nathens, P. Heagerty, R. Maier, and F. Rivara, "An Evaluation of State Firearm Regulations and Homicide and Suicide Death Rates," *Injury Prevention*, Vol. 11, No. 2, 2005, pp. 77–83.
- Rudolph, K. E., E. A. Stuart, J. S. Vernick, and D. W. Webster, "Association Between Connecticut's Permit-to-Purchase Handgun Law and Homicides," *American Journal of Public Health*, Vol. 105, 2015, pp. E49–E54.
- Santaella-Tenorio, J., M. Cerdá, A. Villaveces, and S. Galea, "What Do We Know About the Association Between Firearm Legislation and Firearm-Related Injuries?" *Epidemiologic Reviews*, Vol. 38, No. 1, 2016, pp. 140–157.
- Schell, Terry L., and Andrew R. Morral, *Evaluating Methods and Findings from a Study of State Gun Policies*, Santa Monica, Calif.: RAND Corporation, RR-1642-RC, 2016. As of January 13, 2017: http://www.rand.org/pubs/research_reports/RR1642.html
- Shaffer, J. P., "Multiple Hypothesis Testing," *Annual Review of Psychology*, Vol. 46, 1995, pp. 561–584.
- Vernick, J. S., and L. M. Hepburn, "State and Federal Gun Laws: Trends for 1970–1999," in Jens Ludwig and Philip J. Cook, eds., *Evaluating Gun Policy: Effects on Crime and Violence*, Washington, D.C.: Brookings Institution Press, 2003, pp. 345–402.

APPENDIX B

Source Data Used to Produce the Forest Plot Figures

To construct the figures in this report showing estimated effect sizes (i.e., the forest plots), we used results reported as the preferred models in each study. In some cases, these sources reported incidence rate ratios (IRRs) as the estimated effect of a law and provided confidence intervals (CIs). In such cases, we used these numbers as reported. In other cases, we calculated IRRs from effects estimated in the studies as regression coefficients, and we calculated CIs from standard errors, test statistics, or reported *p*-values. Discussion of these calculations is provided in Chapter Two. Table B.1 provides the source data used in this report to calculate IRRs and CIs as presented in each forest plot figure.

Table B.1
Source Data Used to Estimate Study Effect Sizes in the Forest Plot Figures

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
3.1	Ludwig and Cook (2000)	Brady Act	Firearm suicide rate	Aged 21+	0.98	0.94	0.94	1.02			Table 1: Col 3
3.1	Ludwig and Cook (2000)	Brady Act	Firearm suicide rate	Aged 55+	0.94	0.90	0.90	0.98			Table 1: Col 6
3.1	Ludwig and Cook (2000)	Brady Act	Nonfirearm suicide rate	Aged 21+	1.01	0.95	0.95	1.08			Table 1: Col 3
3.1	Ludwig and Cook (2000)	Brady Act	Nonfirearm suicide rate	Aged 55+	1.03	0.97	0.97	1.11			Table 1: Col 6
3.1	Ludwig and Cook (2000)	Brady Act	Proportion of suicides with firearm	Aged 21+	1.17	0.87	0.87	1.58			Table 1: Col 3
3.1	Ludwig and Cook (2000)	Brady Act	Proportion of suicides with firearm	Aged 55+	0.97	0.94	0.94	0.99			Table 1: Col 6
3.1	Ludwig and Cook (2000)	Brady Act	Total suicide rate	Aged 21+	0.98	0.93	0.93	1.03			Table 1: Col 3
3.1	Ludwig and Cook (2000)	Brady Act	Total suicide rate	Aged 55+	0.97	0.93	0.93	1.01			Table 1: Col 6
3.1	Sen and Panjamapirom (2012)	Check on fugitive status	Firearm suicide rate	All ages	0.95	0.90	0.90	0.99			Table 2: Col 4
3.1	Sen and Panjamapirom (2012)	Check on fugitive status	Total suicide rate	All ages	0.91	0.87	0.87	0.95			Table 2: Col 6
3.1	Sen and Panjamapirom (2012)	Check on mental illness	Firearm suicide rate	All ages	0.96	0.92	0.92	0.99			Table 2: Col 4

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
3.1	Sen and Panjamapirom (2012)	Check on mental illness	Total suicide rate	All ages	0.97		0.95	0.99			Table 2: Col 6
3.1	Sen and Panjamapirom (2012)	Check on misdemeanor	Firearm suicide rate	All ages	0.95		0.92	1.00			Table 2: Col 4
3.1	Sen and Panjamapirom (2012)	Check on misdemeanor	Total suicide rate	All ages	0.98		0.95	1.02			Table 2: Col 6
3.1	Sen and Panjamapirom (2012)	Check on "other miscellaneous" records	Firearm suicide rate	All ages	1.01		0.97	1.05			Table 2: Col 4
3.1	Sen and Panjamapirom (2012)	Check on "other miscellaneous" records	Total suicide rate	All ages	1.00		0.97	1.03			Table 2: Col 6
3.1	Sen and Panjamapirom (2012)	Check on restraining order	Firearm suicide rate	All ages	1.03		0.98	1.09			Table 2: Col 4
3.1	Sen and Panjamapirom (2012)	Check on restraining order	Total suicide rate	All ages	1.02		0.98	1.06			Table 2: Col 6
3.1	Sen and Panjamapirom (2012)	Background check comprehensiveness	Firearm suicide rate	All ages	0.98		0.96	1.00			Table 2: Col 2
3.2	Sen and Panjamapirom (2012)	Check on "other miscellaneous" records	Total homicide rate	All ages	1.05		0.98	1.13			Table 2: Col 5

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
3.2	Sen and Panjamapirom (2012)	Check on "other miscellaneous" records	Firearm homicide rate	All ages	1.12		1.03	1.22			Table 2: Col 3
3.2	Sen and Panjamapirom (2012)	Background check comprehensiveness	Firearm homicide rate	All ages	0.93		0.91	0.96			Table 2: Col 1
3.2	Sen and Panjamapirom (2012)	Check on restraining order	Total homicide rate	All ages	0.91		0.85	0.98			Table 2: Col 5
3.2	Sen and Panjamapirom (2012)	Check on restraining order	Firearm homicide rate	All ages	0.87		0.79	0.95			Table 2: Col 3
3.2	Sen and Panjamapirom (2012)	Check on mental illness	Total homicide rate	All ages	0.93		0.86	0.99			Table 2: Col 5
3.2	Sen and Panjamapirom (2012)	Check on mental illness	Firearm homicide rate	All ages	0.93		0.87	1.01			Table 2: Col 3
3.2	Sen and Panjamapirom (2012)	Check on fugitive status	Total homicide rate	All ages	0.77		0.71	0.84			Table 2: Col 5
3.2	Sen and Panjamapirom (2012)	Check on fugitive status	Firearm homicide rate	All ages	0.79		0.72	0.88			Table 2: Col 3
3.2	Sen and Panjamapirom (2012)	Check on misdemeanor	Total homicide rate	All ages	1.02		0.95	1.1			Table 2: Col 5

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
3.2	Sen and Panjamapirom (2012)	Check on misdemeanor	Firearm homicide rate	All ages	0.99	0.060	0.9	1.08			Table 2: Col 3
3.2	La Valle (2013)	Brady Act	Total homicide rate	All ages	0.003	0.060					Table 7
3.2	La Valle (2013)	Brady Act	Firearm homicide rate	All ages	0.022	0.071					Table 7
3.2	Gius (2015a)	State dealer background check	Gun-related murder rate	All ages	-0.683				-5.34		Table 2
3.2	Gius (2015a)	State private-seller background check	Gun-related murder rate	All ages	1.05				7.47		Table 2
3.2	Ludwig and Cook (2000)	Brady Act	Total homicide rate	Aged 21+	0.97		0.87	1.08			Table 1: Col 3
3.2	Ludwig and Cook (2000)	Brady Act	Firearm homicide rate	Aged 21+	0.99		0.86	1.13			Table 1: Col 3
3.2	Ludwig and Cook (2000)	Brady Act	Nonfirearm homicide rate	Aged 21+	0.94		0.87	1.02			Table 1: Col 3
3.2	Ludwig and Cook (2000)	Brady Act	Proportion of homicides with firearm	Aged 21+	1.02		0.99	1.04			Table 1: Col 3
3.2	Ludwig and Cook (2000)	Brady Act	Total homicide rate	Aged 55+	1.00		0.90	1.12			Table 1: Col 6
3.2	Ludwig and Cook (2000)	Brady Act	Firearm homicide rate	Aged 55+	1.07		0.97	1.16			Table 1: Col 6
3.2	Ludwig and Cook (2000)	Brady Act	Nonfirearm homicide rate	Aged 55+	0.95		0.81	1.12			Table 1: Col 6

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
3.2	Ludwig and Cook (2000)	Brady Act	Proportion of homicides with firearm	Aged 55+	1.07		0.98	1.18			Table 1: Col 6
3.2	Swanson et al. (2016)	NICS reporting (Fla.)	Violent crime arrest	No crim. disqualified	0.62		0.50	0.76			In text (page 1071)
3.2	Wright, Wintemute, and Rivara (1999)	No felony prohibition/checks	Any offense	Calif. purchasers	1.05		1.04	1.07			Table 1, row 3
3.2	Wright, Wintemute, and Rivara (1999)	No felony prohibition/checks	Gun offense	Calif. purchasers	1.21		1.08	1.36			Table 1, row 3
3.2	Wright, Wintemute, and Rivara (1999)	No felony prohibition/checks	Violent offense	Calif. purchasers	1.24		1.11	1.39			Table 1, row 3
3.3	Luca, Deepak, and Poliquin (2016)	Background check (all handgun sales)	Any mass shooting incident	N/A	-0.112	0.089					Table C2: Col 1
3.3	Luca, Deepak, and Poliquin (2016)	Background check (all handgun sales)	Any mass shooting incident	N/A	-0.124	0.098					Table C2: Col 2
3.3	Luca, Deepak, and Poliquin (2016)	Background check (all firearm sales)	Any mass shooting incident	N/A	0.011	0.131					Table C2: Col 1
3.3	Luca, Deepak, and Poliquin (2016)	Background check (all firearm sales)	Any mass shooting incident	N/A	-0.032	0.142					Table C2: Col 2
4.1	Lott (2010)	State/federal assault weapon ban	Total homicide	All ages	0.004				0.11		Table A6.3
4.1	Gius (2014)	State assault weapon ban	Firearm murder rate	All ages	-0.29				-1.57		Table 1
4.2	Gius (2015c)	State assault weapon ban	Mass shooting deaths	All ages	-0.59202				-2.28		Table 1: Col 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
4.2	Gius (2015c)	State assault weapon ban	Mass shooting injuries	All ages	0.298				1.16		Table 1: Col 2
4.2	Luca, Deepak, and Poliquin (2016)	State assault weapon ban	Any mass shooting incident	N/A	0.062	0.056					Table C2: Col 1
4.2	Luca, Deepak, and Poliquin (2016)	State assault weapon ban	Any mass shooting incident	N/A	0.067	0.057					Table C2: Col 2
5.1	Humphreys, Gasparrini, and Wiebe (2017)	Stand-your-ground law	Total suicide rate	All ages	0.99, 1.00					0.97	Table 1
5.1	Humphreys, Gasparrini, and Wiebe (2017)	Stand-your-ground law	Firearm suicide rate	All ages	0.98, 0.95					0.54	Table 1
5.2	Cheng and Hoekstra (2013)	Castle doctrine law	Homicide	All ages	0.0937	0.029					Table 5: Col 3
5.2	Cheng and Hoekstra (2013)	Castle doctrine law	Burglary	All ages	0.0223	0.0223					Table 4: Col 3
5.2	Cheng and Hoekstra (2013)	Castle doctrine law	Robbery	All ages	0.0262	0.0229					Table 4: Col 3
5.2	Cheng and Hoekstra (2013)	Castle doctrine law	Aggravated assault	All ages	0.0372	0.0319					Table 4: Col 3
5.2	Webster, Crifasi, and Vernick (2014)	Stand-your-ground law	Total homicide rate	All ages	0.102	0.183					Corrected Supplement Table 3
5.2	Webster, Crifasi, and Vernick (2014)	Stand-your-ground law	Firearm homicide rate	All ages	0.16	0.17					Corrected Supplement Table 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
5.2	Webster, Crifasi, and Vernick (2014)	Stand-your-ground law	Nonfirearm homicide rate	All ages	0.01	0.1					Corrected Supplement Table 2
5.2	Humphreys, Gasparrini, and Wiebe (2017)	Stand-your-ground law	Total homicide rate	All ages	1.24, 1.06					0.001	Table 1
5.2	Humphreys, Gasparrini, and Wiebe (2017)	Stand-your-ground law	Firearm homicide rate	All ages	1.32, 1.08					0.001	Table 1
5.3	Cheng and Hoekstra (2013)	Castle doctrine law	Justifiable homicide	All ages	0.283	0.235					Table 6: Panel E: Col 3
6.1	Sen and Panjamapirom (2012)	Check on mental illness	Total suicide rate	All ages	0.97		0.95	0.99			Table 2: Col 6
6.1	Sen and Panjamapirom (2012)	Check on mental illness	Firearm suicide rate	All ages	0.96		0.92	0.99			Table 2: Col 4
6.2	Sen and Panjamapirom (2012)	Check on mental illness	Total homicide rate	All ages	0.93		0.86	0.99			Table 2: Col 5
6.2	Sen and Panjamapirom (2012)	Check on mental illness	Firearm homicide rate	All ages	0.93		0.87	1.01			Table 2: Col 3
6.2	Swanson et al. (2016)	NICS reporting (Fla.)	Violent crime arrest	No crim. disqualified	0.62		0.50	0.76			In text (p. 1071)
8.1	Webster et al. (2004)	Permit-to-purchase law	Total suicide rate	Aged 14–17	1.06		0.92	1.23			Table 2: Col 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
8.1	Webster et al. (2004)	Permit-to-purchase law	Total suicide rate	Aged 18–20	1.18		1.04	1.34			Table 2: Col 2
8.1	Webster et al. (2004)	Permit-to-purchase law	Firearm suicide rate	Aged 14–17	0.92		0.76	1.10			Table 2: Col 1
8.1	Webster et al. (2004)	Permit-to-purchase law	Firearm suicide rate	Aged 18–20	1.22		1.04	1.43			Table 2: Col 2
8.1	Webster et al. (2004)	Permit-to-purchase law	Nonfirearm suicide rate	Aged 14–17	1.27		1.00	1.61			Table 2: Col 1
8.1	Webster et al. (2004)	Permit-to-purchase law	Nonfirearm suicide rate	Aged 18–20	1.14		0.93	1.39			Table 2: Col 2
8.1	Crifasi et al. (2015)	Permit-to-purchase law	Total suicide rate	All ages	1.01		0.95	1.08			Appendix Table 2
8.1	Crifasi et al. (2015)	Permit-to-purchase law	Firearm suicide rate	All ages	0.88		0.81	0.96			Appendix Table 2
8.1	Crifasi et al. (2015)	Permit-to-purchase law	Nonfirearm suicide rate	All ages	1.14		1.05	1.24			Appendix Table 2
8.1	Crifasi et al. (2015)	Repeal of Missouri permit-to-purchase	Total suicide rate	All ages	1.03		0.97	1.08			Appendix Table 2
8.1	Crifasi et al. (2015)	Repeal of Missouri permit-to-purchase	Firearm suicide rate	All ages	1.02		0.96	1.09			Appendix Table 2
8.1	Crifasi et al. (2015)	Repeal of Missouri permit-to-purchase	Nonfirearm suicide rate	All ages	1.03		0.95	1.11			Appendix Table 2
8.2	Webster, Crifasi, and Vernick (2014)	Repeal of Missouri permit-to-purchase	Total homicide rate	All ages	1.08	0.16					Corrected Table 2
8.2	Webster, Crifasi, and Vernick (2014)	Repeal of Missouri permit-to-purchase	Firearm homicide rate	All ages	1.18	0.13					Corrected Table 2

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
8.2	Webster, Crifasi, and Vernick (2014)	Repeal of Missouri permit-to-purchase	Nonfirearm homicide rate	All ages	-0.08	0.1					Corrected Table 2
8.2	Rudolph et al. (2015)	Connecticut permit-to-purchase	Firearm homicide rate	All ages	0.60					0.04	In text (p. e51) and Table 2, "2xMSPE"
8.3	Luca, Deepak, and Poliquin (2016)	Handgun permit system	Any mass shooting incident (no political controls)	All ages	-0.009	0.115					Table C2: Col 1
8.3	Luca, Deepak, and Poliquin (2016)	Handgun permit system	Any mass shooting incident (political controls)	All ages	0.004	0.117					Table C2: Col 2
10.1	Cummings et al. (1997a)	CAP law	Firearm suicide rate	Aged 0–14	0.81		0.66	1.01			In text (p. 1085)
10.1	Cummings et al. (1997a)	CAP law	Nonfirearm suicide rate	Aged 0–14	0.95		0.75	1.2			In text (p. 1085)
10.1	Webster et al. (2004)	CAP law	Total suicide rate	Aged 14–17	0.92		0.86	0.98			Table 2: Col 1
10.1	Webster et al. (2004)	CAP law	Total suicide rate	Aged 18–20	0.89		0.85	0.93			Table 2: Col 2
10.1	Webster et al. (2004)	CAP law	Firearm suicide rate	Aged 14–17	0.89		0.83	0.96			Table 2: Col 1
10.1	Webster et al. (2004)	CAP law	Firearm suicide rate	Aged 18–20	0.87		0.82	0.92			Table 2: Col 2
10.1	Webster et al. (2004)	CAP law	Nonfirearm suicide rate	Aged 14–17	1.00		0.91	1.10			Table 2: Col 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
10.1	Webster et al. (2004)	CAP law	Nonfirearm suicide rate	Aged 18–20	0.91	0.228	0.85	0.98			Table 2: Col 2
10.1	DeSimone, Markowitz, and Xu (2013)	Negligent storage (11 states)	Firearm self-inflicted injury rate	Aged 0–17	-1.165	0.339					Table 3: Col 3
10.1	DeSimone, Markowitz, and Xu (2013)	Negligent storage (11 states)	Firearm self-inflicted injury rate	Aged 18+	-0.003	0.228					Table 3: Col 4
10.1	DeSimone, Markowitz, and Xu (2013)	Negligent storage or reckless provision (11 states)	Firearm self-inflicted injury rate	Aged 0–17	-1.06	0.296					Table 3: Col 1
10.1	DeSimone, Markowitz, and Xu (2013)	Negligent storage or reckless provision (11 states)	Firearm self-inflicted injury rate	Aged 18+	0.161	0.227					Table 3: Col 2
10.1	Gius (2015b)	CAP law	Firearm suicide rate	Aged 0–19	-0.218				-4.36		Table 4
10.2	Cummings et al. (1997a)	CAP law	Firearm homicide rate	Aged 0–14	0.89		0.76	1.05			In text (p. 1085)
10.2	Cummings et al. (1997a)	CAP law	Nonfirearm homicide rate	Aged 0–14	0.96		0.86	1.06			In text (p. 1085)
10.2	Lott and Whitley (2001)	Safe storage law	Murder rate	All ages	0.039				1.141		Table 3: Col 2
10.2	Lott and Whitley (2001)	Safe storage law	Rape rate	All ages	0.092				3.357		Table 3: Col 3
10.2	Lott and Whitley (2001)	Safe storage law	Robbery rate	All ages	0.1056				2.823		Table 3: Col 4

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
10.2	Lott and Whitley (2001)	Safe storage law	Assault rate	All ages	-0.041				1.493		Table 3: Col 5
10.3	Cummings et al. (1997a)	CAP law	Unintentional firearm death rate	Aged 0–14	0.77	0.63	0.63	0.94			In text (p. 1085)
10.3	Cummings et al. (1997a)	CAP law	Unintentional firearm death rate	Aged 15–19	0.91	0.77	0.77	1.08			In text (p. 1085)
10.3	Cummings et al. (1997a)	CAP law	Unintentional firearm death rate	Aged 20–24	0.84	0.68	0.68	1.03			In text (p. 1085)
10.3	Webster and Starnes (2000)	CAP law	Unintentional firearm death rate	Aged 0–14	0.83	0.71	0.71	0.97			Table 1
10.3	Webster and Starnes (2000)	Felony CAP law	Unintentional firearm death rate	Aged 0–14	0.69	0.56	0.56	0.85			Table 1
10.3	Webster and Starnes (2000)	Misdemeanor CAP law	Unintentional firearm death rate	Aged 0–14	1.00	0.81	0.81	1.22			Table 1
10.3	Webster and Starnes (2000)	Florida CAP law	Unintentional firearm death rate	Aged 0–14	0.49	0.25	0.25	0.69			Table 1
10.3	Webster and Starnes (2000)	Non-Florida CAP law	Unintentional firearm death rate	Aged 0–14	0.95	0.80	0.80	1.12			Table 1
10.3	Hepburn et al. (2006)	CAP law	Unintentional firearm death rate	Aged 0–14	0.78	0.61	0.61	0.99			Table 3: Col 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
10.3	Hepburn et al. (2006)	CAP law	Unintentional firearm death rate	Aged 55–74	0.88		0.63	1.22			Table 3: Col 2
10.3	Hepburn et al. (2006)	Felony CAP law	Unintentional firearm death rate	Aged 0–14	0.64		0.46	0.89			Table 3: Col 1
10.3	Hepburn et al. (2006)	Felony CAP law	Unintentional firearm death rate	Aged 55–74	0.90		0.72	1.12			Table 3: Col 2
10.3	Hepburn et al. (2006)	Misdemeanor CAP law	Unintentional firearm death rate	Aged 0–14	0.93		0.76	1.13			Table 3: Col 1
10.3	Hepburn et al. (2006)	Misdemeanor CAP law	Unintentional firearm death rate	Aged 55–74	0.88		0.54	1.44			Table 3: Col 2
10.3	Hepburn et al. (2006)	CAP law (exclude Fla.)	Unintentional firearm death rate	Aged 0–14	0.86		0.72	1.03			Table 3: Col 1
10.3	Hepburn et al. (2006)	CAP law (exclude Fla.)	Unintentional firearm death rate	Aged 55–74	0.87		0.61	1.28			Table 3: Col 2
10.3	Hepburn et al. (2006)	CAP law (exclude Calif.)	Unintentional firearm death rate	Aged 0–14	0.77		0.56	1.06			Table 3: Col 1
10.3	Hepburn et al. (2006)	CAP law (exclude Calif.)	Unintentional firearm death rate	Aged 55–74	0.86		0.45	1.27			Table 3: Col 2

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
10.3	Gius (2015b)	CAP law	Unintentional firearm death rate	Aged 0–19	-0.036				-0.8		Table 5
10.3	DeSimone, Markowitz, and Xu (2013)	CAP law, negligent storage (11 states)	Unintentional firearm injury rate	Aged 0–17	-0.273	0.184					Table 3: Col 3
10.3	DeSimone, Markowitz, and Xu (2013)	CAP law, negligent storage (11 states)	Unintentional firearm injury rate	Aged 18+	-0.343	0.143					Table 3: Col 4
10.3	DeSimone, Markowitz, and Xu (2013)	Negligent storage or reckless provision (11 states)	Unintentional firearm injury rate	Aged 0–17	-0.191	0.154					Table 3: Col 1
10.3	DeSimone, Markowitz, and Xu (2013)	Negligent storage or reckless provision (11 states)	Unintentional firearm injury rate	Aged 18+	-0.283	0.121					Table 3: Col 2
10.4	Lott (2003)	Safe storage law	Shooting fatalities and injuries	All ages	1.073774				0.459		Appendix Table 6.2: Col 3
10.4	Lott (2003)	Safe storage law	Number of shooting incidents	All ages	0.8250622				0.628		Appendix Table 6.2: Col 4
11.1	Vigdor and Mercy (2006)	Confiscation law	Total IPH rate	All ages	0.95		0.87	1.04			Table 5: Panel 1
11.1	Vigdor and Mercy (2006)	Confiscation law	Firearm IPH rate	All ages	0.94		0.83	1.07			Table 5: Panel 1
11.1	Vigdor and Mercy (2006)	Confiscation law	Total IPH rate	Female victims	0.98		0.89	1.09			Table 5: Panel 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
11.1	Vigdor and Mercy (2006)	Confiscation law	Firearm IPH rate	Female victims	0.96		0.82	1.11			Table 5: Panel 1
11.1	Zeoli and Webster (2010)	Confiscation law	Total IPH rate	All ages	1.10		0.92	1.31			Table 1
11.1	Zeoli and Webster (2010)	Confiscation law	Firearm IPH rate	All ages	1.19		0.97	1.46			Table 1
11.1	Raission (2016)	Gun Control Act expansion	Firearm IPH rate	All intimate partners	-0.0667	0.0309					Table 3: Model 3
11.1	Raission (2016)	Gun Control Act expansion	Firearm IPH rate	Female IPH victims	-0.136	0.0443					Table 3: Model 3
11.1	Raission (2016)	Gun Control Act expansion	Firearm IPH rate	Male IPH victims	0.0053	0.0312					Table 3: Model 3
12.1	Webster et al. (2004)	State minimum purchase age	Total suicide rate	Aged 14–17	1.04		0.90	1.21			Table 2: Col 1
12.1	Webster et al. (2004)	State minimum purchase age	Total suicide rate	Aged 18–20	0.97		0.91	1.05			Table 2: Col 2
12.1	Webster et al. (2004)	State minimum purchase age	Firearm suicide rate	Aged 14–17	1.04		0.87	1.16			Table 2: Col 1
12.1	Webster et al. (2004)	State minimum purchase age	Firearm suicide rate	Aged 18–20	0.91		0.83	1.00			Table 2: Col 2
12.1	Webster et al. (2004)	State minimum purchase age	Nonfirearm suicide rate	Aged 14–17	1.05		0.85	1.31			Table 2: Col 1
12.1	Webster et al. (2004)	State minimum purchase age	Nonfirearm suicide rate	Aged 18–20	1.05		0.94	1.17			Table 2: Col 2
12.1	Webster et al. (2004)	State minimum possession age	Total suicide rate	Aged 14–17	0.97		0.90	1.05			Table 2: Col 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
12.1	Webster et al. (2004)	State minimum possession age	Total suicide rate	Aged 18–20	1.13	1.01	1.01	1.27			Table 2: Col 2
12.1	Webster et al. (2004)	State minimum possession age	Firearm suicide rate	Aged 14–17	1.02	0.92	0.92	1.12			Table 2: Col 1
12.1	Webster et al. (2004)	State minimum possession age	Firearm suicide rate	Aged 18–20	1.14	0.98	0.98	1.34			Table 2: Col 2
12.1	Webster et al. (2004)	State minimum possession age	Nonfirearm suicide rate	Aged 14–17	0.93	0.82	0.82	1.05			Table 2: Col 1
12.1	Webster et al. (2004)	State minimum possession age	Nonfirearm suicide rate	Aged 18–20	1.07	0.90	0.90	1.27			Table 2: Col 2
12.1	Webster et al. (2004)	Federal minimum purchase age	Total suicide rate	Aged 14–17	1.02	0.91	0.91	1.14			Table 2: Col 1
12.1	Webster et al. (2004)	Federal minimum purchase age	Firearm suicide rate	Aged 14–17	1.00	0.87	0.87	1.16			Table 2: Col 1
12.1	Webster et al. (2004)	Federal minimum purchase age	Nonfirearm suicide rate	Aged 14–17	1.08	0.91	0.91	1.28			Table 2: Col 1
12.1	Webster et al. (2004)	Federal minimum possession age	Total suicide rate	Aged 14–17	0.98	0.90	0.90	1.08			Table 2: Col 1
12.1	Webster et al. (2004)	Federal minimum possession age	Firearm suicide rate	Aged 14–17	0.99	0.89	0.89	1.09			Table 2: Col 1
12.1	Webster et al. (2004)	Federal minimum possession age	Nonfirearm suicide rate	Aged 14–17	1.12	0.99	0.99	1.26			Table 2: Col 1
12.1	Gius (2015b)	State minimum possession age	Firearm suicide rate	Aged 0–19	-0.046				-1.05		Table 4
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Total suicide rate	All ages	1.02	0.98	0.98	1.07			Table 4

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Total suicide rate	Aged 0–19	1.1	0.94	0.94	1.29			Table 3
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Total suicide rate	Aged 20+	1.04	0.99	0.99	1.1			Table 3
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm suicide rate	All ages	1	0.94	0.94	1.06			Table 4
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm suicide rate	Aged 0–19	0.94	0.8	0.8	1.06			Table 3
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm suicide rate	Aged 20+	1.02	0.96	0.96	1.08			Table 3
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Total suicide rate	All ages	1.03	0.96	0.96	1.11			Table 4
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Total suicide rate	Aged 0–19	1.15	0.93	0.93	1.42			Table 3
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Total suicide rate	Aged 20+	1.04	0.95	0.95	1.13			Table 3
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Firearm suicide rate	All ages	0.99	0.88	0.88	1.13			Table 4
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Firearm suicide rate	Aged 0–19	0.93	0.77	0.77	1.12			Table 3
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Firearm suicide rate	Aged 20+	0.99	0.88	0.88	1.13			Table 3
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Total homicide rate	All ages	1	0.94	0.94	1.05			Table 2
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Total homicide rate	Aged 0–19	0.92	0.81	0.81	1.05			Table 3

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Total homicide rate	Aged 20+	1.01		0.95	1.06			Table 3
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm homicide rate	All ages	0.98		0.91	1.06			Table 2
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm homicide rate	Aged 0–19	0.92		0.8	1.06			Table 3
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm homicide rate	Aged 20+	0.99		0.93	1.06			Table 3
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Total homicide rate	All ages	1.02		0.89	1.18			Table 2
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Total homicide rate	Aged 0–19	0.98		0.79	1.2			Table 3
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Total homicide rate	Aged 20+	1.03		0.88	1.2			Table 3
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Firearm homicide rate	All ages	1.06		0.88	1.27			Table 2
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Firearm homicide rate	Aged 0–19	0.91		0.72	1.15			Table 3
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Firearm homicide rate	Aged 20+	1.08		0.89	1.31			Table 3
12.2	Rudolph et al. (2015)	State minimum purchase age of 21	Firearm homicide rate	All ages	0.6					0.04	In text (p. e51) and Table 2, "2xMSPE"
12.3	Gius (2015b)	State minimum possession age	Unintentional firearm death rate	Aged 0–19	-0.0636				-1.6		Table 5

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
12.4	Luca, Deepak, and Poliquin (2016)	State minimum purchase age of 18	Any mass shooting incident	N/A	0.007	0.025					Table C2: Col 1
12.4	Luca, Deepak, and Poliquin (2016)	State minimum purchase age of 18	Any mass shooting incident	N/A	0.01	0.026					Table C2: Col 2
12.4	Luca, Deepak, and Poliquin (2016)	State minimum purchase age of 21	Any mass shooting incident	N/A	-0.059	0.051					Table C2: Col 1
12.4	Luca, Deepak, and Poliquin (2016)	State minimum purchase age of 21	Any mass shooting incident	N/A	-0.075	0.051					Table C2: Col 2
13.1	Rosengart et al. (2005)	Shall-issue law	Total suicide rate	All ages	0.98		0.96	1.01			Table 4
13.1	Rosengart et al. (2005)	Shall-issue law	Firearm suicide rate	All ages	1		0.97	1.02			Table 4
13.1	DeSimone, Markowitz, and Xu (2013)	Shall-issue law	Self-inflicted firearm injury rate	Aged 0–17	0.662	0.747					Table 5
13.1	DeSimone, Markowitz, and Xu (2013)	Shall-issue law	Self-inflicted firearm injury rate	Aged 18+	0.742	0.163					Table 6
13.2	Rosengart et al. (2005)	Shall-issue law vs. no CC permitted	Total homicide rate	All ages	1.07		0.98	1.17			Table 2
13.2	Rosengart et al. (2005)	Shall-issue law vs. no CC permitted	Firearm homicide rate	All ages	1.11		0.99	1.24			Table 2
13.2	Grambsch (2008)	Shall-issue vs. no CC (random effects)	Murder rate	All ages	0.005	0.011					Table 3
13.2	Grambsch (2008)	Shall-issue vs. no CC (fixed effects)	Murder rate	All ages	0.06	0.015					Table 3

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
13.2	French and Heagerty (2008)	Shall-issue law vs. no CC	Firearm homicide rate	All ages	1.101	0.993	0.993	1.22			In text (p. 14)
13.2	Roberts (2009)	May-issue vs. shall-issue	Total IPH rate	All ages	1.7128	0.216					Table 2
13.2	Roberts (2009)	No CC vs. shall-issue	Total IPH rate	All ages	0.9621	0.212					Table 2
13.2	Roberts (2009)	May-issue vs. shall-issue	Firearm IPH rate	All ages	1.1202	0.128					Table 3
13.2	Roberts (2009)	No CC vs. shall-issue	Firearm IPH rate	All ages	0.8608	0.19					Table 3
13.2	La Valle and Glover (2012)	May-issue	Total homicide rate	All ages	-0.214	0.065					Table 8
13.2	La Valle and Glover (2012)	Shall-issue	Total homicide rate	All ages	0.206	0.08					Table 8
13.2	La Valle and Glover (2012)	May-issue	Firearm homicide rate	All ages	-0.263	0.08					Table 7
13.2	La Valle and Glover (2012)	Shall-issue	Firearm homicide rate	All ages	0.274	0.075					Table 7
13.2	La Valle (2013)	Shall-issue law vs. no CC permitted	Total homicide rate	All ages	-0.137	0.062					Table 7
13.2	La Valle (2013)	Shall-issue law vs. no CC permitted	Firearm homicide rate	All ages	-0.166	0.073					Table 7
13.2	Webster, Crifasi, and Vernick (2014)	Shall-issue law vs. no CC permitted	Total homicide rate	All ages	0.38	0.23					Corrected Supplement Table 3
13.2	Webster, Crifasi, and Vernick (2014)	Shall-issue law vs. no CC permitted	Firearm homicide rate	All ages	0.25	0.21					Corrected Supplement Table 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
13.2	Webster, Crifasi, and Vernick (2014)	Shall-issue law vs. no CC permitted	Nonfirearm homicide rate	All ages	0.21	0.12					Corrected Supplement Table 2
13.2	Webster, Crifasi, and Vernick (2014)	Shall-issue law vs. no CC permitted	Murder/manslaughter rate	All ages	0.58	0.42					Corrected Supplement Table 4
13.2	Gius (2014)	Restrictive vs. lenient CC laws	Firearm murder rate	All ages	0.365				3.74		Table 1
13.2	Aneja, Donohue, and Zhang (2014)	Shall-issue vs. any other CC law	Murder rate	All ages	0.0331	0.0651					Table 8A
13.2	Aneja, Donohue, and Zhang (2014)	Shall-issue vs. any other CC law	Rape rate	All ages	0.1153	0.0573					Table 8A
13.2	Aneja, Donohue, and Zhang (2014)	Shall-issue vs. any other CC law	Robbery rate	All ages	0.1385	0.0803					Table 8A
13.2	Aneja, Donohue, and Zhang (2014)	Shall-issue vs. any other CC law	Assault rate	All ages	0.0803	0.0446					Table 8A
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Violent crime	All ages	-0.0566				-3.067		Table 6: Model V
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Murder rate	All ages	-0.0492				-1.696		Table 6: Model V
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Rape rate	All ages	-0.0161				-0.739		Table 6: Model V
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Aggravated Assault	All ages	-0.0705				-2.927		Table 6: Model V
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Robbery rate	All ages	-0.0385				-1.322		Table 6: Model V

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
13.2	Kendall and Tamura (2010)	Shall-issue (vs. other CC law)	Murder rate	All ages	-0.003				1.52		Table 3
13.2	Kendall and Tamura (2010)	Shall-issue (vs. other CC law)	Rape rate	All ages	-0.002				0.99		Table 3
13.2	Kendall and Tamura (2010)	Shall-issue (vs. other CC law)	Robbery rate	All ages	0.001				0.55		Table 3
13.2	Kendall and Tamura (2010)	Shall-issue (vs. other CC law)	Assault rate	All ages	0				0.05		Table 3
13.3	Lott and Mustard (1997)	Shall-issue law	Unintentional handgun death rate	All ages	0.00478				0.096		Table 18: Col 1
13.3	Lott and Mustard (1997)	Shall-issue law	Unintentional nonhandgun death rate	All ages	0.098				1.706		Table 18: Col 2
13.3	DeSimone, Markowitz, and Xu (2013)	Shall-issue law	Unintentional firearm injury rate	Aged 0–17	0.53	0.364					Table 5
13.3	DeSimone, Markowitz, and Xu (2013)	Shall-issue law	Unintentional firearm injury rate	Aged 18+	0.823	0.191					Table 6
13.4	Lott (2003)	Shall-issue law	Multiple-victim gun deaths, injuries	All ages	0.2151				9.609		Appendix Table 6.2: Col 3
13.4	Lott (2003)	Shall-issue law	No. of multiple-victim gun incidents	All ages	0.3280486				3.82		Appendix Table 6.2: Col 4
13.4	Luca, Deepak, and Poliquin (2016)	Permitless carry	Any mass shooting incident	All ages	0.152	0.182					Table C2: Col 1

Table B.1—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Estimate	Standard Error	Lower CI	Upper CI	Test Statistic	p	Source Table
13.4	Luca, Deepak, and Poliquin (2016)	Permitless carry	Any mass shooting incident	All ages	0.207	0.18					Table C2: Col 2
13.4	Luca, Deepak and Poliquin (2016)	Shall-issue law	Any mass shooting incident	All ages	-0.011	0.039					Table C2: Col 1
13.4	Luca, Deepak and Poliquin (2016)	Shall-issue law	Any mass shooting incident	All ages	-0.009	0.038					Table C2: Col 2
13.5	Duggan (2001)	Right-to-carry laws	Gun ownership	None	0.0038	0.0099					Table 10: Col 3

NOTE: CAP = child-access prevention; CC = concealed carry; Col = column; IPH = intimate partner homicide; N/A = not applicable; NICS = National Instant Criminal Background Check System.

Table B.2 shows the most-common methodological concerns we identified for analyses included in this report's forest plot figures. When we identified no such concerns for a study, the forest plots show that study's IRR values with green circles (see, for example, Figure 3.1). In Table B.2, we identify five categories of concerns:

- The *Parameter* column identifies with an *X* the analyses we believed to have been performed with fewer than ten observations per parameter estimate. In several cases, models with random effects were conducted, but no estimate of the effective number of parameters was reported. In these cases, we guessed that the effective number of random effect parameters was about half the total number of random effects. This resulted in none of the random effects models having fewer than ten observations per parameter estimate.
- The *Tx Units* column identifies the analyses that we believed identified a causal effect with three or fewer units (states, usually) exposed to the law.
- The *Cluster* column identifies the analyses that appeared to make no adjustments to the standard error to account for either serial correlation in the longitudinal data or heteroscedasticity. We were sparing in assigning this concern to analyses, giving credit for some type of standard error adjustment even when papers reported, for instance, having checked for the presence of serial correlation or performing adjustments of doubtful validity. Studies that made no reference to any type of adjustment or check are identified with this concern.
- The *Model* column identifies the analyses that reported results from models we believe may have been misspecified. We assigned this concern to just two types of models: those using ordinary least squares (OLS) to model dichotomous outcomes and those using OLS to model rates, many of which are close to zero. We did not assign this concern to OLS models of logged rate values, although this too is problematic.
- The *Other* column identifies studies with other methodological features that raised significant concerns for us. It was often the case that studies had multiple idiosyncratic methodological features that concerned us. However, we did not assign the *Other* concern to studies that had already been identified as having one of the other four common concerns. When a study is listed as having an *Other* concern, that concern is described in the text of the report whenever the study is discussed.

Table B.2
Methodological Concerns Identified for Analyses Included in the Report's Forest Plot Figures

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
3.1	Ludwig and Cook (2000)	Brady Act	Firearm suicide rate	Aged 21+	X				
3.1	Ludwig and Cook (2000)	Brady Act	Firearm suicide rate	Aged 55+	X				
3.1	Ludwig and Cook (2000)	Brady Act	Nonfirearm suicide rate	Aged 21+	X				
3.1	Ludwig and Cook (2000)	Brady Act	Nonfirearm suicide rate	Aged 55+	X				
3.1	Ludwig and Cook (2000)	Brady Act	Proportion of suicides with firearm	Aged 21+	X				
3.1	Ludwig and Cook (2000)	Brady Act	Proportion of suicides with firearm	Aged 55+	X				
3.1	Ludwig and Cook (2000)	Brady Act	Total suicide rate	Aged 21+	X				
3.1	Ludwig and Cook (2000)	Brady Act	Total suicide rate	Aged 55+	X				
3.1	Sen and Panjamapirom (2012)	Check on fugitive status	Firearm suicide rate	All ages		X			
3.1	Sen and Panjamapirom (2012)	Check on fugitive status	Total suicide rate	All ages		X			
3.1	Sen and Panjamapirom (2012)	Check on mental illness	Firearm suicide rate	All ages					
3.1	Sen and Panjamapirom (2012)	Check on mental illness	Total suicide rate	All ages					
3.1	Sen and Panjamapirom (2012)	Check on misdemeanor	Firearm suicide rate	All ages					
3.1	Sen and Panjamapirom (2012)	Check on misdemeanor	Total suicide rate	All ages					
3.1	Sen and Panjamapirom (2012)	Check on "other miscellaneous" records	Firearm suicide rate	All ages					
3.1	Sen and Panjamapirom (2012)	Check on "other miscellaneous" records	Total suicide rate	All ages					

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
3.1	Sen and Panjamapirom (2012)	Check on restraining order	Firearm suicide rate	All ages					
3.1	Sen and Panjamapirom (2012)	Check on restraining order	Total suicide rate	All ages					
3.1	Sen and Panjamapirom (2012)	Background check comprehensiveness	Firearm suicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Check on "other miscellaneous" records	Total homicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Check on "other miscellaneous" records	Firearm homicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Background check comprehensiveness	Firearm homicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Check on restraining order	Total homicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Check on restraining order	Firearm homicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Check on mental illness	Total homicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Check on mental illness	Firearm homicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Check on fugitive status	Total homicide rate	All ages				X	
3.2	Sen and Panjamapirom (2012)	Check on fugitive status	Firearm homicide rate	All ages				X	
3.2	Sen and Panjamapirom (2012)	Check on misdemeanor	Total homicide rate	All ages					
3.2	Sen and Panjamapirom (2012)	Check on misdemeanor	Firearm homicide rate	All ages					
3.2	La Valle (2013)	Brady Act	Total homicide rate	All ages					

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
3.2	La Valle (2013)	Brady Act	Firearm homicide rate	All ages					
3.2	Gius (2015a)	State dealer background check	Gun-related murder rate	All ages					X
3.2	Gius (2015a)	State private-seller background check	Gun-related murder rate	All ages		X			X
3.2	Ludwig and Cook (2000)	Brady Act	Total homicide rate	Aged 21+	X				
3.2	Ludwig and Cook (2000)	Brady Act	Firearm homicide rate	Aged 21+	X				
3.2	Ludwig and Cook (2000)	Brady Act	Nonfirearm homicide rate	Aged 21+	X				
3.2	Ludwig and Cook (2000)	Brady Act	Proportion of homicides with a firearm	Aged 21+	X				
3.2	Ludwig and Cook (2000)	Brady Act	Total homicide rate	Aged 55+	X				
3.2	Ludwig and Cook (2000)	Brady Act	Firearm homicide rate	Aged 55+	X				
3.2	Ludwig and Cook (2000)	Brady Act	Nonfirearm homicide rate	Aged 55+	X				
3.2	Ludwig and Cook (2000)	Brady Act	Proportion of homicides with a firearm	Aged 55+	X				
3.2	Swanson et al. (2016)	NICS reporting (Fla.)	Violent crime arrest	No crim. disqualified				X	
3.2	Wright, Wintemute, and Rivara (1999)	No felony prohibition/ checks	Any offense	Calif. purchasers					
3.2	Wright, Wintemute, and Rivara (1999)	No felony prohibition/ checks	Gun offense	Calif. purchasers					
3.2	Wright, Wintemute, and Rivara (1999)	No felony prohibition/ checks	Violent offense	Calif. purchasers					

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
3.3	Luca, Deepak, and Poliquin (2016)	Background check (all handgun sales)	Any mass shooting incident	N/A		X	X	X	
3.3	Luca, Deepak, and Poliquin (2016)	Background check (all handgun sales)	Any mass shooting incident	N/A				X	
3.3	Luca, Deepak, and Poliquin (2016)	Background check (all firearm sales)	Any mass shooting incident	N/A				X	
3.3	Luca, Deepak, and Poliquin (2016)	Background check (all firearm sales)	Any mass shooting incident	N/A				X	
4.1	Lott (2010)	State/federal assault weapon bans	Total homicide	All ages	X		X		
4.1	Gius (2014)	State assault weapons ban	Firearm murder rate	All ages			X	X	
4.2	Gius (2015c)	State assault weapons ban	Mass shooting deaths	All ages			X		
4.2	Gius (2015c)	State assault weapons ban	Mass shooting injuries	All ages			X		
4.2	Luca, Deepak, and Poliquin (2016)	State assault weapons ban	Any mass shooting incident	N/A				X	
4.2	Luca, Deepak, and Poliquin (2016)	State assault weapons ban	Any mass shooting incident	N/A				X	
5.1	Humphreys, Gasparrini, and Wiebe (2017)	Stand-your-ground law	Total suicide rate	All ages				X	
5.1	Humphreys, Gasparrini, and Wiebe (2017)	Stand-your-ground law	Firearm suicide rate	All ages				X	
5.2	Cheng and Hoekstra (2013)	Castle doctrine law	Homicide	All ages	X				

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
5.2	Cheng and Hoekstra (2013)	Castle doctrine law	Burglary	All ages	X				
5.2	Cheng and Hoekstra (2013)	Castle doctrine law	Robbery	All ages	X				
5.2	Cheng and Hoekstra (2013)	Castle doctrine law	Aggravated assault	All ages	X				
5.2	Webster, Crifasi, and Vernick (2014)	Stand-your-ground law	Total homicide rate	All ages	X	X	X	X	X
5.2	Webster, Crifasi, and Vernick (2014)	Stand-your-ground law	Firearm homicide rate	All ages	X	X	X	X	X
5.2	Webster, Crifasi, and Vernick (2014)	Stand-your-ground law	Nonfirearm homicide rate	All ages	X	X	X	X	X
5.2	Humphreys, Gasparrini, and Wiebe (2017)	Stand-your-ground law	Total homicide rate	All ages					X
5.2	Humphreys, Gasparrini, and Wiebe (2017)	Stand-your-ground law	Firearms homicide rate	All ages					X
5.3	Cheng and Hoekstra (2013)	Castle doctrine law	Justifiable homicide	All ages	X				
6.1	Sen and Panjamapirom (2012)	Check on mental illness	Total suicide rate	All ages					
6.1	Sen and Panjamapirom (2012)	Check on mental illness	Firearm suicide rate	All ages					
6.2	Sen and Panjamapirom (2012)	Check on mental illness	Total homicide rate	All ages					
6.2	Sen and Panjamapirom (2012)	Check on mental illness	Firearm homicide rate	All ages					
6.2	Swanson et al. (2016)	NICS reporting (Fla.)	Violent crime arrest	No crim. disqualified					X
8.1	Webster et al. (2004)	Permit-to-purchase law	Total suicide rate	Aged 14–17					X
8.1	Webster et al. (2004)	Permit-to-purchase law	Total suicide rate	Aged 18–20					X

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
8.1	Webster et al. (2004)	Permit-to-purchase law	Firearm suicide rate	Aged 14–17		X			
8.1	Webster et al. (2004)	Permit-to-purchase law	Firearm suicide rate	Aged 18–20		X			
8.1	Webster et al. (2004)	Permit-to-purchase law	Nonfirearm suicide rate	Aged 14–17		X			
8.1	Webster et al. (2004)	Permit-to-purchase law	Nonfirearm suicide rate	Aged 18–20		X			
8.1	Crifasi et al. (2015)	Permit-to-purchase law	Total suicide rate	All ages		X			
8.1	Crifasi et al. (2015)	Permit-to-purchase law	Firearm suicide rate	All ages		X			
8.1	Crifasi et al. (2015)	Permit-to-purchase law	Nonfirearm suicide rate	All ages		X			
8.1	Crifasi et al. (2015)	Repeal of Missouri permit-to-purchase	Total suicide rate	All ages		X			
8.1	Crifasi et al. (2015)	Repeal of Missouri permit-to-purchase	Firearm suicide rate	All ages		X			
8.1	Crifasi et al. (2015)	Repeal of Missouri permit-to-purchase	Nonfirearm suicide rate	All ages		X			
8.2	Webster, Crifasi, and Vernick (2014)	Repeal of Missouri permit-to-purchase	Total homicide rate	All ages	X	X			X
8.2	Webster, Crifasi, and Vernick (2014)	Repeal of Missouri permit-to-purchase	Firearm homicide rate	All ages	X	X			X
8.2	Webster, Crifasi, and Vernick (2014)	Repeal of Missouri permit-to-purchase	Nonfirearm homicide rate	All ages	X	X			X
8.2	Rudolph et al. (2015)	Connecticut permit-to-purchase	Firearm homicide rate	All ages		X			
8.3	Luca, Deepak, and Poliquin (2016)	Handgun permit system	Any mass shooting incident	All ages					X

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
8.3	Luca, Deepak, and Poliquin (2016)	Handgun permit system	Any mass shooting incident	All ages					X
10.1	Cummings et al. (1997a)	CAP law	Firearm suicide rate	Aged 0–14					
10.1	Cummings et al. (1997a)	CAP law	Nonfirearm suicide rate	Aged 0–14					
10.1	Webster et al. (2004)	CAP law	Total suicide rate	Aged 14–17					
10.1	Webster et al. (2004)	CAP law	Total suicide rate	Aged 18–20					
10.1	Webster et al. (2004)	CAP law	Firearm suicide rate	Aged 14–17					
10.1	Webster et al. (2004)	CAP law	Firearm suicide rate	Aged 18–20					
10.1	Webster et al. (2004)	CAP law	Nonfirearm suicide rate	Aged 14–17					
10.1	Webster et al. (2004)	CAP law	Nonfirearm suicide rate	Aged 18–20					
10.1	DeSimone, Markowitz, and Xu (2013)	Negligent storage (11 states)	Firearm self-inflicted injury rate	Aged 0–17					X
10.1	DeSimone, Markowitz, and Xu (2013)	Negligent storage (11 states)	Firearm self-inflicted injury rate	Aged 18+					X
10.1	DeSimone, Markowitz, and Xu (2013)	Negligent storage or reckless provision (11 states)	Firearm self-inflicted injury rate	Aged 0–17					X
10.1	DeSimone, Markowitz, and Xu (2013)	Negligent storage or reckless provision (11 states)	Firearm self-inflicted injury rate	Aged 18+					X
10.1	Gius (2015b)	CAP law	Firearm suicide rate	Aged 0–19					X
10.2	Cummings et al. (1997a)	CAP law	Firearm homicide rate	Aged 0–14					
10.2	Cummings et al. (1997a)	CAP law	Nonfirearm homicide rate	Aged 0–14					

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
10.2	Lott and Whitley (2001)	Safe storage law	Murder rate	All ages	X	X	X	X	X
10.2	Lott and Whitley (2001)	Safe storage law	Rape rate	All ages	X	X	X	X	X
10.2	Lott and Whitley (2001)	Safe storage law	Robbery rate	All ages	X	X	X	X	X
10.2	Lott and Whitley (2001)	Safe storage law	Assault rate	All ages	X	X	X	X	X
10.3	Cummings et al. (1997a)	CAP law	Unintentional firearm death rate	Aged 0–14					
10.3	Cummings et al. (1997a)	CAP law	Unintentional firearm death rate	Aged 15–19					
10.3	Cummings et al. (1997a)	CAP law	Unintentional firearm death rate	Aged 20–24					
10.3	Webster and Starnes (2000)	CAP law	Unintentional firearm death rate	Aged 0–14					
10.3	Webster and Starnes (2000)	Felony CAP law	Unintentional firearm death rate	Aged 0–14		X			
10.3	Webster and Starnes (2000)	Misdemeanor CAP law	Unintentional firearm death rate	Aged 0–14					
10.3	Webster and Starnes (2000)	Florida CAP law	Unintentional firearm death rate	Aged 0–14		X			
10.3	Webster and Starnes (2000)	Non-Florida CAP law	Unintentional firearm death rate	Aged 0–14					
10.3	Hepburn et al. (2006)	CAP law	Unintentional firearm death rate	Aged 0–14					X
10.3	Hepburn et al. (2006)	CAP law	Unintentional firearm death rate	Aged 55–74					X

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
10.3	Hepburn et al. (2006)	Felony CAP law	Unintentional firearm death rate	Aged 0–14		X			X
10.3	Hepburn et al. (2006)	Felony CAP law	Unintentional firearm death rate	Aged 55–74		X			X
10.3	Hepburn et al. (2006)	Misdemeanor CAP law	Unintentional firearm death rate	Aged 0–14					X
10.3	Hepburn et al. (2006)	Misdemeanor CAP law	Unintentional firearm death rate	Aged 55–74					X
10.3	Hepburn et al. (2006)	CAP law (exclude Fla.)	Unintentional firearm death rate	Aged 0–14					X
10.3	Hepburn et al. (2006)	CAP law (exclude Fla.)	Unintentional firearm death rate	Aged 55–74					X
10.3	Hepburn et al. (2006)	CAP law (exclude Calif.)	Unintentional firearm death rate	Aged 0–14					X
10.3	Hepburn et al. (2006)	CAP law (exclude Calif.)	Unintentional firearm death rate	Aged 55–74					X
10.3	Gius (2015b)	CAP law	Unintentional firearm death rate	Aged 0–19				X	
10.3	DeSimone, Markowitz, and Xu (2013)	CAP law, negligent storage (11 states)	Unintentional firearm injury rate	Aged 0–17					X
10.3	DeSimone, Markowitz, and Xu (2013)	CAP law, negligent storage (11 states)	Unintentional firearm injury rate	Aged 18+					X
10.3	DeSimone, Markowitz, and Xu (2013)	Negligent storage or reckless provision (11 states)	Unintentional firearm injury rate	Aged 0–17					X

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
10.3	DeSimone, Markowitz, and Xu (2013)	Negligent storage or reckless provision (11 states)	Unintentional firearm injury rate	Aged 18+					X
10.4	Lott (2003)	Safe storage law	Shooting fatalities + injuries	All ages	X		X		
10.4	Lott (2003)	Safe storage law	Number of shooting incidents	All ages	X		X		
11.1	Vigdor and Mercy (2006)	Confiscation law	Total IPH rate	All ages					
11.1	Vigdor and Mercy (2006)	Confiscation law	Firearm IPH rate	All ages					
11.1	Vigdor and Mercy (2006)	Confiscation law	Total IPH rate	Female victims					
11.1	Vigdor and Mercy (2006)	Confiscation law	Firearm IPH rate	Female victims					
11.1	Zeoli and Webster (2010)	Confiscation law	Total IPH rate	All ages					
11.1	Zeoli and Webster (2010)	Confiscation law	Firearm IPH rate	All ages					
11.1	Raissian (2016)	Gun Control Act expansion	Firearm IPH rate	All intimate partners					X
11.1	Raissian (2016)	Gun Control Act expansion	Firearm IPH rate	Female IPH victims					X
11.1	Raissian (2016)	Gun Control Act expansion	Firearm IPH rate	Male IPH victims					X
12.1	Webster et al. (2004)	State minimum purchase age	Total suicide rate	Aged 14–17					
12.1	Webster et al. (2004)	State minimum purchase age	Total suicide rate	Aged 18–20					

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
12.1	Webster et al. (2004)	State minimum purchase age	Firearm suicide rate	Aged 14–17					
12.1	Webster et al. (2004)	State minimum purchase age	Firearm suicide rate	Aged 18–20					
12.1	Webster et al. (2004)	State minimum purchase age	Nonfirearm suicide rate	Aged 14–17					
12.1	Webster et al. (2004)	State minimum purchase age	Nonfirearm suicide rate	Aged 18–20					
12.1	Webster et al. (2004)	State minimum possession age	Total suicide rate	Aged 14–17				X	
12.1	Webster et al. (2004)	State minimum possession age	Total suicide rate	Aged 18–20				X	
12.1	Webster et al. (2004)	State minimum possession age	Firearm suicide rate	Aged 14–17				X	
12.1	Webster et al. (2004)	State minimum possession age	Firearm suicide rate	Aged 18–20				X	
12.1	Webster et al. (2004)	State minimum possession age	Nonfirearm suicide rate	Aged 14–17				X	
12.1	Webster et al. (2004)	State minimum possession age	Nonfirearm suicide rate	Aged 18–20				X	
12.1	Webster et al. (2004)	Federal minimum purchase age	Total suicide rate	Aged 14–17					
12.1	Webster et al. (2004)	Federal minimum purchase age	Firearm suicide rate	Aged 14–17					
12.1	Webster et al. (2004)	Federal minimum purchase age	Nonfirearm suicide rate	Aged 14–17					

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
12.1	Webster et al. (2004)	Federal minimum possession age	Total suicide rate	Aged 14–17					
12.1	Webster et al. (2004)	Federal minimum possession age	Firearm suicide rate	Aged 14–17					
12.1	Webster et al. (2004)	Federal minimum possession age	Nonfirearm suicide rate	Aged 14–17					
12.1	Gius (2015b)	State minimum possession age	Firearm suicide rate	Aged 0–19					X
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Total suicide rate	All ages				X	
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Total suicide rate	Aged 0–19				X	
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Total suicide rate	Aged 20+				X	
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm suicide rate	All ages				X	
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm suicide rate	Aged 0–19				X	
12.1	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm suicide rate	Aged 20+				X	
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Total suicide rate	All ages				X	
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Total suicide rate	Aged 0–19				X	
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Total suicide rate	Aged 20+				X	

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Firearm suicide rate	All ages	X				
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Firearm suicide rate	Aged 0–19	X				
12.1	Rosengart et al. (2005)	State minimum possession age of 21	Firearm suicide rate	Aged 20+	X				
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Total homicide rate	All ages	X				
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Total homicide rate	Aged 0–19	X				
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Total homicide rate	Aged 20+	X				
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm homicide rate	All ages	X				
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm homicide rate	Aged 0–19	X				
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm homicide rate	Aged 20+	X				
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Total homicide rate	All ages	X				
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Total homicide rate	Aged 0–19	X				
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Total homicide rate	Aged 20+	X				
12.2	Rosengart et al. (2005)	State minimum purchase age of 21	Firearm homicide rate	All ages	X				

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Firearm homicide rate	Aged 0–19	X				
12.2	Rosengart et al. (2005)	State minimum possession age of 21	Firearm homicide rate	Aged 20+	X				
12.2	Rudolph et al. (2015)	State minimum purchase age of 21	Firearm homicide rate	All ages		X			
12.3	Gius (2015b)	State minimum possession age	Unintentional firearm death rate	Aged 0–19				X	
12.4	Luca, Deepak, and Poliquin (2016)	State minimum purchase age of 18	Any mass shooting incident	N/A				X	
12.4	Luca, Deepak, and Poliquin (2016)	State minimum purchase age of 18	Any mass shooting incident	N/A				X	
12.4	Luca, Deepak, and Poliquin (2016)	State minimum purchase age of 21	Any mass shooting incident	N/A				X	
12.4	Luca, Deepak, and Poliquin (2016)	State minimum purchase age of 21	Any mass shooting incident	N/A				X	
13.1	Rosengart et al. (2005)	Shall-issue law	Total suicide rate	All ages	X				
13.1	Rosengart et al. (2005)	Shall-issue law	Firearm suicide rate	All ages	X				
13.1	DeSimone, Markowitz, and Xu (2013)	Shall-issue law	Self-inflicted firearm injury rate	Aged 0–17		X			
13.1	DeSimone, Markowitz, and Xu (2013)	Shall-issue law	Self-inflicted firearm injury rate	Aged 18+		X			
13.2	Rosengart et al. (2005)	Shall-issue law vs. no CC permitted	Total homicide rate	All ages	X				

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
13.2	Rosengart et al. (2005)	Shall-issue law vs. no CC permitted	Firearm homicide rate	All ages	X				
13.2	Grambsch (2008)	Shall-issue vs. no CC (random effects)	Murder rate	All ages				X	
13.2	Grambsch (2008)	Shall-issue vs. no CC (fixed effects)	Murder rate	All ages	X			X	
13.2	French and Heagerty (2008)	Shall-issue law vs. no CC	Firearm homicide rate	All ages					
13.2	Roberts (2009)	May-issue vs. shall-issue	Total IPH rate	All ages				X	
13.2	Roberts (2009)	No CC vs. shall-issue	Total IPH rate	All ages				X	
13.2	Roberts (2009)	May-issue vs. shall-issue	Firearm IPH rate	All ages				X	
13.2	Roberts (2009)	No CC vs. shall-issue	Firearm IPH rate	All ages				X	
13.2	La Valle and Glover (2012)	May-issue	Total homicide rate	All ages					
13.2	La Valle and Glover (2012)	Shall-issue	Total homicide rate	All ages					
13.2	La Valle and Glover (2012)	May-issue	Firearm homicide rate	All ages					
13.2	La Valle and Glover (2012)	Shall-issue	Firearm homicide rate	All ages					
13.2	La Valle (2013)	Shall-issue law vs. no CC permitted	Total homicide rate	All ages					
13.2	La Valle (2013)	Shall-issue law vs. no CC permitted	Firearm homicide rate	All ages					
13.2	Webster, Crifasi, and Vernick (2014)	Shall-issue law vs. no CC permitted	Total homicide rate	All ages	X				X
13.2	Webster, Crifasi, and Vernick (2014)	Shall-issue law vs. no CC permitted	Firearm homicide rate	All ages	X				X

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
13.2	Webster, Crifasi, and Vermick (2014)	Shall-issue law vs. no CC permitted	Nonfirearm homicide rate	All ages	X				X
13.2	Webster, Crifasi, and Vermick (2014)	Shall-issue law vs. no CC permitted	Murder/manslaughter rate	All ages	X				X
13.2	Gius (2014)	Restrictive vs. lenient CC laws	Firearm murder rate	All ages		X			X
13.2	Aneja, Donohue, and Zhang (2014)	Shall-issue vs. any other CC law	Murder rate	All ages					
13.2	Aneja, Donohue, and Zhang (2014)	Shall-issue vs. any other CC law	Rape rate	All ages					
13.2	Aneja, Donohue, and Zhang (2014)	Shall-issue vs. any other CC law	Robbery rate	All ages					
13.2	Aneja, Donohue, and Zhang (2014)	Shall-issue vs. any other CC law	Assault rate	All ages					
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Violent crime	All ages	X		X		X
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Murder rate	All ages	X		X		X
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Rape rate	All ages	X		X		X
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Aggravated assault	All ages	X		X		X
13.2	Martin and Legault (2005)	Shall-issue (vs. other CC law)	Robbery rate	All ages	X		X		X

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
13.2	Kendall and Tamura (2010)	Shall-issue (vs. other CC law)	Murder rate	All ages					
13.2	Kendall and Tamura (2010)	Shall-issue (vs. other CC law)	Rape rate	All ages					
13.2	Kendall and Tamura (2010)	Shall-issue (vs. other CC law)	Robbery rate	All ages					
13.2	Kendall and Tamura (2010)	Shall-issue (vs. other CC law)	Assault rate	All ages					
13.3	Lott and Mustard (1997)	Shall-issue law	Unintentional handgun death rate	All ages	X			X	
13.3	Lott and Mustard (1997)	Shall-issue law	Unintentional nonhandgun death rate	All ages	X			X	
13.3	DeSimone, Markowitz, and Xu (2013)	Shall-issue law	Unintentional firearm injury rate	Aged 0–17		X			
13.3	DeSimone, Markowitz, and Xu (2013)	Shall-issue law	Unintentional firearm injury rate	Aged 18+		X			
13.4	Lott (2003)	Shall-issue law	Multiple-victim gun deaths, injuries	All ages	X			X	
13.4	Lott (2003)	Shall-issue law	No. of multiple-victim gun incidents	All ages	X			X	
13.4	Luca, Deepak, and Poliquin (2016)	Permitless carry	Any mass shooting incident	All ages					X
13.4	Luca, Deepak, and Poliquin (2016)	Permitless carry	Any mass shooting incident	All ages					X

Table B.2—Continued

Report Figure	Study	Specific Policy or Independent Variable	Specific Outcome	Population	Parameter	Tx Units	Cluster	Model	Other
13.4	Luca, Deepak, and Poliquin (2016)	Shall-issue law	Any mass shooting incident	All ages					X
13.4	Luca, Deepak, and Poliquin (2016)	Shall-issue law	Any mass shooting incident	All ages					X
13.5	Duggan (2001)	Right-to-carry laws	Gun ownership	None				X	

NOTE: CAP = child-access prevention; CC = concealed carry; IPH = intimate partner homicide; N/A = not applicable; NICS = National Instant Criminal Background Check System.



The RAND Corporation's Gun Policy in America initiative is a unique attempt to systematically and transparently assess available scientific evidence on the real effects of firearm laws and policies. Good gun policies require consideration of many factors, including the law and constitutional rights, the interests of various stakeholder groups, and information about the likely effects of different laws or policies on a range of outcomes. This report seeks to provide the third—objective information about what the scientific literature examining gun policy can tell us about the likely effects of laws. The study synthesizes the available scientific data on the effects of various firearm policies on firearm deaths, violent crime, the gun industry, participation in hunting and sport shooting, and other outcomes. By highlighting where scientific evidence is accumulating, the authors hope to build consensus around a shared set of facts that have been established through a transparent, nonpartisan, and impartial review process. In so doing, they also illuminate areas where more and better information could make important contributions to establishing fair and effective gun policies.

\$80.00

Download a free
electronic copy at
www.rand.org/t/RR2088

ISBN-10 0-8330-9841-1
ISBN-13 978-0-8330-9841-2

58000

9 780833 098412

The ISBN block contains the ISBN-10 and ISBN-13 numbers, a barcode for the ISBN-13, a smaller barcode for the publisher's code (58000), and the ISBN-13 digits with a leading 9.

GZJ DKV'3; "

YOUNG ADULthood AS A TRANSITIONAL LEGAL CATEGORY: SCIENCE, SOCIAL CHANGE, AND JUSTICE POLICY

Elizabeth S. Scott,* Richard J. Bonnie** & Laurence Steinberg***

INTRODUCTION

In the past decade, much attention has focused on developmental brain research and its implications for the regulation of crime. Public and policy interest has been directed primarily toward juveniles. In light of recent research, courts and legislatures increasingly have rejected the punitive response of the 1990s and embraced a developmental approach to young offenders.¹ Of particular importance in propelling this trend has been the framework offered by the U.S. Supreme Court in a series of Eighth Amendment opinions that have rejected harsh adult sentences for juveniles.² These decisions, supported by adolescent brain research,³ rested on two empirically based principles: First, juvenile offenders, due to their developmental immaturity, typically are less culpable and, therefore,

* Harold R. Medina Professor of Law, Columbia University. The authors are members of the John D. and Catherine T. MacArthur Foundation Research Network on Neuroscience and Criminal Law and are grateful to the Foundation for its support of research that has advanced understanding of young adults. This Article is part of a symposium entitled *Criminal Behavior and the Brain: When Law and Neuroscience Collide* held at Fordham University School of Law. For an overview of the symposium, see Deborah W. Denno, *Foreword: Criminal Behavior and the Brain: When Law and Neuroscience Collide*, 85 FORDHAM L. REV. 399 (2016).

** Harrison Foundation Professor of Law and Medicine; Director, Institute of Law, Psychiatry, and Public Policy, University of Virginia.

*** Distinguished University Professor, Temple University.

1. See ELIZABETH S. SCOTT & LAURENCE STEINBERG, *RETHINKING JUVENILE JUSTICE* 206–13 (2008); see also NAT'L RES. COUNCIL, NAT'L ACADS., *REFORMING JUVENILE JUSTICE: A DEVELOPMENTAL APPROACH* 31–88 (Richard J. Bonnie et al. eds., 2013).

2. In 2005, the Supreme Court held that the Eighth Amendment prohibits the death penalty for crimes committed by juveniles in *Roper v. Simmons*, 543 U.S. 551, 578–79 (2005). In 2010, the Court prohibited the imposition of life without parole for juveniles committed by juveniles. *Graham v. Florida*, 560 U.S. 48, 82 (2010). Two years later, the Court extended *Graham*, holding that the Eighth Amendment prohibits the mandatory sentence of life without parole even for juveniles convicted of homicide in *Miller v. Alabama*, 132 S. Ct. 2455, 2475 (2012). Most recently, in *Montgomery v. Louisiana*, 136 S. Ct. 718, 736 (2016), the Court held that *Miller* created a rule of substantive constitutional law and therefore must be applied retroactively.

3. See *Miller*, 132 S. Ct. at 2464–65 (citing developmental brain research showing differences between juvenile and adult brains); *Graham*, 560 U.S. at 68 (same).

deserve less punishment than their adult counterparts. Second, because their criminal conduct is the product of immaturity, most juveniles have a greater potential to reform than do adults. This framework has influenced broader sentencing reforms for juvenile offenders.⁴ It has also led policymakers to focus on the impact of juvenile justice settings and programs on youth development and crime reduction.⁵

More recently, advocates and some policymakers have argued that developmental research should shape the law's response to young adult offenders.⁶ Over the past decade, developmental psychologists and neuroscientists have found that biological and psychological development continues into the early twenties, well beyond the age of majority.⁷ Recently, researchers have found that eighteen- to twenty-one-year-old adults are more like younger adolescents than older adults in their impulsivity under conditions of emotional arousal.⁸ It is also well established that young adults, like teenagers, engage in risky behavior, such as drinking, smoking, unsafe sex, drug use, and criminal activity, to a greater extent than older adults.⁹ The possibility that much risky behavior, including involvement in criminal activity, is a product of psychological and social immaturity raises the question of whether the presumption of reduced culpability and greater potential for reform should be applied to young adult offenders as well as juveniles.

Major reform of this kind would represent a substantial departure from what has become a commonly recognized boundary in the justice system between juveniles and adults, marked by the age of majority: legal adults charged with criminal acts are typically subject to a standard punishment regime that applies to all offenders whether they are eighteen or thirty-five years old.¹⁰ This response is not surprising. Legal line drawing is inevitably arbitrary at the margins, and age eighteen, the default age of

4. See ELIZABETH SCOTT ET AL., *THE SUPREME COURT AND THE TRANSFORMATION OF JUVENILE SENTENCING* 25–29 (2015), http://modelsforchange.net/publications/778/The_Supreme_Court_and_the_Transformation_of_Juvenile_Sentencing.pdf [https://perma.cc/WM4Z-XWTC].

5. See NAT'L RES. COUNCIL, *supra* note 1, at 241–80.

6. See Vincent Schiraldi et al., *Community-Based Responses to Justice-Involved Young Adults*, NEW THINKING COMMUNITY CORRECTIONS, Sept. 2015, at 1–3 (recommending that cases involving young adults be handled by the juvenile system). Recently, New York City Mayor Bill de Blasio took action to address some of the unique challenges posed by young adults in the New York City justice system. See Press Release, Office of the Mayor, Mayor de Blasio Appoints Heads of Key Criminal Justice Positions (Mar. 11, 2014), <http://www1.nyc.gov/office-of-the-mayor/news/082-14/mayor-de-blasio-appoints-heads-key-criminal-justice-positions#/0> [https://perma.cc/Q9JE-74M7].

7. See LAURENCE STEINBERG, *AGE OF OPPORTUNITY: LESSONS FROM THE NEW SCIENCE OF ADOLESCENCE* 5 (2014).

8. See Alexandra O. Cohen et al., *When Is an Adolescent an Adult?: Assessing Cognitive Control in Emotional and Nonemotional Contexts*, 27 *PSYCHOL. SCI.* 549, 559–60 (2016).

9. Different types of risky behavior peak at different ages. For example, binge drinking peaks at age twenty, while involvement in criminal activity peaks at age eighteen.

10. See Elizabeth S. Scott, *The Legal Construction of Adolescence*, 29 *HOFSTRA L. REV.* 547, 547–50 (2000).

majority, seems like a natural dividing line between adult and juvenile status in the justice system.¹¹ Further, individuals between the ages of eighteen to twenty-one commit a large portion of serious offenses and have high recidivism rates.¹² Thus, limiting the rehabilitative and more lenient approach of the juvenile system to youths who are legal minors might be justified on public safety grounds. Moreover, until recently, no compelling scientific argument existed for treating young adults differently than their older counterparts. Not so long ago, developmentalists thought that eighteen-year-olds were biologically mature and that young adult brains were fully developed.¹³

In other legal domains, the age at which children attain adult status is often raised or lowered from the default age of majority (age eighteen) when social welfare interests are served.¹⁴ Is it time to reconsider the law's approach to young adult offenders in light of the recent scientific research?

In our view, modest policy reform is justified, although the developmental research suggesting that young adults are not fully mature is in an early stage. In part we reach this conclusion because the scientific research is reinforced by demographic data indicating that the social transition to independent adulthood extends well beyond the age of majority. In contemporary society, age eighteen no longer marks the assumption of mature adult roles. Only a small percentage of young adults today marry or live self-sufficient lives. Instead, this period has become a critical developmental stage of extended dependency and investment in acquiring the skills necessary to accomplish the transition to mature adulthood.¹⁵ For many young adults in the justice system, the prospect of successfully navigating this transition is low.

This Article seeks to advance discussions about the potential implications for justice policy of recent neuroscientific, psychological, and sociological research on young adults. In doing so, we emphasize the importance of not exaggerating either the empirical findings or their policy relevance. The available research does not indicate that individuals between the ages of eighteen and twenty are indistinguishable from younger adolescents in attributes relevant to criminal offending and punishment.¹⁶ Thus, we are skeptical on both scientific and pragmatic grounds about the merits of the proposal by some advocates that juvenile court jurisdiction should be

11. *See id.* at 548.

12. *See* CRAIG A. PERKINS, U.S. DEP'T OF JUSTICE, AGE PATTERNS OF VICTIMS OF SERIOUS VIOLENT CRIME 2 (1997), <http://www.bjs.gov/content/pub/pdf/apvsvc.pdf> (finding that the eighteen- to twenty-one-year-old population commits the highest percentage of serious violent crimes out of all age groups) [<https://perma.cc/MA5A-LGBE>].

13. *See* NAT'L RES. COUNCIL, NAT'L ACADS., ADOLESCENT DEVELOPMENT AND THE BIOLOGY OF PUBERTY 1–3 (Michele D. Kipke ed., 1999).

14. *See* Scott, *supra* note 10, at 556.

15. *See* INST. OF MED. & NAT'L RES. COUNCIL, INVESTING IN THE HEALTH AND WELL-BEING OF YOUNG ADULTS (Richard J. Bonnie et al. eds., 2015) (providing a comprehensive discussion of the changing nature of young adulthood and finding young adulthood in contemporary society to be a vulnerable period of extended dependency and proposing policy reforms).

16. *See infra* Part I.

categorically extended to age twenty-one.¹⁷ But the research does suggest that young adults, like juveniles, are more prone to risk-taking and that they act more impulsively than older adults in ways that likely influence their criminal conduct. Moreover, correctional reform is justified because young adult offenders, like noncriminal young adults and juvenile offenders, are more likely to become productive members of society if they are given the tools to do so during a critical developmental period.

Policymakers today can draw lessons from the developmental model that has shaped juvenile justice reform. At the heart of this reform is a conception of adolescence as a distinct stage between childhood and adulthood.¹⁸ This conception has supported a classification of juveniles as an intermediate category of offenders who are neither excused for their crimes as children nor deemed fully responsible adults.¹⁹ Juvenile justice programs increasingly respond to the developmental needs of adolescent offenders, recognizing that this is the best means of promoting their productive engagement in society and reducing crime.²⁰ Young adults between the ages of eighteen and twenty-one constitute a less well-defined category that has only recently received even informal acknowledgment. But this developmental stage has taken on heightened importance as a period of preparation for adult roles. We conclude that the research supports a regime that recognizes young adults as a transitional category between juveniles and older adult offenders.

Part I of this Article analyzes the behavioral and neuroscientific research on young adults. The research on age patterns of risk-taking, combined with the neuroscientific and psychological research on young adults, suggests that the period of young adulthood can be understood as a transitional stage between adolescence and mature adulthood. Part II turns to the sociological research that reinforces this conception of young adults as occupying a transitional developmental stage. Finally, Part III explores the implications of the developmental and sociological research for crime regulation. We conclude that many of the developmental lessons that have driven reforms of the treatment of juveniles in the justice system can inform the response to the criminal conduct of young adults. Young adults should be treated as a distinct, transitional category subject to reduced sanctions for less serious crimes, special expedited parole policies, and correctional programs and settings designed to serve their developmental needs. This approach can promote the social welfare goals of the justice system more effectively than the conventional binary approach that prevails today.

17. See Schiraldi et al., *supra* note 6.

18. See SCOTT & STEINBERG, *supra* note 1, at 31.

19. See Elizabeth S. Scott & Laurence Steinberg, *Adolescent Development and the Regulation of Youth Crime*, 18 FUTURE CHILD 15, 19 (2008).

20. See *infra* Part III.

I. BEHAVIORAL, PSYCHOLOGICAL, AND NEUROBIOLOGICAL
DEVELOPMENT IN YOUNG ADULTS

Studies of behavioral, psychological, and neurobiological development indicate that the years from the late teens to the early twenties constitute a transitional period that bridges adolescence and mature adulthood. Development is gradual, and the psychological boundaries between adolescence and adulthood are fuzzy. Although eighteen- to twenty-one-year-olds are in some ways similar to individuals in their midtwenties, in other ways, young adults are more like adolescents in their behavior, psychological functioning, and brain development. Thus, developmental science does not support the bright-line boundary that is observed in criminal law under which eighteen-year-olds are categorically deemed to be adults.

A. Age Patterns of Risk-Taking Behavior

An important similarity between adolescents and young adults—potentially relevant to justice policy—is that eighteen- to twenty-one-year-olds, like adolescents, engage in risk-taking behavior (including involvement in criminal activity) at a higher rate than older adults.²¹ Research on the developmental trajectory of criminal behavior has consistently documented an age-linked pattern of offending—the “age-crime curve”—in which rates of criminal behavior increase over the course of adolescence, peak around age eighteen, and then decline during the early twenties.²² Therefore, young adulthood is both the stage during which criminal behavior is most common and the period during which the vast majority of offenders begin desisting from crime. In this regard, young adulthood is arguably the most significant transitional period in the development of criminal behavior.

Young adult offending is best understood as part of a broader behavioral pattern, and not as an isolated phenomenon, because many forms of risk-taking behavior are disproportionately likely during this period.²³ It is noteworthy that the inverted U-shaped developmental pattern observed in the age-crime curve applies as well to most forms of risky activity, which increase over the course of adolescence, peak in the late teens or early twenties (the peak age varies somewhat across different behaviors), and then decline.²⁴ According to a recent Institute of Medicine/National Research Council (IOM/NRC) report, young adults (aged eighteen to twenty-four) experience higher rates of morbidity and mortality than either

21. See INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 203–13; Teena Willoughby et al., *Examining the Link Between Adolescent Brain Development and Risk Taking from a Social-Developmental Perspective*, 83 BRAIN & COGNITION 315, 315–16 (2013).

22. See generally Gary Sweeten et al., *Age and the Explanation of Crime, Revisited*, 42 J. YOUTH ADOLESCENCE 921 (2013). This pattern is found across the developed world, over time within the United States, and with respect to both violent and nonviolent crime.

23. See INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15.

24. See generally Sweeten, *supra* note 22.

adolescents or older adults from a wide variety of preventable causes, including automobile crashes, physical assaults, gun violence, sexually transmitted diseases, and substance abuse.²⁵ In short, developmental changes in criminal activity follow the same age pattern as developmental changes in risky, but noncriminal, activity.²⁶

Viewing criminal offending as a specific instance of the more general inclination of young adults to engage in risky activity can inform discussions of how we should respond to criminal behavior at this age. During the past two decades, developmental science has been invoked in discussions of juvenile justice reform to advance the argument that much adolescent crime is the product of developmental immaturity.²⁷ This, in turn, supported policies based on the premise that adolescents are both less culpable and more amenable to reform than adults, in part, simply through maturation.²⁸ To the extent that young adult offending is also the consequence of normative developmental changes that create a transient inclination toward risky behavior, it should prompt a similar conversation.

*B. Explaining Young Adult Risk-Taking:
Psychological Development in Young Adults*

In recent years, developmental scientists have sought to understand the underlying causes of age differences in risk-taking. However, as we explain below, research on developmental differences between adolescents and adults often has not drawn age distinctions among individuals older than eighteen, and therefore is of limited value in understanding risk-taking among young adults.²⁹ Nevertheless, theoretical models, advanced to explain heightened rates of risk-taking among adolescents relative to children or adults, can inform our discussion of risk-taking in young adulthood. These “dual systems” or “maturational imbalance” models emphasize the different developmental trajectories of reward seeking and self-control.³⁰ Heightened risk-taking during adolescence is understood to be the result of a developmental asynchrony wherein inclinations to pursue exciting, potentially rewarding experiences are especially strong, but the ability to control such urges is still relatively immature. The tendency toward heightened sensation seeking is thought to be sparked by the

25. See INST. OF MED. & NAT’L RES. COUNCIL, *supra* note 15, at 203–13.

26. In one large longitudinal study of serious juvenile offenders tracked for seven years, impulsivity was one of the best psychological predictors of offending in young adulthood: Individuals who developed mature impulse control were most likely to desist from crime. See Kathryn C. Monahan et al., *Psychosocial (Im)maturity from Adolescence to Early Adulthood: Distinguishing Between Adolescence-Limited and Persisting Antisocial Behavior*, 25 DEV. & PSYCHOPATHOLOGY 1093, 1093–95 (2013).

27. See generally SCOTT & STEINBERG, *supra* note 1.

28. See *id.* Adolescent brains are also more plastic than those of adults, which may contribute to amenability. See generally STEINBERG, *supra* note 7.

29. This limitation also applies to developmental neuroscience research.

30. See B.J. Casey, *Beyond Simple Models of Self-Control to Circuit-Based Accounts of Adolescent Behavior*, 66 ANN. REV. PSYCHOL. 295, 298–300 (2015); Elizabeth P. Shulman et al., *The Dual Systems Model: Review, Reappraisal, and Reaffirmation*, 17 DEVELOPMENTAL COGNITIVE NEUROSCIENCE 103, 103–05 (2016).

hormonal changes of puberty, which are believed to increase activity in the brain's reward pathways, making individuals more attentive, sensitive, and responsive to actual and potential rewards.³¹ However, because development of brain systems that regulate impulse control is more protracted, continuing into the early twenties, a period of vulnerability to risky behavior results.³² As some writers have described it, adolescence is a time when the “accelerator” is pressed to the floor, but a good “braking system” is not yet in place.³³

From this perspective, the relatively high rate of risky activity observed in late adolescence and young adulthood—including criminal offending—is likely due to a combination of high reward seeking and poor self-control, leading individuals to make impetuous, short-sighted decisions that privilege the potential rewards of risky choices and underestimate the potential costs. According to this view, risk-taking declines as individuals develop more mature judgment, as a result of a decrease in reward seeking, an increase in self-control, or both.³⁴ Importantly, these developmental changes, which continue into the early twenties, are now viewed as normative, driven by processes of brain maturation that are not under the control of young people.

These theoretical models, and the research they have generated, have influenced discussions of juvenile justice policy over the past decade.³⁵ Indeed, the tendency of adolescents to make impulsive and shortsighted decisions is one of the characteristic features of adolescence highlighted by the U.S. Supreme Court in its Eighth Amendment opinions limiting the use of harsh sentences for juveniles.³⁶ The Court also pointed to adolescents' heightened susceptibility to social influence—particularly peer influence—and to the relatively unformed nature of adolescents' character, which makes them better candidates for rehabilitation.³⁷ The Court found that these hallmark features of adolescence contribute to reduced culpability in juvenile offenders, as compared to adults, and to their greater potential to reform. Now that policy discussions about the treatment of young offenders are beginning to include young adults, it is important to ask whether these characteristics apply to this group as well.

The age patterns in risk-taking would seem to offer support for the conclusion that young adults are also affected by the developmental

31. See Ashley R. Smith et al., *Impact of Socio-Emotional Context, Brain Development, and Pubertal Maturation on Adolescent Risk-Taking*, 64 HORMONES & BEHAV. 323, 323–25 (2013).

32. See generally Casey, *supra* note 30.

33. See STEINBERG, *supra* note 7, at 85.

34. See generally Laurence Steinberg, *A Social Neuroscience Perspective on Adolescent Risk-Taking*, 28 DEVELOPMENTAL REV. 78 (2008).

35. See Laurence Steinberg, *The Influence of Neuroscience on US Supreme Court Decisions About Adolescents' Criminal Culpability*, 14 NATURE REVIEWS NEUROSCIENCE 513, 513 (2013).

36. See generally *Montgomery v. Louisiana*, 136 S. Ct. 718 (2016); *Miller v. Alabama*, 132 S. Ct. 2455 (2012); *Graham v. Florida*, 560 U.S. 48 (2010); *Roper v. Simmons*, 543 U.S. 551 (2005).

37. See *Roper*, 543 U.S. at 569.

influences that contribute to juvenile offending—at least to some degree.³⁸ But the study of psychological development in young adulthood is less advanced, and the findings of this research are less consistent than the findings of research on adolescents.³⁹ One limitation is that studies rarely survey a sample that includes adolescents, young adults, and individuals in their late twenties using the same measures for all three age groups. A second limitation is that studies that span the necessary age range frequently lack the statistical power to compare narrowly defined age groups. A third limitation is that many studies cluster individuals into broad age categories, often including in the same group individuals whose chronological age would place them on different sides of a legally important age boundary.

One challenge is to formulate research questions in ways that are most informative to legal policy debates. Scientists cannot point to a specific chronological age as the appropriate boundary between legal childhood and adulthood because different aspects of psychological and neural functioning develop along different timetables.⁴⁰ But a reasonable, and potentially answerable, research question is whether development continues in legally relevant psychological domains beyond age eighteen, the presumptive age of majority. The few existing studies that may be relevant to justice policy have yielded equivocal results that vary as a function of the outcome, age range, and sample studied. Thus, a reasonable assessment is that the extant research is suggestive but inconclusive. Nonetheless, it is possible to draw several broad, albeit cautious, conclusions.

First, it is clear that individuals mature intellectually before they mature emotionally or socially and that emotional and social development continues past age eighteen in realms that are legally relevant.⁴¹ Thus, studies of age differences in basic cognitive abilities, such as memory or logical reasoning, do not find appreciable growth after age sixteen.⁴² This is consistent with studies of adjudicative competence, which also do not find significant age differences after sixteen.⁴³ In contrast, studies of the two hypothesized contributors to adolescents' immature judgment, often, but not always, have found continued decline in sensation seeking and improvement in self-control between ages seventeen and thirty. However,

38. See *infra* Parts II–III.

39. See Alexandra O. Cohen et al., *When Does a Juvenile Become an Adult? Implications for Law and Policy*, 88 TEMP. L. REV. 769, 769–72 (2016).

40. See Laurence Steinberg, *Should the Science of Adolescent Brain Development Inform Public Policy?*, ISSUES SCI. & TECH., Spring 2012, at 67, 67–70 (2012).

41. See Laurence Steinberg et al., *Are Adolescents Less Mature Than Adults? Minors' Access to Abortion, the Juvenile Death Penalty, and the Alleged APA "Flip-Flop,"* 64 AM. PSYCHOLOGIST 583, 592–93 (2009).

42. See *id.*

43. See Thomas Grisso & Linda Vierling, *Minors' Consent to Treatment: A Developmental Perspective*, 9 PROF. PSYCHOL. 412, 415–16 (1978); Thomas Grisso et al., *Juveniles' Competence to Stand Trial: A Comparison of Adolescents' and Adults' Capacities as Trial Defendants*, 27 LAW & HUM. BEHAV. 333, 356–61 (2003).

the age at which developmental change is most evident during this interval depends on the specific outcome being assessed.⁴⁴

Second, conclusions about whether psychological development continues beyond age eighteen are highly task dependent. Consider, for example, the question of whether young adults, like juveniles, are more susceptible than older adults to peer influence. The answer is equivocal. Studies of resistance to peer influence using self-reports do not find age differences after eighteen,⁴⁵ but experimental studies comparing individuals' performance on decision-making tasks when they are alone versus when they are with their peers find peer effects on task performance after this age, at least into the early twenties. For example, exposure to peers increases young adults' preference for immediate rewards,⁴⁶ willingness to engage in exploratory behavior,⁴⁷ and ability to learn from experience.⁴⁸ In some studies, exposure to peers has been shown to increase young adults' risk-taking;⁴⁹ but in other studies, this has not been found.⁵⁰

Third, psychological maturity among individuals at any given age varies considerably.⁵¹ Consider the research on the stability of personality over time. As noted above,⁵² the Supreme Court cited the relatively unformed nature of character as a defining feature of adolescence that justifies more lenient sentences for juveniles.

Is young adulthood a similarly inchoate stage of character development? The empirical literature on personality development is ambiguous. The prevailing view among psychologists is that during adulthood, personality becomes more stable over time, but no consensus exists on when, if at all, personality ceases to change.⁵³ Some studies have found that young

44. See Laurence Steinberg et al., *Age Differences in Sensation Seeking and Impulsivity as Indexed by Behavior and Self-Report: Evidence for a Dual Systems Model*, 44 DEVELOPMENTAL PSYCHOL. 1764, 1764–66 (2008).

45. See generally Laurence Steinberg & Kathryn C. Monahan, *Age Differences in Resistance to Peer Influence*, 43 DEVELOPMENTAL PSYCHOL. 1531 (2007).

46. See generally Lia O'Brien et al., *Adolescents Prefer More Immediate Rewards When in the Presence of Their Peers*, 21 J. RES. ON ADOLESCENCE 747 (2011); Alexander Weigard et al., *Effects of Anonymous Peer Observation on Adolescents' Preference for Immediate Rewards*, 17 DEVELOPMENTAL SCI. 71 (2014).

47. See Karol Silva et al., *Peers Increase Late Adolescents' Exploratory Behavior and Sensitivity to Positive and Negative Feedback*, J. RES. ON ADOLESCENCE 7–9 (Aug. 19, 2015), <http://onlinelibrary.wiley.com/doi/10.1111/jora.12219/epdf> [<https://perma.cc/9QWF-3JS2>].

48. See *id.*

49. See Margo Gardner & Laurence Steinberg, *Peer Influence on Risk Taking, Risk Preference, and Risky Decision Making in Adolescence and Adulthood: An Experimental Study*, 41 DEVELOPMENTAL PSYCHOL. 625, 632–34 (2005).

50. See Jason Chein et al., *Peers Increase Adolescent Risk Taking by Enhancing Activity in the Brain's Reward Circuitry*, 14 DEVELOPMENTAL SCI. F1, F7–F9 (2010).

51. See Steinberg, *supra* note 40, at 67–70.

52. See *supra* note 36 and accompanying text.

53. See Avshalom Caspi & Brent W. Roberts, *Personality Development Across the Life Course: The Argument for Change and Continuity*, 12 PSYCHOL. INQUIRY 49, 51 (2001); Robert R. McCrae & Paul T. Costa, Jr., *The Stability of Personality: Observations and Evaluations*, 3 CURRENT DIRECTIONS PSYCHOL. SCI. 173 (1994).

adulthood is a time of considerable stability in personality;⁵⁴ others have found that it is a time of instability, especially during the transition from adolescence to young adulthood;⁵⁵ and yet another group has found variation among individuals.⁵⁶ Moreover, some studies have also found variability *within individuals* in the stability of personality, in that some traits appear to be considerably more stable than others.⁵⁷

Finally, age differences in psychological functioning in young adulthood vary as a function of the context in which individuals are assessed. Recent work conducted under the auspices of the MacArthur Foundation Research Network on Law and Neuroscience (of which the authors are members) is illustrative.⁵⁸ In this research, adolescents (ages thirteen to seventeen), young adults (ages eighteen to twenty-one), and somewhat older young adults (ages twenty-two to twenty-four) were asked to perform a standard task measuring self-control under conditions that were systematically manipulated to vary the degree and nature (positive or negative) of emotional arousal.⁵⁹ Under nonarousing conditions, young adults' performance did not differ from that of the younger or older subjects; however, the adolescents performed worse than the oldest group.⁶⁰ Under conditions of positive arousal, the young adults performed comparably to the older group and better than the adolescents.⁶¹ Under negatively arousing conditions, however, the adolescent and young adult groups did not differ, and both performed worse than the oldest group.⁶² In other words, whereas the differences between adolescents under age eighteen and individuals older than twenty-one were observed consistently, differences between young adults and the other two age groups depended on the emotional context. Sometimes young adults behaved like people in their mid-twenties. But sometimes they behaved like teenagers—a conclusion that will surely resonate with those who spend time on college campuses.

54. See generally Brent W. Roberts et al., *The Kids Are Alright: Growth and Stability in Personality Development from Adolescence to Adulthood*, 81 J. PERSONALITY & SOC. PSYCHOL. 670 (2001); Richard W. Robins et al., *A Longitudinal Study of Personality Change in Young Adulthood*, 69 J. PERSONALITY 617 (2001).

55. See generally Norma Haan et al., *As Time Goes By: Change and Stability in Personality over Fifty Years*, 1 PSYCHOL. & AGING 220 (1986).

56. See generally M. Brent Donnellan et al., *Personality Development from Late Adolescence to Young Adulthood: Differential Stability, Normative Maturity, and Evidence for the Maturity-Stability Hypothesis*, 75 J. PERSONALITY 237 (2007).

57. See generally Jatin G. Vaidya et al., *On the Temporal Stability of Personality: Evidence for Differential Stability and the Role of Life Experiences*, 83 J. PERSONALITY & SOC. PSYCHOL. 1469 (2002).

58. See generally Cohen et al., *supra* note 8.

59. See *id.*

60. See *id.*

61. See *id.*

62. See *id.*

*C. Neurobiological Research:
Brain Development in Young Adulthood*

Research on the extent and nature of age differences in brain structure and function after age eighteen is also best characterized as suggestive but inconclusive. As with behavioral research, very few studies have systematically examined age differences in brain development among individuals older than eighteen. In most studies, adolescents are compared to “adults,” with the latter group composed of people who may be as young as nineteen or as old as fifty. When adult comparison groups average data from such a wide age range, it is impossible to draw specific inferences about potential differences between young adults and their older counterparts.

Brain maturation comprises several processes that vary in their developmental timetable across brain regions and systems.⁶³ The most important components of brain maturation in adolescence and young adulthood involve changes in the prefrontal cortex and its connections with other brain regions. The prefrontal cortex plays a crucial role in advanced thinking abilities, including planning ahead and weighing risk and reward, and in self-regulation, including impulse control and the coordination of emotion and cognition. Immaturity in the prefrontal cortex is thought to make adolescents and young adults more susceptible to impetuous and shortsighted decision making and more vulnerable to the effects of emotional and social arousal on intellectual functioning.⁶⁴ This aspect of brain development has been critically important to discussions about the appropriate legal response to criminal activity in adolescents and young adults.

The maturation of the prefrontal cortex is multifaceted, involving synaptic pruning (which increases the efficiency of information processing by eliminating unnecessary connections between neurons), myelination (which increases the speed of information processing by “insulating” neural pathways), and improved structural and functional connectivity (which enhances communication between the prefrontal cortex and other brain regions). These processes are all ongoing during adolescence, but they are completed at different ages.⁶⁵ For example, pruning of the prefrontal cortex is more or less complete by midadolescence, which is why there is little improvement in basic thinking abilities beyond this age.⁶⁶ In contrast, connectivity, especially between the prefrontal cortex and brain regions that process rewards and respond to emotional and social stimuli, is not complete until the midtwenties,⁶⁷ which is why aspects of social and emotional functioning, such as impulse control and resistance to peer

63. See generally Steinberg, *supra* note 40.

64. See *id.*

65. See generally Cohen et al., *supra* note 39.

66. See *id.*

67. See generally Nico U.F. Dosenbach et al., *Prediction of Individual Brain Maturity Using fMRI*, 329 SCIENCE 1358 (2010).

influence, are slower to mature.⁶⁸ The bottom line is that brain systems that govern “cold cognition” (thinking that takes place under ideal conditions) reach adult levels of maturity long before those that govern “hot cognition” (thinking that takes place under conditions of emotional or social arousal).⁶⁹ In the MacArthur study mentioned earlier, patterns of brain activation and functional connectivity in young adults resembled those of teenagers when brain activity was assessed under emotionally arousing conditions but appeared more similar to those of people in their midtwenties when conditions were more neutral.⁷⁰

Studies of brain development in adolescence and young adulthood have not yet significantly informed our understanding of the neural underpinnings of age differences in susceptibility to social influence or in the potential for rehabilitation—characteristics considered important in legal policy discussions on juvenile crime.⁷¹ The research indicates that brain systems governing thinking about social relationships undergo significant change in adolescence in ways that heighten concerns about the opinions of others.⁷² Compared to adults, adolescents seem especially sensitive to both praise and rejection, making young people potentially more easily influenced by their peers.⁷³ But very little research has asked whether and how these brain systems continue to change beyond the teen years. One study that examined the impact of peers on neural responses to reward in a sample of adolescents (ages fourteen to eighteen), young adults (nineteen to twenty-two), and adults (twenty-four to twenty-nine) found that the presence of peers increased activation in this brain region among adolescents but had no impact in the other two age groups.⁷⁴

With respect to potential for rehabilitation, there is a growing consensus that adolescence is likely to be a period of heightened brain plasticity—the capacity of the brain to change in response to experience—not unlike the first few years of life.⁷⁵ If so, juveniles are probably better candidates for rehabilitation than adults. This strengthens the argument against imposing long sentences on juveniles and especially against harsh sentences that can inflict toxic harm during a susceptible developmental period. It is not known, however, how long this period of plasticity extends.⁷⁶ One difficulty is that much of the evidence of heightened brain plasticity in adolescence comes mainly from studies of rodents, whose development can

68. See generally Cohen et al., *supra* note 39.

69. See generally STEINBERG, *supra* note 7.

70. See generally Cohen et al., *supra* note 8; Marc Rudolph et al., At Risk of Being Risky: The Relationship Between “Brain Age” Under Emotional States and Risk Preference (unpublished manuscript) (on file with the author).

71. See Sarah-Jayne Blakemore, *Development of the Social Brain in Adolescence*, 105 J. ROYAL SOC’Y MED. 111, 112 (2012); Sarah-Jayne Blakemore & Kathryn L. Mills, *Is Adolescence a Sensitive Period for Sociocultural Processing?*, 65 ANN. REV. PSYCHOL. 187, 189 (2014).

72. See Blakemore, *supra* note 71, at 112; Blakemore & Mills, *supra* note 71, at 189.

73. See Blakemore, *supra* note 71, at 112; Blakemore & Mills, *supra* note 71, at 189.

74. See generally Chein et al., *supra* note 50.

75. See generally STEINBERG, *supra* note 7.

76. See *infra* Part II.

be reliably segmented into just three stages: infant, juvenile (peripubertal), and adult.⁷⁷ Thus, the distinctions between “young adult” and “adult” that can be applied to humans cannot be applied to most other animals.

Because the research described in this part is at a relatively early stage, its implications for justice policies directed toward young adults are uncertain. It is clear that the psychological and neurobiological development that characterizes adolescence continues into the midtwenties, but the research has not yet produced a robust understanding of maturation in young adults age eighteen to twenty-one. Studies find continued development during this period but also find that, in some ways, young adults are similar to adults in their midtwenties. The research on age patterns in risk-taking and on emotional maturation—particularly on impulse control in negative arousal states and peer influence in social contexts—provides the most powerful evidence that young adult offending likely represents a continuation of adolescent risk-taking, driven by developmental forces; but many uncertainties remain. The question is to what extent this still-developing body of research on young adults should affect justice policy.

II. THE CHANGING SOCIOECONOMIC CONTEXT OF YOUNG ADULTHOOD

Although the biological and psychological account of maturation is incomplete, it is clear that the transition to *social* adulthood is grounded in cultural norms that vary over time (and across cultures), dictating when young people are expected to achieve independence and assume adult roles. Demographic research indicates that, today, young adults in the United States and other developed societies experience a prolonged and stressful period of transition to adulthood. Contemporary society is marked by increased knowledge and information transfer, heightened risks, fairly low social mobility, and greater economic inequality—changes that have placed greater demands on young adults than previous generations experienced, while also providing less latitude for failure.⁷⁸ Not so long ago, the typical transitional path for most young adults was to graduate from high school, enter college or the workforce, leave home, establish an enduring romantic relationship, marry, and start a family. These milestones provided structure and direction for most young adults as they assumed adult responsibilities; they also fostered connection with the larger society and its institutions. Today, those pathways are considerably less predictable, often extended, and—for many—significantly more challenging.⁷⁹

Based on this trend, a 2014 IOM/NRC report characterized young adulthood in our society as a “critical” developmental period⁸⁰ that has a

77. See generally LD Selemon, *A Role for Synaptic Plasticity in the Adolescent Development of Executive Function*, 3 TRANSLATIONAL PSYCHIATRY 1 (2013).

78. INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 35–67.

79. See *id.*

80. Young adults continue to mature socially, psychologically, and biologically; however, social features of maturation predominate during this period. See *id.* at 1–3.

profound impact on individuals' future life-course trajectories, analogous to the critical periods of early childhood and adolescence. Success or failure during this time can have a lifelong impact. Thus, the stakes are high both for young adults and for society. The report drew out the policy implications of this social trend, particularly emphasizing the need to provide developmentally appropriate supports and interventions for young adults during this period.⁸¹

A. Education and Employment

Achievement of financial independence has become a prolonged and uncertain challenge for an increasing number of young adults. College enrollment has increased dramatically in recent years,⁸² but many students who enroll in college do not earn a degree.⁸³ Indeed, the college graduation rate in the United States has *dropped* even as enrollment rates have increased.⁸⁴ In part, this is because the cost of college has grown substantially, and many students are unable to finance the investment. Yet prospects for well-paying jobs for young adults without a college degree are slim.

The problem for young adults without a college degree has been exacerbated in recent decades by the sharply reduced number of good manufacturing jobs. Even accounting for the increased percentage of young adults attending college (and thus not in the work force), the unemployment rate among individuals under age twenty-five is twice that of the general population.⁸⁵ This disparity has been growing in recent decades and has become especially pronounced since the start of the 2008 recession.⁸⁶ Young adults without a college degree who *are* employed generally receive low wages because they lack skills needed for higher paying, knowledge-based jobs.⁸⁷ Many obtain only part-time employment. Not surprisingly perhaps, the earning gap between college graduates and those with only a high school education has more than doubled since 1980.⁸⁸ Today, young adults without a college degree—a cohort that includes most individuals in

81. *See id.*

82. *See id.* at 129.

83. *See id.* at 135.

84. *See id.* at 47; Martha J. Bailey & Susan M. Dynarski, *Inequality in Postsecondary Education*, in *WHITHER OPPORTUNITY?: RISING INEQUALITY, SCHOOLS, AND CHILDREN'S LIFE CHOICES* 117 (Greg J. Duncan & Richard J. Murnane eds., 2011). Large gaps exist in Bachelor of Arts completion rates by race and socioeconomic position. Completion rates for whites exceed those for blacks and Hispanics by 20–30 percent, and students from families in the bottom socioeconomic quartile have completion rates nearly 40 percent lower than those of other students. *See* INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 137–38.

85. *See* INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 47; *see also* CLIVE R. BELFIELD & HENRY M. LEVIN, *THE ECONOMICS OF INVESTING IN OPPORTUNITY YOUTH 7* (2012) (showing 17 percent of youth and young adults between ages sixteen and twenty-four are neither in school nor working).

86. *See* INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 48.

87. *See id.* at 123–34. Many young adults earn less than similar demographic groups have earned in the past and an increasing number of low skill positions are part-time jobs.

88. *See id.* at 131.

the justice system—face greater challenges in attaining financial self-sufficiency as adults than did earlier generations.

B. Partnering and Parenting

A similar gap has emerged in contemporary patterns of family formation. Traditionally, marriage was a marker of adult status and independence from parents across social classes.⁸⁹ For middle and upper class couples, marriage often followed graduation from college, while working class couples tended to marry at an earlier age.⁹⁰ Today, middle class individuals tend to become independent of their parents, marry, and have children years later than their parents did.⁹¹ In part, of course, this is because the period of young adulthood is devoted to education, skills training, and career development for this cohort. Such investment in human capital can be more readily accomplished without family responsibilities. For less educated young adults, particularly those from disadvantaged backgrounds, the pattern is quite different. Marriage has become less common altogether for this group, and partnering typically takes the form of informal, often unstable, unions.⁹² Many less educated young people have children outside of marriage, often before they have the skills and income to support a family.⁹³ In turn, the burden of raising children impedes young parents' ability to acquire the skills and training necessary to become economically self-sufficient.

C. Inequality

Recent changes in the established economic and social pathways of young adulthood have presented more choice and opportunity for some young adults and created more barriers for many others. Of particular importance for our purposes is the impact of these economic and social trends on marginalized young adults from disadvantaged backgrounds—namely, those who are children of low-income immigrants, those aging out of foster care, those with histories of involvement in the justice system, those with disabilities, and those who dropped out of school. These young adults are substantially less likely than their peers to experience a successful transition to adulthood.⁹⁴ Compared with other young adults, for example,

89. See generally JUNE CARBONE & NAOMI CAHN, *MARRIAGE MARKETS: HOW INEQUALITY IS REMAKING THE AMERICAN FAMILY* (2014).

90. See *id.*

91. See generally Monica Kirkpatrick Johnson et al., *Insights on Adolescence from a Life Course Perspective*, 21 J. RES. ON ADOLESCENCE 273 (2011); Glenn I. Roisman et al., *Salient and Emerging Developmental Tasks in the Transition to Adulthood*, 75 CHILD DEV. 123 (2004). In the 1980s, the age at first marriage was twenty-two; today it is twenty-seven. See INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 45.

92. This trend has been well documented. See generally CARBONE & CAHN, *supra* note 89; ANDREW CHERLIN, *THE MARRIAGE GO-ROUND: THE STATE OF MARRIAGE AND THE FAMILY IN AMERICA TODAY* (2010).

93. See generally SARA MCLANAHAN & GARY SANDEFUR, *GROWING UP WITH A SINGLE PARENT* (1997).

94. See *supra* note 78 and accompanying text.

former foster youths are less likely to graduate from high school, have lower rates of college attendance, suffer from more mental and physical health problems, and experience higher levels of housing instability and homelessness; they are more likely to be dependent on public assistance and unemployed, and be involved with the criminal justice system.⁹⁵ These disadvantaged young adults also are less likely to marry or cohabitate and are more likely to have children outside of marriage.⁹⁶ A particular source of concern is the increase in early parenthood by adolescents and young adults in this cohort and the increasing number of young children with one or more incarcerated parents.⁹⁷

Young adults in the justice system largely belong to a cohort of individuals whose prospects of making a successful transition to adulthood are poor. As a 2015 IOM/NRC report emphasized, meeting the needs of marginalized young adults not only has the potential to improve their lives and reduce persistent inequalities due to family background, but it can also help them become more fully contributing members of society.⁹⁸ Absent deliberate action by policymakers, however, this period of development is likely to magnify inequality, with lasting effects through adulthood. For young adult offenders, the cost of failing to intervene to promote successful maturation extends even beyond the enormous social cost of continued involvement in criminal activity. Many young adults in the justice system have children born into nonmarital relationships; thus, an increasing number of children have one or more incarcerated parent.⁹⁹ This concern led the IOM/NRC committee to highlight the urgency of investing in incarcerated and otherwise marginalized young adults and their children to interrupt the transmission of disadvantage from generation to generation.¹⁰⁰

Young adulthood is a period of risk and heightened stress for those individuals without the support and resources they need. This includes young adult offenders whose prospects for productive lives may depend on the justice system's response to their crimes. Counterintuitively perhaps, their criminal offending presents the opportunity for intervening in ways that can serve their interests and society's interest as well.

III. YOUNG ADULT OFFENDERS IN THE JUSTICE SYSTEM

The developmental and sociological research described in Parts I and II supports justice system reforms that focus on young adults as a transitional category of offenders between juveniles and adults. The research, although not conclusive, indicates that offending by young adults often may be

95. The IOM/NRC report emphasized the critical challenges facing this group. See INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 4.

96. *See id.*

97. About 45 percent of incarcerated young adults have children. Parental incarceration is associated with family instability, economic hardship, reductions in fathers' involvement in their children's lives, and increased child behavior problems. *See id.* at 107, 357–58.

98. *See id.* at 347–92.

99. *See supra* note 97 and accompanying text.

100. *See supra* note 15 and accompanying text.

driven by tendencies toward impulsivity and risk-taking that characterize much of the criminal activity of juveniles.¹⁰¹ This conclusion is also supported by empirical data on age patterns in risky behavior.¹⁰² If immaturity continues to play a role in criminal involvement beyond age eighteen, many young adults, like most juveniles, are likely to desist from criminal involvement as they mature. Moreover, recent social and economic trends have prolonged the period of dependency and vulnerability into adulthood.¹⁰³ Against this backdrop, the potential criminogenic effects of imprisonment and the benefits of rehabilitative programs for young adult offenders have become more salient.¹⁰⁴ In short, our expanded knowledge about this period of life supports legal changes that acknowledge young adults' potential for reform and aim to facilitate offenders' transitions to noncriminal adulthood.

The approach to reform that we propose draws on the developmental model that has powerfully influenced the law's response to juvenile crime in the past decade.¹⁰⁵ Like juveniles, young adults are most usefully classified as a distinct category of offenders in recognition of the social reality that young adulthood, like adolescence, is a critical developmental period.¹⁰⁶ This does not mean, however, that eighteen- to twenty-one-year-olds generally should be reclassified as juveniles or that their crimes should be adjudicated in the juvenile court.

The evidence suggests that young adult offenders are developmentally distinguishable from adolescents in several ways. Furthermore, as we discuss below, pragmatic considerations militate against categorically raising the age of juvenile court jurisdiction to twenty-one.¹⁰⁷ But, just as the justice system has come to recognize that adolescents are neither innocent children nor fully responsible adults, lawmakers should understand that young adults occupy a transitional developmental space between adolescents and mature adults. As we will explain, this approach supports reforms in the adult justice system directed toward young adults that not only enhance the welfare of these individuals but also offer the potential to reduce crime. These reforms include special sentencing and parole policies, as well as correctional programs that aim to provide young adult offenders with the skills necessary to function adequately in adult roles.

Attention to the research evidence comes at a propitious time: when many lawmakers and the public increasingly are receptive to reform. The extraordinary increase in incarceration rates over the past forty years has generated sharp criticism across the political spectrum.¹⁰⁸ Critics recognize

101. *See supra* Part I.

102. *See supra* Part I.

103. *See supra* Part II.

104. *See generally* NAT'L RES. COUNCIL, *supra* note 1; SCOTT & STEINBERG, *supra* note 1.

105. *See generally* NAT'L RES. COUNCIL, *supra* note 1; SCOTT & STEINBERG, *supra* note 1.

106. *See supra* Part II.

107. *See infra* Part III.C.

108. *See* NAT'L RES. COUNCIL, NAT'L ACADS., *THE GROWTH OF INCARCERATION IN THE UNITED STATES: EXPLORING CAUSES AND CONSEQUENCES 2* (Jeremy Travis et al. eds., 2014)

that overincarceration has had only a modest impact on crime reduction, while it has generated a wide range of well-documented financial and social costs: the latter have particularly burdened the large cohort of incarcerated young adults.¹⁰⁹ It is well understood that criminal convictions and incarceration negatively affect employment, educational attainment, and civic engagement, diminishing the prospect that young adult offenders will become productive citizens or assume conventional adult roles.¹¹⁰ The call for reform is made even more urgent because the consequences of our penal policies fall disproportionately on racial and ethnic minorities.¹¹¹

A. Young Adulthood: A Transitional Category

The boundary between childhood and adulthood typically creates binary legal categories: individuals are either adults or children for particular legal purposes. For most purposes, age eighteen marks the boundary, but the line between childhood and adulthood is sometimes drawn either before or after this age.¹¹² For example, young adults are sometimes classified as legal children; they cannot obtain and drink alcoholic beverages and may be entitled to financial support from noncustodial parents while they attend college.¹¹³ These regulations recognize that a categorical assumption that eighteen-year-olds conform to the conventional expectations of adults in their maturity, competence, and independence sometimes can undermine social welfare.¹¹⁴

In the context of justice policy, age classification is more complex in a way that may be instructive for reforming the law's response to young adult offenders. To be sure, the binary norm currently prevails in the classification of adults in the justice system: eighteen- and thirty-five-year-old offenders typically have been subject to undifferentiated treatment as "adults." But in dealing with juvenile offenders, contemporary lawmakers have effectively created an intermediate category. Under the recent legal

(describing the increase as "historically unprecedented and internationally unique"). Calls for reform have come from both sides of the political spectrum.

109. Approximately 410,900 young adults ages eighteen to twenty-four were in state or federal prisons or local jails in 2010. *See id.*

110. *See generally* NAT'L RES. COUNCIL, *supra* note 1; SCOTT & STEINBERG, *supra* note 1.

111. Among young men ages twenty to twenty-four, 8 percent of non-Hispanic blacks, 3.3 percent of Hispanics, and 1.3 percent of whites, were incarcerated in 2010. *See* NAT'L RES. COUNCIL, *supra* note 108.

112. *See* Scott, *supra* note 10, at 552. For example, legal minors can obtain motor vehicle licenses, exercise their right of free speech, and consent to particular medical treatments, including treatment for substance abuse, sexually transmitted diseases, and mental illness. *See id.*

113. *See id.* at 560. Congress raised the legal drinking age in response to data indicating that drunk drivers in this age cohort caused a disproportionate percentage of serious motor vehicle accidents. *See* NAT'L RES. COUNCIL, NAT'L ACADS., REDUCING UNDERAGE DRINKING: A COLLECTIVE RESPONSIBILITY 2 (Richard J. Bonnie & Mary Ellen O'Connell eds., 2004).

114. *See* Scott, *supra* note 10, at 589; *see also* INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 101–04, 235–39 (discussing parental support and minimum purchase ages).

reforms, the response to juvenile offending has been tailored to the developmental needs and capacities of adolescents.¹¹⁵

The acknowledgement that teenage offenders are neither children nor adults is grounded in pragmatic, political, and scientific considerations that have emerged from the recognition that the law's conventional binary approach is unsatisfactory as a basis for responding to juvenile crime.¹¹⁶ The traditional characterization of young offenders as children who lacked responsibility for their crimes seemed discordant as applied to older youths who committed violent crimes. Not surprisingly, perhaps, this approach was effectively ridiculed by the punitive law reformers of the 1990s.¹¹⁷ But their view that juveniles are not different from adult criminals has also been rejected as costly, offensive to conventional morality, and inconsistent with developmental research.¹¹⁸ Under modern law reforms, juveniles are held accountable for their crimes, but their culpability is mitigated as compared to adults.¹¹⁹ Furthermore, contemporary lawmakers increasingly realize that correctional programs and dispositions tailored to the developmental needs of adolescent offenders are more likely to reduce crime at a lower cost than either punitive adult sanctions or permissive policies that treat delinquent youth as children. A core objective of modern justice policy (and one submerged until recently) is to facilitate the transition of teenage offenders to productive adulthood by providing a healthy developmental context and giving them the tools they need to succeed.

This model can be adapted to young adult offenders, who also can be usefully classified as a transitional category, but one located within the adult justice system. Like juveniles, young adults are not fully mature and are more likely to reform than are older offenders. Also like juveniles, young adult offenders are in a critical period in which programs targeted to their developmental needs may powerfully influence their future lives in a positive direction. The monolithic classification of offenders over age eighteen under contemporary law assumes that uniform offense-based sentencing policies directed at adults regardless of age will protect the public and reduce crime. But this strategy is shortsighted to the extent that much young adult crime is the product of immature risk-taking propensities and that investment during this developmental period could facilitate these offenders' transitions to productive adult lives. At the same time, however, existing research does not support the classification of young adults as juveniles.¹²⁰ As we explain below, under current conditions, an institutional structure that generally treats young adults as separate transitional category of criminal offenders is likely to enhance the effectiveness of justice policy.

115. See generally NAT'L RES. COUNCIL, *supra* note 1; SCOTT & STEINBERG, *supra* note 1.

116. See SCOTT & STEINBERG, *supra* note 1, at 82–117.

117. See *id.*

118. See *id.*

119. See *id.*; see also *supra* Part I (discussing Supreme Court opinions).

120. See *infra* Part III.C.

*B. Twenty-First Century Criminal Justice:
A Developmental Approach to Young Adult Offenders*

In this section, we suggest how an understanding of young adulthood as a period of biological, psychological, and social maturation might be translated into policies and programs directed at this group of offenders. The elements of reform already exist: some proposals draw on sentencing and parole policies directed at juvenile offenders, while others (youthful offender statutes) would revive ameliorative statutory policies enacted in an earlier era.¹²¹ The heart of reform, however, is an ongoing project to develop effective interventions to provide young adult offenders with the tools to make the transition to productive adulthood. Just as policymakers in the juvenile system turned to evidence-based correctional programs grounded in developmental knowledge in seeking effective responses to juvenile crime, criminal justice officials in some jurisdictions have begun to invest in programs directed at young adults in pursuit of the same goal.¹²² As we explain, although few programs have been evaluated, investment in promising correctional programs that promote healthy development in these still maturing offenders is likely to be the most effective response to their criminal conduct.

1. Young Adult Offender Status for Nonviolent Offenders

For young adults who commit nonviolent crimes, a regime modeled on the young offender statutes enacted in the 1960s and 1970s¹²³ can preserve future life options. These statutes create a special status, extending rehabilitative features of juvenile proceedings to eligible young adults (as well as transferred juveniles) who are prosecuted in the criminal courts.¹²⁴ Young offender status limits sentence duration and shields offenders from the burdensome collateral consequences of having a criminal record, which can severely restrict their ability to pursue educational, employment, and

121. See *infra* Part III.C.1–2.

122. See *infra* Part III.C.3.

123. See COLO. REV. STAT. § 18-1.3-407 (2013); FLA. STAT. ANN. §§ 958.011–.15 (West 2012); GA. CODE ANN. §§ 42-7-1 to -9 (West 1997); MICH. COMP. LAWS ANN. §§ 762.11–.16 (West 2000); N.Y. CRIM. PROC. LAW § 720.10–.35 (McKinney 2011); S.C. CODE ANN. § 24-19-10 to -160 (2007). One rationale for young offender status is to protect young offenders from the harshness and collateral consequences of criminal prosecution and conviction. See *Raines v. State*, 317 So. 2d 559, 561 (Ala. 1975); *People v. Perkins*, 309 N.W.2d 634, 636–37 (Mich. Ct. App. 1981). Other rationales include provisions of educational, training, and rehabilitation programs to reduce recidivism. See FLA. STAT. ANN. § 958.021; GA. CODE ANN. § 42-7-3(a); S.C. CODE ANN. § 24-19-60; *Perkins*, 309 N.W.2d at 636–37.

124. See William Easton, *Expunging Criminal Records: A Judge's Perspective*, 27 WAYNE L. REV. 1391, 1396 (1981); Sally Terry Green, *Realistic Opportunity for Release Equals Rehabilitation: How the States Must Provide Meaningful Opportunity for Release*, 16 BERKELEY J. CRIM. L. 1, 24–26 (2011). One of the most comprehensive statutes is New York's, which provides for confidentiality of records, restrictions on the consequences of a criminal conviction, and lenient sentencing alternatives. See N.Y. CRIM. PROC. LAW §§ 720.15, 720.35; N.Y. PENAL LAW § 60.02 (McKinney 2009). See generally Alison Marie Grinnell, Note, *Searching for a Solution: The Future of New York's Juvenile Offender Law*, 16 N.Y.U. J. HUM. RTS. 635 (2000).

even housing opportunities essential to the transition to adulthood.¹²⁵ Typically, trial courts have discretion to confer this status on a young adult offender charged with designated crimes, and some laws restrict the status to first-time offenders.¹²⁶ Most statutes limit the maximum sentence to between one and three years.¹²⁷ Other consequences of being designated as a young offender vary from state to state and include the opportunity to avoid a criminal conviction (and thus a criminal record)¹²⁸ and to have the record sealed after a period of good behavior.¹²⁹ A contemporary young offender statute could confer the status presumptively on all adults under twenty-one and transferred juveniles charged with particular crimes, including misdemeanors, most property crimes, and drug possession offenses.¹³⁰ Beyond this, brief sentences, together with protection from the collateral consequences of criminal conviction, can help preserve the opportunities for productive adult lives for many young adult offenders.

2. Sentencing and Parole Policies

For young adults who commit serious violent offenses, young offender status is unlikely to be deemed sufficiently protective of public safety. Nonetheless, their relative youth should be considered in sentencing. Age has long been considered a basis for mitigation under both capital and noncapital sentencing statutes.¹³¹ Immaturity has featured most prominently as a key mitigating factor in juvenile sentencing cases,¹³² but recently courts sentencing young adults also have begun to consider

125. *See generally* COUNCIL OF STATE GOV'TS JUSTICE CTR., REDUCING RECIDIVISM AND IMPROVING OTHER OUTCOMES FOR YOUNG ADULTS IN THE JUVENILE AND ADULT CRIMINAL JUSTICE SYSTEMS (Nov. 2015) (discussing the collateral consequences of having a criminal record and the ways in which it inhibits the ability of young adults to transition to productive adulthood).

126. *See* MICH. COMP. LAWS ANN. §§ 762.11 (excluding offenses carrying a maximum penalty of life imprisonment, major controlled substance offenses, traffic offenses, and criminal sexual conduct, and excluding offenders with a prior conviction or adjudication for an offense requiring a sex-offender registration); N.Y. CRIM. PROC. LAW § 720.10(3) (excluding murder, armed felonies, rape in the first degree, criminal sexual act in the first degree, or aggravated sexual abuse).

127. *See* ALA. CODE § 15-19-6(a)(4) (LexisNexis 2011) (limiting to no more than three years for felonies); FLA. STAT. ANN. § 958.04(1)(2)(c)-(d) (limiting to no more than six years); MICH. COMP. LAWS ANN. § 762.13(1) (limiting to no more than one year); N.Y. PENAL CODE §§ 60.02(2), 70.00(2)(e) (limiting to no more than four years for most felonies).

128. *See* ALA. CODE § 15-19-7(a); MICH. COMP. LAWS ANN. § 762.11(1); N.Y. CRIM. PROC. LAW § 720.35(1).

129. *See* S.C. CODE ANN. § 22-5-920(B) (2007) (providing for applications to expunge records of arrest and conviction fifteen years after conviction).

130. The New York legislature is currently considering a bill that proposes a presumption of youthful offender status to young defendants who do not have a prior conviction or adjudication for a felony. *See* Assemb. 238-7642, 2015–2016 Reg. Sess. § 79 (N.Y. 2015); S. 238-5642, 2015–2016 Reg. Sess. § 79 (N.Y. 2015).

131. *See* ARIZ. REV. STAT. ANN. § 13-751(G)(5) (2010) (considering the defendant's age as a mitigating circumstance); S.C. CODE ANN. § 16-3-20(3)(C)(b)(7) (same); UTAH CODE ANN. § 76-3-207(4)(e) (LexisNexis 2012) (same).

132. *See supra* notes 2, 36 and accompanying text.

evidence of immaturity in mitigation.¹³³ In 2015, for example, an Illinois court set aside a mandatory sentence of life without parole imposed on a nineteen-year-old as a violation of the Eighth Amendment prohibition of cruel and unusual punishment.¹³⁴ The court cited the Supreme Court's juvenile sentencing opinions and also pointed to developmental research indicating that brain maturation continues into the twenties.¹³⁵ This evidence can also support a presumption that mandatory minimum adult sentencing regimes should exclude young adult offenders, just as juvenile offenders are excluded in some states.¹³⁶

The determination of whether a reduced sentence is warranted can also be made *ex post* through parole policies designed for young adult offenders. Some states have adopted special statutes that allow juvenile prisoners sentenced for serious offenses in the adult system to petition for expedited parole and provide programmatic assistance to prepare them for the hearing.¹³⁷ These laws are premised on developmental evidence that much juvenile crime is the product of immaturity and that many young offenders will reform as they mature.¹³⁸ If the crimes of many young adult offenders similarly represent impulsive risk-taking behavior that is characteristic of this period of life, their inclination to offend is likely to decline with maturation. A special parole statute would allow the young adult offender to demonstrate, on an expedited basis, that he no longer represents a threat to society. These prisoners can be held accountable and public safety can be protected through briefer sentences than those imposed on prisoners who offended as older adults or who have not demonstrated reform.

3. Specialized Correctional Facilities and Programs

At this point, the justice system has only begun to offer correctional programs or special facilities aimed at young adult offenders (and juvenile offenders sentenced as adults),¹³⁹ and few programs have been subject to rigorous evaluation. Thus, no blueprint exists for transforming correctional

133. *See, e.g.*, *United States v. C.R.*, 296 F.R.D. 131, 132–35 (E.D.N.Y. 2013); *People v. House*, No. 1-11-0580, 2015 WL 9428803, at *27 (Ill. App. Ct. Dec. 24, 2015).

134. *See House*, 2015 WL 9428803, at *27; *see also C.R.*, 296 F.R.D. at 132–35 (sentencing a nineteen-year-old defendant to the five year minimum). In a lengthy memorandum, Judge Jack Weinstein described the research on brain development in young adulthood as justification for imposing the minimum sentence. *See Sentencing Memorandum, C.R.*, 296 F.R.D. 131 (No. 09 Cr. 0155 (JBW)), 2013 WL 11263190.

135. *See Sentencing Memorandum, supra* note 134.

136. *See State v. Lyle*, 854 N.W.2d 378, 386 (Iowa 2014) (finding mandatory minimum sentences inappropriate for juveniles).

137. *See CAL. PENAL CODE* § 4801 (West 2011) (special expedited parole statute for juvenile offenders); *WASH. REV. CODE ANN.* § 10.95.030 (West 2014).

138. *See CAL. PENAL CODE* § 4801, pmb. (offering this rationale).

139. Colorado's Youthful Offender System (YOS) was legislatively created primarily to reduce recidivism in violent offenders, both transferred juveniles and (through a later statute) young adults ages eighteen and nineteen, and to provide them with the means to become productive adult citizens. *See COLO. DEP'T OF PUB. SAFETY, EVALUATION OF THE YOUTHFUL OFFENDER SYSTEM (YOS) IN COLORADO: A REPORT OF FINDINGS PER 18-1.3-408, C.R.S.* 14–17 (2014).

policy. However, promising reforms implemented in the juvenile system over the past generation provide guidance for policymakers focusing on young adult offenders. Effective juvenile programs, policies, and practices that are tailored to the unique needs of this population can be—and are being—adapted for young adults.¹⁴⁰ For example, multi-systemic therapy, which has been shown to effectively reduce recidivism in juveniles, is being adapted to treat young adults.¹⁴¹ Substance abuse and other mental health services, as well as social skills training, are important interventions with young adult offenders, as with juveniles. Finally, developing effective educational and vocational skills training programs for this age cohort is essential to successful justice policy and poses a challenge perhaps even greater than in the juvenile justice context. Sociological research indicates that young adult offenders are often detached from the socializing institutions of work and family that reduce recidivism.¹⁴² What is needed is a comprehensive effort to provide these offenders with programs and facilities that will aid in promoting their integration into the larger society as productive adults.

Increasingly, states and localities have begun to take up this challenge, persuaded that policies targeting young adult offenders potentially can be an effective means to reduce recidivism. Localities have developed promising community-based programs for young adult offenders that provide intensive services and supervision, with good employment and recidivism-reduction outcomes.¹⁴³ For incarcerated young adult offenders, some states have created separate facilities modeled on successful juvenile facilities and programs. These facilities have developmentally trained staff and emphasize education, workforce development, and cognitive behavioral training and typically are connected with specialized aftercare services.¹⁴⁴ Programs directed at young adults within integrated facilities are also being

140. See COUNCIL OF STATE GOV'TS JUSTICE CTR., *supra* note 125, at 7.

141. See *id.* Multisystemic therapy has been one of the most effective programs with both violent and nonviolent juvenile offenders. See SCOTT & STEINBERG, *supra* note 1, at 217–20.

142. See Schiraldi et al., *supra* note 6, at 4.

143. The San Francisco Adult Probation Transitional Age Youth Unit is a successful community-based program. See *id.* at 11. Roca, a Massachusetts program that combines cognitive behavioral therapy, substance abuse treatment, and best-practice community corrections, has effectively reduced recidivism and increased employment in justice-involved high-risk young men. See *id.* at 12.

144. The Colorado YOS is among the most comprehensive programs aimed at young adults ages eighteen and nineteen. See generally COLO. DEP'T OF PUB. SAFETY, *supra* note 139. First established in 1994 for violent juvenile offenders in the adult system, YOS houses offenders in separate facilities and provides specially designed programs and services that focus on academics, rehabilitation, and the development of prosocial behaviors and reentry planning. The recidivism rates of offenders who successfully complete the YOS program (most offenders) is far better than comparable offenders. YOS offenders receive career and technical education, anger management treatment, and substance abuse treatment. See *id.* at 43. New York City and California are developing facilities for young adults. The planned California facility (the California Leadership Academy) is modeled on the successful “Missouri Model” of juvenile residential facilities. See COUNCIL OF STATE GOV'TS JUSTICE CTR., *supra* note 125, at 14.

developed.¹⁴⁵ Through these programs, policymakers recognize that even when incarceration is justified for punishment and public protection, society's interests, as well as that of offenders, are served by investing in the education, health, and well-being of young adults who will eventually be allowed to return to the community.¹⁴⁶

C. *Why Not Extend the Jurisdictional Age of Juvenile Court?*

As we have indicated, reforms in the justice system's treatment of young adult offenders should build on the developmental approach to juvenile justice. Thus, the natural next move might seem to be a unitary rehabilitative justice system with general jurisdiction over juveniles and young adults. Nonetheless, we are hesitant to argue for this bold reform for several reasons.

As we have shown, the scientific evidence does not currently justify an institutional reform of this magnitude. Moreover, the political and practical obstacles to such a change are formidable. Although modest steps toward consolidating responses to minor offenses by young adults may be feasible, it is not clear that, under current conditions, the interests of either juveniles or young adults would be promoted by a unitary justice system.

Some reformers have pointed to neuroscience and other research in advocating that young adults be adjudicated in the juvenile system.¹⁴⁷ But the research supporting the presumption underlying the lenient, rehabilitative approach of the juvenile system—that youthful offending is driven by developmental immaturity—is weaker for young adults.¹⁴⁸ Because of their youth, adolescents are deemed less culpable and more malleable than older offenders. The emerging developmental evidence indicates that young adult brains are developing and that these offenders may be similar to adolescents in their impulsivity.¹⁴⁹ However, the developmental factors that likely drive offending in younger teens are subtler in young adults, and, in some regards, young adults are more like older adults than teenagers.¹⁵⁰ As explained in Part I, scientific evidence is simply not robust enough to support a response of categorical leniency toward young adult offenders.

We are also concerned that raising the age for juvenile court adjudication to twenty-one may have the unintended consequence of making adolescents

145. See *About the Division of Juvenile Justice*, CAL. DEP'T OF CORRECTIONS & REHABILITATION, http://www.cdcr.ca.gov/Juvenile_Justice/About_DJJ/index.html (last visited Oct. 16, 2016) (providing training and treatment to young adult offenders) [<https://perma.cc/59FM-CQEG>]; FLA. S., INTERIM REPORT ON YOUTHFUL OFFENDER DESIGNATION IN THE DEPARTMENT OF CORRECTIONS, S. 2011-114, at 3 (2010) (providing educational, work, and rehabilitative programs to young adult offenders).

146. See INST. OF MED. & NAT'L RES. COUNCIL, *supra* note 15, at 361–66.

147. See *supra* note 17 and accompanying text.

148. See *supra* Part I.

149. See *supra* Part I.

150. Young adults respond more like adolescents on measures of self-control under conditions of threat, but they perform more like adults under conditions of positive arousal. See *supra* Part I.

in the justice system worse off than under the current regime without producing the intended benefits for young adults. Political reality dictates that public safety will always be a preeminent concern of justice policy. Indeed, the juvenile system, with its commitment to rehabilitation, often has been challenged on the ground that its lenient response to young offenders sacrifices public safety.¹⁵¹ During periods when public fears about violent juvenile crime are aroused, such as the 1990s, politicians have responded by adopting punitive laws facilitating the adult prosecution and punishment of juveniles.¹⁵² To be sure, the moral panic of that period has receded. But the lessons of the 1990s are that public and political acceptance of the special status of juveniles is tentative and that the developmental approach to juvenile justice policy could be readily destabilized.¹⁵³ Extending the general jurisdiction of the juvenile system to age twenty-one would only increase its vulnerability. A system committed to leniency and to more abbreviated sanctions is unlikely to be deemed satisfactory in dealing with a category of offenders who commit a substantial percentage of serious offenses.¹⁵⁴ Moreover, young adult offenders have different needs than younger juveniles, and integrating substantial numbers of young adults into the juvenile system could have a negative impact on its ability to serve the needs of the youths who are its primary concern.¹⁵⁵

Young adults themselves are likely to attain greater benefit from institutional reforms in the adult system than from juvenile status. Even if the age of juvenile court jurisdiction were raised, young adults charged with serious crimes predictably would be transferred to an adult system with few programs or policies dedicated to their rehabilitation. Reformers are better advised to concentrate on ameliorative institutional reforms in the adult system. As the youngest offenders within the jurisdiction of the adult system, young adults have a claim to correctional responses that acknowledge their transitional status and potential for reform. More importantly, perhaps, if programs tailored to the needs of young adult offenders reduce crime by giving them the tools to assume conventional adult roles, society may also reap substantial benefits.

Modest extensions of juvenile court jurisdiction are possible. Indeed, many states have extended the jurisdictional age for juvenile court

151. See generally SCOTT & STEINBERG, *supra* note 1.

152. See *id.* at 94–99 (discussing moral panics of the 1990s in response to an increase in juvenile crime); Elizabeth S. Scott, *Miller v. Alabama and the (Past and) Future of Juvenile Crime Regulation*, 31 LAW & INEQ. 535 (2013).

153. See generally Scott, *supra* note 152.

154. See generally Perkins, *supra* note 12.

155. See Tamar R. Birckhead, *North Carolina, Juvenile Court Jurisdiction, and the Resistance to Reform*, 86 N.C. L. REV. 1143, 1494–500 (2008) (discussing arguments against raising the age of the juvenile system, such as expansion of an already underfunded system); see also Nancy L. Iredale & Paul L. Joffe, *Between Juvenile and Adult Courts: A No Man's Land for the Youthful Offender*, YALE REV. L. & SOC. ACTION, Spring 1971, at 49, 52–53 (noting arguments made by a juvenile court judge that the juvenile system's facilities for treating older offenders are inadequate and that raising the age of the juvenile system would dilute the trust and efficacy of the special handling of juveniles by a specialist court).

dispositions to twenty-one or even beyond.¹⁵⁶ This extension allows older juveniles, whose offenses and age warrant more extensive interventions than would be possible if jurisdiction ended at age eighteen, to avoid transfer and the harsh sanctions of the adult system and to benefit as young adults from programs in the juvenile system. A more innovative reform (and an alternative to young offender status)¹⁵⁷ would be the extension of juvenile court jurisdiction to individuals who commit minor crimes as young adults. Adjudication and disposition in the juvenile system of these offenders allows them to avoid the stigma of criminal conviction, without an undue destabilizing impact on the juvenile system.¹⁵⁸

CONCLUSION

At a time when policymakers and the public are likely to be receptive to reforms that reduce crime, developmental and sociological research supports a new approach to young adult offenders. Drawing on lessons from juvenile justice reforms, we argue that individuals in this age cohort should be treated as a discrete and transitional category between juveniles and adults. Tailoring sentencing policies to this group and investing in effective programs to give them the tools to become productive noncriminal adults will serve social welfare, as well as the interests of the most vulnerable young adults.

156. Statutes in thirty-five states extend dispositional jurisdiction beyond age eighteen. *See State Statutes Define Who Is Under Juvenile Court Jurisdiction*, JUV. OFFENDER & VICTIMS NAT'L REP. SERIES BULL. (Office of Juvenile Justice & Delinquency Prevention, Wash. D.C.), June 2003, <https://www.ncjrs.gov/pdffiles1/ojjdp/195420.pdf> [<https://perma.cc/A5EW-MYCJ>].

157. *See supra* notes 126–34 and accompanying text.

158. An alternative is youthful offender status that shields criminal records. *See supra* notes 128–29 and accompanying text.

EXHIBIT 20



KEEPING OUR SCHOOLS SAFE: A PLAN TO STOP MASS SHOOTINGS AND END GUN VIOLENCE IN AMERICAN SCHOOLS

TABLE OF CONTENTS

- I. Introduction..... 2**
- II. Executive Summary.....4**
- III. Gun Violence in America’s Schools.....8**
 - What Does Gun Violence in American Schools Look Like?9
 - What Do We Know About School Gun Violence Incidents? 11
- IV. A Comprehensive Plan to Prevent Mass Shootings and Other Gun Violence
in Our Schools.....14**
 - Tailored Gun Violence Prevention Policies and Interventions.....14
 - Protecting Schools Through Threat Identification, Security, Planning
And by Creating Safe School Environments.....21
- V. Arming Teachers Is Dangerous.....30**
- VI. Conclusion 35**
- Appendix. Guns in Schools Laws Legal Overview.....36**

INTRODUCTION

For the last 20 years our students, teachers and parents have lived with the reality of school shootings. Meanwhile, America's gun violence epidemic, in the form of mass shootings, homicides, assaults, unintentional discharges, and firearm suicides, has been infecting America's schools. The failure of our leaders to address the root causes of school gun violence from all angles is having lasting consequences for millions of American children.

We need meaningful action to keep our schools safe — action that addresses what we know about gun violence in America's schools and prevents it from occurring in the first place. It's time for our leaders to adopt a multi-faceted approach that provides the school community with the tools it needs to intervene and prevent school-based gun violence. We can't let risky ideas, like arming teachers, dominate the debate. Put simply, an armed teacher cannot, in a moment of extreme duress and confusion, transform into a specially trained law enforcement officer. In reality, an armed teacher is much more likely to hit a student bystander or be shot by law enforcement than to be an effective solution to an active shooter in a school.

This report focuses on approaches that are proven most effective, such as addressing students' health, empowering teachers and law enforcement to intervene when students show signs they could be a danger to themselves or others, improving our schools' physical security, and keeping guns out of the hands of people who shouldn't have them in the first place.

OUR PLAN

- 1. Pass Red Flag Laws**
- 2. Encourage Responsible Firearm Storage**
- 3. Raise the Age to Purchase Semiautomatic Firearms**
- 4. Require Background Checks on All Gun Sales**
- 5. Create Threat Assessment Programs in Schools**
- 6. Implement Expert-Endorsed School Security Upgrades**
- 7. Initiate Effective Emergency Planning**
- 8. Create Safe and Equitable Schools**

EXECUTIVE SUMMARY

In this report, the nation's largest education unions and its largest gun safety organization are joining together to present a plan that combines carefully tailored gun safety policies with school-based intervention strategies. Using data to paint the full picture of what gun violence looks like on school grounds and drawing upon research and recommendations from school safety experts, Everytown for Gun Safety Support Fund, the American Federation of Teachers, and the National Education Association have crafted a plan focused on intervention that can prevent mass shooting incidents and help end gun violence in American schools.

The aim of this report is three-fold:

1. Demonstrate What Gun Violence in American Schools Looks Like

First, Everytown for Gun Safety Support Fund, the American Federation of Teachers, and the National Education Association want to provide policymakers and the public with an understanding of how gun violence impacts America's schools. To accomplish this goal, Everytown has updated its study of gun violence on school grounds. Analyzing this information and supplementing our data with research from other respected organizations, we learned the following:

1. Those committing gun violence on school grounds often have a connection to the school;
2. Guns used in school-based violence generally come from home, or the homes of family or friends;
3. Shooters often exhibit warning signs of potential violence; and
4. Gun violence in American schools has a disproportionate impact on students of color.

2. Outline a Plan to Prevent Gun Violence in Schools

Second, the report provides a proactive, research-informed intervention plan to prevent active shooter incidents and, more broadly, address gun violence in all its

forms in American schools. As representatives of educational professionals from across the country, parents of school-aged children who volunteer with Moms Demand Action for Gun Sense in America (part of Everytown), and student activists through Everytown's Students Demand Action chapters, the authors believe it is imperative to help keep our kids safe at school with approaches that are proven effective. Using what we know about school gun violence our organizations have put together a plan that focuses on intervening before violence occurs. The first part of this plan focuses on preventing shooters from getting their hands on guns by enacting sensible laws including:

1. Red Flag laws so that law enforcement and family members can act on warning signs of violence, like those that repeatedly occurred in Parkland, and temporarily prevent access to firearms;
2. Responsible firearm storage laws to address the most common source of guns used in school gun violence, including the guns that were used in the Santa Fe shooting;
3. Raising the age to purchase semiautomatic firearms to 21 to prevent minors, like the shooter in Parkland, from easily getting their hands on guns; and
4. Requiring background checks on all gun sales so people exhibiting warning signs, minors, and people with dangerous histories can't evade our gun laws and get their hands on guns.

The second part of the plan focuses on evidence-based and expert-endorsed actions that schools can take. These solutions empower educators and law enforcement to intervene to address warning signs of violence and to keep shooters out of schools. Schools can do this by:

1. Establishing threat assessment programs in schools to understand and intervene when a student is a risk to themselves or others;
2. Implementing basic security upgrades to prevent access to schools and classrooms;

3. Planning in advance for emergencies so staff can immediately lock out schools and law enforcement can respond quickly; and
4. Establishing safe and equitable schools to help reduce gun violence, especially in high-risk communities.

These solutions work hand in hand to help create safe schools, address violence at its earliest stages and block easy access to firearms by those who would do harm.

3. Stop Schools from Arming Teachers

Third and finally, this report provides a thorough overview of why arming teachers and allowing more guns in our schools poses a risk to our children. The authors understand the strong desire for solutions, but this report carefully considers all of the arguments for arming teachers and explains why it is an ineffective solution to gun violence in our schools. Using a wealth of research that shows allowing teachers to carry guns in schools increase the risks to children, this report demonstrates that it is unrealistic to believe a teacher would be able to protect their students, neutralize a shooter, and not be a risk to themselves and to their students. Instead, the report urges our leaders to adopt proven solutions that address what we know about school gun violence.

WHO WE ARE

Everytown for Gun Safety Support Fund

Everytown for Gun Safety Support Fund (“Everytown”) seeks to improve our understanding of the causes of gun violence and the means to reduce it — by conducting groundbreaking original research, developing evidence-based policies, and communicating this knowledge in the courts and the court of public opinion.

Moms Demand Action for Gun Sense in America

Moms Demand Action for Gun Sense in America (“Moms Demand Action”) is a grassroots movement of Americans fighting for public safety measures that can protect people from gun violence. Moms Demand Action has established a chapter in every state of the country.

Students Demand Action for Gun Sense in America

Students Demand Action for Gun Sense in America (“Students Demand Action”) is a national initiative, created by and for teens and young adults, to channel the energy and passion of high school and college-aged students into the fight against gun violence. Students Demand Action volunteers work within their schools and communities to educate their peers, register voters and demand common-sense solutions to this national crisis.

American Federation of Teachers

The American Federation of Teachers (AFT), represents more than 1.7 million educators, school professionals, government employees, and healthcare professionals. AFT has more than 3,000 affiliates nationwide and advocates across the country for high-quality public education, healthcare, and public-services for students, families, and communities.

National Education Association

The National Education Association (NEA), the nation's largest professional employee organization, is committed to advancing the cause of public education. NEA's 3 million members work at every level of education from preschool to university graduate programs. NEA has affiliate organizations in every state and in more than 14,000 communities across the United States.

GUN VIOLENCE IN AMERICA'S SCHOOLS

Everytown's database of gunfire on school grounds details the myriad ways in which gun violence manifests in American schools. Following the mass shooting at Sandy Hook School in 2012, Everytown began tracking all cases of gunfire on school grounds. The aim of this project was to build a detailed national database that included all scenarios involving gunfire on school grounds. As such, Everytown created a definition that was purposely broad, including incidents defined as follows:

Any time a gun discharges a live round inside (or into) a school building, or on (or onto) a school campus or grounds, where "school" refers to elementary, middle, and high schools — K-12 — as well as colleges and universities.¹

From 2013 to 2018, Everytown identified 405 incidents of gunfire on school grounds. Of these, 260 occurred on the grounds of an elementary, middle, or high school, resulting in 109 deaths and 219 injuries.² While Everytown's database includes higher-education institutions, for the purposes of this report all numbers and analyses reflect only those incidents that occurred on the grounds of elementary, middle, or high schools.

This analysis shows that mass shootings like the incident at Sandy Hook — and, more recently, Parkland and Santa Fe — are not commonplace. They represent less than 1 percent of overall school gun violence incidents. However, these incidents account for a disproportionate share of the overall deaths and injuries from school gun violence. Mass shootings also are imposing an unknown amount of trauma on a generation of students. It is unfathomable that our leaders have not taken the steps necessary to address and help those with patterns of violent behavior and to block their easy access to guns.

The analysis also demonstrates that other incidents of gun violence are occurring in our schools with distressing frequency. These include homicide and assaults; unintentional

¹ For six full years beginning in 2013, Everytown collected detailed information on all incidents that met this definition, including demographic details of shooters and victims, the shooter or shooters' intention, location, school population and racial demographic, and, where available, the original source of the firearm. To gather this material, Everytown relied on news reports by reputable media sources. Where necessary, inquiries were made to law enforcement and school officials. All incidents used in the final analyses — the data points underlying this report — were then confirmed by an independent research firm. In addition, where appropriate, Everytown used publicly available databases and studies from the Naval Postgraduate School and the New York Police Department, to supplement original analyses and findings.

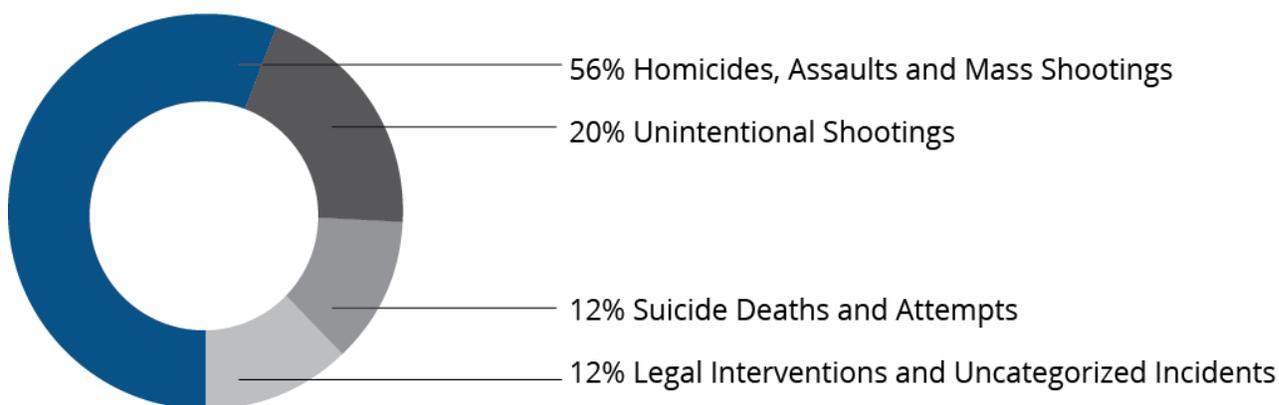
² Everytown's Gunfire on School Grounds database includes 145 incidents on colleges and universities. These incidents were excluded from analyses to focus on gunfire on K-12 school grounds.

discharges resulting in injury or death; and, to a slightly lesser extent, self-harm and suicide deaths using a firearm.

All of these incidents of gun violence, regardless of their intent or victim count, compromise the safety of our schools — safety that directly impacts learning outcomes and the emotional and social development of our students.³ A growing body of research shows that the lingering trauma from exposure to gun violence affects everything from ability to maintain attention⁴ to overall enrollment numbers and performance on standardized tests.

⁵ To address all of these incidents, a broader platform of solutions is required.

WHAT DOES GUN VIOLENCE IN AMERICA'S SCHOOLS LOOK LIKE?⁶



Homicides, Assaults and Mass Shootings

The majority of incidents of gun violence in elementary, middle, and high schools — 56 percent — are homicides, assaults, and mass shootings. Everytown identified only three mass shootings — incidents where a shooter killed four or more people — in an elementary, middle, or high school between 2013 and 2018.⁷ Far more common were

³ Cornell DG, Mayer MJ. Why do school order and safety matter? *Educational Researcher*. 2010; 39(1): 7-15.

⁴ Sharkey PT, Tirado-Strayer N, Papachristos AV, Raver CC. The effect of local violence on children's attention and impulse control. *American Journal of Public Health*. 2012; 102(12): 2287-2293.

⁵ Beland LP, Kim D. The effect of high school shootings on school and student performance. *Education Evaluation and Policy Analysis*. 2016; 38(1): 113-126.

⁶ Everytown was able to determine the shooter's intent in 235 incidents, the breakdown and analysis for which is provided below.

⁷ Everytown defines a mass shooting as an incident in which four or more people, not including the shooter, are killed with a firearm. These shootings occurred at: Marysville Pilchuck High School in Marysville, WA, Marjory Stoneman Douglas in Parkland, FL, and Santa Fe High School, in Santa Fe, TX.

incidents involving specific individuals, arguments that escalated, acts of domestic violence, parking lot altercations, and robberies where the school was an unfortunate backdrop.

While mass shootings in schools are rare,⁸ comprising only 1 percent of school gun violence incidents, they account for more than a quarter (28 percent) of overall deaths in schools and 14 percent of overall injuries. And the statistics do not begin to capture the collective impact these shootings have on the schools in which they occur, their communities, and all students and parents.

Over the last six years, there were 131 homicides and assaults with a firearm that took place on the grounds of elementary, middle, and high schools. These incidents resulted in at least 248 victims: 74 deaths and 174 non-fatal gunshot injuries.⁹ At least 130 of these victims were students at the time.

Unintentional Shootings

Approximately 20 percent of gunfire incidents that occurred on the grounds of elementary, middle, and high schools were unintentional including those resulting in injury or death and incidents in which no one was shot. These 47 incidents resulted in at least one death and 32 non-fatal gunshot injuries.¹⁰ At least 21 of these victims were students at the time.

Suicide Deaths and Attempts

Twelve percent of elementary, middle, and high school gunfire incidents involved suicide deaths and attempts where the shooter had no intention of harming other people. These 28 incidents resulted in 24 deaths and four injuries.¹¹ At least 22 of the victims were students at the time.

⁸ This aligns with research from other organizations that have developed comparable databases of incidents in schools. The Center for Homeland Defense and Security (CHDS) at the Naval Postgraduate School, for example, maintains a public database of gun violence incidents in K-12 schools dating back to 1970. According to the CHDS database, 10 mass shootings that resulted in the deaths of four or more people not including the shooter occurred on school grounds. The CHDS database also includes more than 1,300 other incidents of school gun violence that occurred over the same time period. Center for Homeland Defense and Security. K-12 School Shooting Database. <https://www/chds.us/ssdb/>. Accessed February 4, 2019.

⁹ The number of death and injuries for this category excludes the shooter.

¹⁰ The number of deaths and injuries for this category includes injuries or death of the shooter.

¹¹ The number of deaths and injuries for this category includes injuries or death of the shooter only in the event that the shooter did not intend to harm another.

Legal Interventions and Uncategorized Incidents

The remaining incidents of gunfire on the grounds of elementary, middle, and high schools — 12 percent — were legal interventions or other incidents in which the intention of the shooter falls outside of the categories listed here.

These 29 incidents resulted in eight deaths and four injuries.¹² Incidents involving legal intervention are those in which the shooter or potential shooter was shot or shot at by a law enforcement officer. Uncategorized incidents include, but are not limited to, those in which a firearm was discharged into the air, those in which a gun was discharged but harm was caused to others through other means, and those in which a gun was discharged with intent to damage buildings or other property.

WHAT DO WE KNOW ABOUT SCHOOL GUN VIOLENCE INCIDENTS?

Understanding incidents of gun violence in schools is integral to effectively creating a comprehensive plan to address their threat and effects. Analyzing Everytown’s gunfire on school grounds dataset and relevant studies from other respected organizations, there are several common lessons that guide our school safety proposals.

Those Discharging Guns on School Grounds Often Have a Connection to the School

Everytown’s analysis of gunfire on school grounds reveals that across all forms of gun violence in America’s schools, shooters often have a connection to the school. Overall, 56 percent were associated with the school — they were either current or former students, staff, faculty, or school resource officers.¹³ Of the 109 shooters involved in homicides and assaults, 40 percent were current or former students. Of the 46 shooters involved in unintentional discharges, 67 percent were current or former students. Finally, of the 27 shooters involved in self-harm injuries and suicide deaths, 89 percent were current or former students.

¹² The number of death and injuries for this category excludes the shooter.

¹³ Everytown was able to determine both the shooter’s intent and relationship to the school in 218 incidents.

Considering only active shooters — those shooters who are actively engaged in killing or attempting to kill others in a school¹⁴ — the numbers are higher. An analysis of the New York Police Department’s review of active shooter incidents found that in 75 percent of these incidents at schools, the shooter or shooters were school-aged and were current or former students.¹⁵ This data suggests that school-based interventions, like threat assessment programs, can be an effective tool for addressing school gun violence.

The Guns Generally Come From Home, Family, or Friends

Evidence suggests that most school shooters obtain their guns from family, relatives, or friends rather than purchasing them legally or illegally. Everytown was able to identify the gun source in 51 percent of the incidents that involved shooters under 18 years old (a total of 100 shooters).¹⁶ Most of these shooters — 78 percent — obtained the gun(s) from their home or the homes of relatives or friends. This finding is consistent with other studies showing that 68 to 80 percent of school shooters under the age of 18 acquired the gun(s) used from their home or the homes of relatives or friends.^{17, 18, 19} This data suggests that responsible storage laws can be an effective tool in addressing the source of guns used in school gun violence.

¹⁴ New York City Police Department. *Active shooters: Recommendation and analysis for risk mitigation*. 2016. <https://on.nyc.gov/2GIEbl1>. Everytown’s analysis doesn’t require a definition of “active shooter,” but as used in this report generally, we are referring to shooters actively engaged in killing or attempting to kill people at a school. Specifically, the New York Police Department (NYPD), adopting a definition created by the U.S. Department of Homeland Security defines he Department of Homeland Security (DHS) defines an active shooter as “a person(s) actively engaged in killing or attempting to kill people in a confined and populated area.” In its definition, DHS notes that, “in most cases, active shooters use firearm(s) and there is no pattern or method to their selection of victims.” The NYPD has limited this definition to include only cases that spill beyond an intended victim to involve others, including bystanders and collateral casualties.

¹⁵ New York City Police Department. *Active shooters: Recommendation and analysis for risk mitigation*. 2016. <https://on.nyc.gov/2GIEbl1>. Everytown limited analysis to incidents that took place in K-12 schools and defined school-aged as under the age of 21.

¹⁶ Everytown limited its analysis to “primary shooter” because of the unavailability of gun source data for additional shooters in multiple-shooter incidents. Everytown was able to identify the age of 182 of the 259 primary shooters. Of the remaining shooters, either the shooter was not identified in the media or police reports or demographic information was unavailable.

¹⁷ United States Secret Service and United States Department of Education. *The final report and findings of the safe school initiative: Implications for the prevention of school attacks in the United States*. <https://bit.ly/2oFplwa>. Published May 2002. The study analyzed targeted school violence from 1974 through June 2000 finding that 68 percent of attackers acquired the gun(s) used in the incidents from their home or that of a relative.

¹⁸ Centers for Disease Control and Prevention. *Source of firearms used by students in school-associated violent deaths, United States, 1992-1999*. *MMWR Weekly*. 2003; 52(09): 169-172. The study analyzed school-associated violent deaths between 1992 and 1999 finding that 79 percent of guns used were obtained from the shooter’s home or that of a friend or relative.

¹⁹ Woodrow Cox J, Rich S. ‘The gun’s not in the closet.’ *The Washington Post*. August 1, 2018. <https://wapo.st/2TyDnTW>. The study analyzed acts of gun violence at primary and secondary schools involving shooters under the age of 18 since 1999 finding that of the 105 cases in which the gun’s source was identified, 80 percent were acquired from the child’s home or those of relatives or friends.

There Are Often Warning Signs

Particularly for active shooter incidents, there are often warning signs. These warning signs, if appropriately identified, can offer an opportunity for intervention. The United States Secret Service and the United States Department of Education studied targeted school violence incidents and found that in 93 percent of cases there were behavioral warning signs that caused others to be concerned.²⁰ They also found that in 81 percent of incidents, other people, most often the shooter's peers, had some type of knowledge about the shooter's plans.²¹ This data suggests that Red Flag laws, which enable family and law enforcement to temporarily restrict a person's access to guns when they are a risk to themselves or others, can be effective tools for keeping guns out of the hands of active shooters.

Gun Violence in American Schools Has a Disproportionate Impact on Students of Color²²

While perpetrators of mass shootings in schools have tended to be white, and the popular narrative around school shootings has focused on predominantly white schools, the larger context of gunfire on school grounds presents a very different picture. Among the 253 shooting incidents at K-12 schools where the racial demographic information of the student body was known, 64 percent occurred in majority-minority schools.²³ The burden of gun violence has a particularly outsized impact on Black students. Although Black students represent approximately 15 percent of the total K-12 school population in America,²⁴ they constitute 24 percent of K-12 student victims of gunfire (those who were killed or injured on school grounds where the race of the victim was known).²⁵ This

²⁰ United States Secret Service and United States Department of Education. Prior knowledge of potential school-based violence: Information students learn may prevent a targeted attack. <https://bit.ly/2MPPrOoL>. Published May 2008.

²¹ Id.

²² Everytown also analyzed racial disparities in gunfire on college and university campuses and found similar results. Not only are students of color, especially Black students, disproportionately impacted by gun violence on campus, but Historically Black College and Universities (HBCUs) experience a particularly high number of incidents compared to other high education institutions: 26 of the approximately 102 HBCUs nationwide experienced incidents of gunfire on school grounds between 2013 and 2018 and some campuses experienced multiple incidents.

²³ Everytown gathered demographic information on the student population of each school included in the database for which data were available. A majority-minority school is defined as one in which one or more racial and/or ethnic minorities (relative to the U.S. population) comprise a majority of the student population.

²⁴ U.S. Department of Education, National Center for Education Statistics. Common Core of Data (CCD). "State nonfiscal survey of public elementary and secondary education," 1998-99 through 2015-16; National elementary and secondary enrollment by race/ethnicity projection model, 1972 through 2027. Everytown averaged the student population size, both total and Black student populations, for the years 2013 to 2018. February 2018. <https://bit.ly/2MTkw3C>.

²⁵ Everytown identified the race of 95 of the 177 student victims identified in the database. Of those, 23 were identified as Black, 54 as white, 13 as Hispanic or Latino, 1 as Asian-Pacific Islander, and 4 as other. The analysis includes both injuries and deaths resulting from homicides, assaults, unintentional shootings, and suicides and incidents of self-harm where no one else was hurt, in the count of these victims..

suggests that creating safe and equitable schools in communities with high rates of gun violence can help address these broader trends.

A COMPREHENSIVE PLAN FOR PREVENTING MASS SHOOTINGS AND OTHER GUN VIOLENCE IN OUR SCHOOLS

TAILORED GUN VIOLENCE PREVENTION POLICIES AND INTERVENTIONS

In order to effectively address gun violence in our schools, it must first be acknowledged that it is, in fact, a gun violence problem. There have been many “comprehensive” school safety plans proposed over the last 20 years. Few have effectively and thoroughly addressed the issue common in all school shootings: easy access to guns by those at risk of committing harm. Everytown, AFT, and NEA firmly believe that any effective school safety plan must involve a proactive effort to enact meaningful gun violence prevention policies that enable intervention before a prospective shooter can get his or her hands on a gun. These gun violence prevention solutions work hand in hand with school-based intervention policies to intervene before a shooter ever gets to the school.

Act on Warning Signs by Passing Red Flag Laws

As with most active shooter incidents in schools, there were warning signs prior to the Parkland shooting. Nearly 30 people knew about the shooter’s violent behavior²⁶ and law enforcement had been called to incidents involving the shooter on more than 20 occasions.²⁷ However, the shooter legally bought the gun he used. He had never been convicted of a crime and his mental health history did not legally prohibit him from buying or having guns. Accounts of the shooting show that law enforcement and the shooter’s family had no legal mechanism to address the shooter’s easy access to guns.

²⁶ Marjory Stoneman Douglas High School Public Safety Commission. Initial report submitted to the Governor, Speaker of the House of Representatives and Senate President. See page 264. <https://bit.ly/2t4NFIY>. Published January 2, 2019.

²⁷ Id. See pages 234-39.

To fill this critical gap in our laws, Everytown, AFT, and NEA recommend that states enact Red Flag laws. Red Flag laws create a legal process by which law enforcement and family members can petition a court to prevent a person from having access to firearms when there is evidence that they are a risk of harming themselves or others.

Red Flag laws are a critical intervention tool that can be used to prevent violent situations. When family or law enforcement is made aware that a student or another person is a risk to themselves or others, and that the person has access to guns, they can go to a court and ask a judge for a civil restraining order. These Red Flag orders, commonly known as extreme risk protection orders, can only be issued only after a specific legal determination is made that a person poses a threat to him or herself or others. They also contain strong due process protections to ensure that a person's rights are balanced with public safety. Once an order is issued, a person is required to relinquish any guns they have and is prohibited from buying new guns. This prohibition is temporary, generally lasting one year.

Given that most active shooters show warning signs, Red Flag laws are a critical tool for intervening before a violent student acts on their threats. There is strong evidence that these laws can prevent acts of violence before they happen. In Maryland, according to leaders of the Maryland Sheriffs' Association, a recently passed Red Flag law has been invoked in at least four cases involving "significant threats" against schools.²⁸ In Florida, a Red Flag law passed in 2018 has been invoked in multiple cases of potential school violence, including in the case of a student who was accused of stalking an ex-girlfriend and threatening to kill himself,²⁹ and in another in which a potential school shooter said killing people would be "fun and addicting."³⁰

Red Flag laws can also be used to help address firearm suicide in schools. One study found that following Connecticut's increased enforcement of its Red Flag law, the firearm suicide

²⁸ Broadwater L. Sheriff: Maryland's 'red flag' law prompted gun seizures after four 'significant threats' against schools. *The Baltimore Sun*. January 15, 2019. <https://bit.ly/2Gdf6Qj>.

²⁹ Kennedy E. Tate student's AR-15, father's 54 guns removed under new red flag law. *Pensacola News Journal*. July 9, 2018. <https://bit.ly/2UHmaba>.

³⁰ Lipscomb J. Florida's post-Parkland "Red Flag" law has taken guns from dozens of dangerous people. *Miami New Times*. August 7, 2018. <https://bit.ly/2QRW56U>.

rate decreased by 14 percent.³¹ The same study found that in the 10 years following the passage of Indiana's Red Flag law, the firearm suicide rate decreased by 7.5 percent.³²

Because Red Flag laws are a proven tool, and because they are drafted with strong due process protections, they enjoy strong bipartisan support. The Federal Commission on School Safety, which was convened by President Trump following the shootings at Parkland and Santa Fe, recently endorsed Red Flag laws as an effective tool to prevent school gun violence.³³ Ten states, including Florida, as well as Washington, D.C., have passed Red Flag laws since the Parkland shooting; five of them were signed by Republican governors.³⁴ In all, 15 states and D.C. now have Red Flag laws on the books.³⁵

For states that have already enacted Red Flag laws, public awareness is a key component for successful implementation. The authors recommend that these states train law enforcement on the availability and effective use of these laws. States and community members should also initiate public awareness campaigns to make the public aware of the option to get a Red Flag order. Overall, these laws are a common-sense method for acting on the warning signs commonly found in active shooter incidents and they can be an effective tool for reducing firearm suicide.

Enact Responsible Firearm Storage Laws, Enforce Them, and Raise Awareness

In Santa Fe, TX, on May 18th, 2018, a student walked into Santa Fe High School and shot and killed 10 students and staff members and injured 13 others. He had taken the firearms he used in the shooting from his father who had failed to store them responsibly.³⁶ The most common source of guns used in school shootings and across all school gun violence is from the shooter's home, the homes of friends, or the homes of relatives. This is unsurprising, as nearly 4.6 million American children live in homes with at least one gun

³¹ Kivisto AJ, Phalen PL. Effects of risk-based firearm seizure laws in Connecticut and Indiana on suicide rates, 1981-2015. *Psychiatric Services*. 2018; 69(8): 855-862.

³² Id.

³³ Federal Commission on School Safety. Final report of the Federal Commission on School Safety. <https://bit.ly/2SVPqK6>. Published December 18, 2018.

³⁴ CO, DE, FL, IL, MA, MD, NY, NJ, RI, VT. FL, IL, MA, MD, VT had Republican governors at the time of signing.

³⁵ The 15 states are: CA, CO, CT, DE, FL, IL, IN, MA, MD, NJ, NY, OR, RI, VT, WA.

³⁶ Platoff E. The Santa Fe shooter used his father's guns. But his parents aren't liable under Texas law. *The Texas Tribune*. May 21, 2018. <https://bit.ly/2x8zD4C>.

that is loaded and unlocked.³⁷ Everytown, AFT, and NEA recommend that states enact and enforce responsible firearm storage laws, often known as child access prevention laws. In addition, policymakers should promote public awareness programs that can encourage responsible storage and induce behavior change.

These laws require that people store firearms responsibly when they are not in their possession in order to prevent unauthorized access. Under these laws generally, if and when a person accesses a firearm and does harm with it, the person who failed to adequately store the firearm is liable. A common form of responsible storage laws, child access prevention laws, are more narrowly tailored and they hold individuals liable only when minors access irresponsibly stored firearms. Nineteen states and D.C. currently have some form of responsible storage law.³⁸ In addition, several cities, including New York City; San Francisco; Seattle; and Edmonds, Washington, have passed responsible storage laws.³⁹

Studies show that these laws can have a positive impact on preventing gun violence, particularly on unintentional shootings and firearm suicide. One study found that households that locked both firearms and ammunition were associated with a 78 percent lower risk of self-inflicted firearm injuries and an 85 percent lower risk of unintentional firearm injuries among children and teenagers, than those that locked neither.⁴⁰ Given what is known about the source of guns in school gun violence, evidence suggests these laws can help prevent underage shooters from accessing irresponsibly stored guns in homes and prevent mass shootings and other violent incidents.

Enforcement and public awareness are essential components in making sure that these laws work to create a culture of responsible gun storage. To facilitate effective enforcement, state legislatures need to make sure their laws are precisely written to cover access by all minors under the age of 18. Local officials also need to ensure that they are enforcing these laws in appropriate situations.

³⁷ Azrael D, Cohen J, Salhi C, Miller M. Firearm storage in gun-owning households with children: Results of a 2015 national survey. *Journal of Urban Health*. 2018; 95(3): 295-304. Study defined children as under the age of 18.

³⁸ CA, CT, DC, DE, FL, IL, IA, HI, MA, MN, MD, NV, NH, NJ, NC, RI, TX, VA, WA, WI.

³⁹ New York City Administrative Code 10-312; San Francisco Police Code 4512; Seattle, Wash. Mun. Code Section 10.79.010, et seq (Effective Feb. 2019) Edmonds, Wash. Mun. Code Section 5.26.010, et seq. (Effective March 2019).

⁴⁰ Grossman DC, Mueller BA, Riedy C, et al. Gun storage practices and risk of youth suicide and unintentional injuries. *JAMA: The Journal of the American Medical Association*. 2005; 293(6): 707-714.

In addition to enacting responsible storage laws, policymakers should encourage a culture of responsible gun storage by increasing awareness of responsible storage practices. For years, Moms Demand Action has run a program called Be SMART.⁴¹ This program focuses on fostering conversations about responsible storage among parents and children to help facilitate behavior change and address the hundreds of unintentional shootings committed and experienced by children every year. The acronym SMART encourages: Secure Guns in Homes and Vehicles, Model Responsible Behavior, Ask About Unsecured Guns in Homes, Recognize the Role of Guns in Suicide, Tell Your Peers to Be Smart. The Be SMART model can be used to encourage responsible storage practices. State legislatures, non-profit organizations, and local officials should also work together to develop and fund programs that increase awareness of the need to store firearms responsibly in order to prevent unauthorized access.

Passing responsible storage laws, enforcing them, and encouraging responsible storage practices will help reduce gun violence in schools and directly intervene to address the most common source of firearms used in school gun violence incidents.

Raise the Minimum Age to Purchase Semi-Automatic Firearms to 21

Despite the research that suggests most active shooters are school-aged and have a connection to the school and data that show that 18 to 20-year-olds commit gun homicides at a rate four times higher than adults 21 and older,⁴² few states have stepped in to close gaps that allow minors to legally purchase high-powered firearms. Everytown, AFT, and NEA believe states and the federal government should raise the minimum age to purchase or possess handguns and semi-automatic rifles and shotguns to 21 in order to prevent school-aged shooters from easily obtaining firearms.

⁴¹ For more information, visit <http://besmartforkids.org/>.

⁴² Everytown for Gun Safety analysis; Uniform Crime Reporting Program: Supplementary Homicide Reports (SHR), 2013-2017. Washington, DC: Department of Justice, Federal Bureau of Investigation. While the FBI SHR does not include data from the state of Florida for the years 2013-2017, Everytown obtained data directly from the Florida Department of Law Enforcement (FDLE) and included the reported homicides in the analysis. Rates calculated using age-specific US Census Population Data, 2013-2017. Persons aged 18 to 20 made up 4 percent of the US population and represented 18 percent of all offenders in gun homicides. Adults aged 21 and over made up 73 percent of the population and 74 percent of all offenders in gun homicides. Analysis includes all offenders in single and multiple offender incidents.

To purchase a handgun from a licensed gun dealer under federal law, a person must be 21.⁴³ Yet, to purchase that same handgun in an unlicensed sale, or to purchase a rifle or shotgun from a licensed dealer, a person only has to be 18.⁴⁴ Only a few states have acted to close these gaps.⁴⁵

These deficiencies in the law leave an easy path for active shooters to obtain firearms. Because he was under 21, the Parkland shooter could not have gone into a gun store and bought a handgun, but he was able to legally buy the AR-15 he used in the shooting. Following the shooting, Florida changed its law to raise the age to purchase firearms to 21.⁴⁶ Minimum age laws can work in tandem with responsible storage and Red Flag laws to cut off an easy way for shooters to obtain firearms.

Require Background Checks on All Gun Sales

Background checks are the key to enforcing our gun laws and are an effective tool for keeping guns out of the hands of people with dangerous histories. As part of a comprehensive plan to prevent gun violence in schools, Everytown, AFT, and NEA recommend that states and the federal government act to pass laws that require background checks on all gun sales so that shooters cannot easily purchase firearms.

Current federal law requires that background checks be conducted whenever a person attempts to purchase a firearm from a licensed gun dealer, to ensure that the prospective buyer is not legally prohibited from possessing guns.⁴⁷ For example, when a person becomes subject to a Red Flag order, that record is entered into the federal background check database, and a background check at the point of sale prevents that person from buying a firearm at a gun store. However, current federal law does not require background checks on sales between unlicensed parties. This means that people with dangerous histories can easily circumvent the background check system simply by purchasing their firearm online or at a gun show.

⁴³ 18 U.S.C. § 922(b)(1).

⁴⁴ 18 U.S.C. § 922(b)(1); 18 U.S.C. § 922(x)(2).

⁴⁵ Only five states and D.C. require a person to be 21 to possess a handgun: D.C., IL, MA, MD, NJ, NY. Only IL and D.C. require a person to be 21 to possess a rifle or shotgun and only six states require a person to be 21 to purchase a rifle or shotgun from a licensed gun dealer: CA, DC, FL, HI, IL, VT, WA.

⁴⁶ Fla. Stat. § 790.065(13).

⁴⁷ 18 U.S.C. § 922(t).

A recent Everytown investigation showed that as many as 1 in 9 people arranging to buy a firearm on Armslist.com, the nation's largest online gun marketplace, are people who cannot legally have firearms, including because they are minors under 18.⁴⁸ And the unlicensed sale marketplace is large: the same investigation found that in 2018 there were 1.2 million ads for the sale of a firearm that would not be subject to a background check.⁴⁹ A 2015 survey found that nearly a quarter of Americans — 22 percent — who acquired a firearm within the past two years did so without a background check.⁵⁰

Background checks are an important part of any school safety plan because they are our most comprehensive strategy to prevent minors, people subject to Red Flag orders, and other people who shouldn't have guns from accessing them. Without background checks, guns are easily accessible in the online and gun show markets without any questions asked, making it difficult for law enforcement to detect violations of the law and undermining the other strategies to keep guns out of the hands of shooters.

Background checks are proven to reduce gun violence. State laws requiring background checks for all handgun sales — by point-of-sale check and/or permit — are associated with lower firearm homicide rates, lower firearm suicide rates, and lower firearm trafficking.⁵¹ When Connecticut passed a law requiring background checks for a handgun purchase permit and at the point of sale, its firearm homicide rate decreased by 40 percent⁵² and its firearm suicide rate decreased by 15 percent.⁵³ Background checks reduce gun violence and are a crucial backbone for any school gun violence prevention strategy.

⁴⁸ Everytown for Gun Safety. UNCHECKED: OVER 1 MILLION ONLINE FIREARM ADS, NO BACKGROUND CHECKS REQUIRED. <https://everytownresearch.org/unchecked/>. February 2019.

⁴⁹ Id.

⁵⁰ Miller M, Hepburn L, Azrael D. Firearm acquisition without background checks: Results of a national survey. *Annals of Internal Medicine*. 2017; 166(4): 233-239.

⁵¹ Fleegler EW, Lee LK, Monuteaux MC, Hemenway D, Mannix R. Firearm legislation and firearm-related fatalities in the United States. *JAMA Internal Medicine*. 2013; 173(9): 732-740.

⁵² Rudolph KE, Stuart EA, Vernick JS, Webster DW. Association Between Connecticut's Permit-to-Purchase Handgun Law and Homicides. *American Journal of Public Health*. 2015; 105(8): e49-e54.

⁵³ Crifasi CK, Meyers JS, Vernick JS, Webster DW. Effects of changes in permit-to-purchase handgun laws in Connecticut and Missouri on suicide rates. *Preventive Medicine*. 2015; 79: 43-49.

PROTECTING SCHOOLS THROUGH THREAT IDENTIFICATION, SECURITY UPGRADES, EMERGENCY PLANNING AND SAFE SCHOOL ENVIRONMENTS

ESTABLISH THREAT ASSESSMENT PROGRAMS

The most important thing that schools can do to prevent active shooter incidents — and gun violence overall — is to intervene before a person commits an act of violence. Early intervention is key to addressing potential violent behavior and to providing students appropriate treatment. To do this, Everytown, AFT, and NEA recommend that schools create threat assessment programs and establish threat assessment teams in their schools. State legislatures should also make funding available for schools to establish threat assessment programs.

Threat assessment programs help schools identify students who are at a risk of committing violence in order to resolve student threat incidents by getting them the help they need.⁵⁴ The programs generally consist of multi-disciplinary teams that are specifically trained to intervene at the earliest warning signs of potential violence and divert those who would do harm to themselves or others to appropriate treatment.

Threat assessment teams are unanimously recommended by school safety experts. The theory of the program is rooted in the groundbreaking study on “targeted school violence” by the U.S. Secret Service⁵⁵ and Department of Education.⁵⁶ A 2002 F.B.I. report states that *“By far the most valuable prevention strategy identified was the threat assessment and management team,”*⁵⁷ and a 2018 Department of Homeland Security report (ostensibly about improving physical security of schools) stated that *“preventing violence by detecting and addressing these [behavioral] red flags is more effective than any physical security measure.”*⁵⁸ In addition, reports from federal agencies under the Bush and Trump

⁵⁴ Cornell DG, Sheras P. Guidelines for responding to student threats of violence. *Sopris West*. 2006.

⁵⁵ The Secret Service was assigned to the project because school shootings were seen to be as rare as political assassinations, and this definition and the analysis evolved from the Secret Service’s five year study of the behavior of political assassins.

⁵⁶ United States Secret Service and United States Department of Education. The final report and findings of the safe school initiative: Implications for the prevention of school attacks in the United States. <https://bit.ly/2oFplwa>. Published May 2002. Defined as any incident where (i) a current or recent former student attacked someone at his or her school with lethal means (including weapons other than a firearm); and (ii) where the student attacker purposefully chose his or her school as the location of the attack.

⁵⁷ U.S. Department of Justice, Federal Bureau of Investigation. Making prevention a reality: Identifying, assessing, and managing the threat of targeted effects. *Behavioral Analysis Unit - National Center for the Analysis of Violent Crime*. <https://bit.ly/2BlIckf>.

⁵⁸ U.S. Department of Homeland Security. K-12 School Security: A Guide for Prevention and Protecting Against Gun Violence. <https://bit.ly/2DXzVge>. Second Edition Published 2018.

administrations, including the recent Federal Commission on School Safety report, recommend schools implement school threat assessment programs.^{59,60}

Effective Models

As a model, Everytown, AFT, and NEA endorse the Virginia Student Threat Assessment Guidelines (VSTAG) which was created by Dr. Dewey Cornell at the University of Virginia. VSTAG is a national leader in school-based threat assessment. The program is also listed on the National Registry of Evidence-based Programs and Practices, an evidence-based repository and review system designed to provide the public with reliable information on mental health and substance use interventions.

Research Shows Threat Assessment Programs Are Effective

Several studies have found that schools that have used threat assessment programs see as few as 0.5 to 3.5 percent of students attempt or carry out their threat of violence, with none of the threats that were carried out being serious threats to kill, shoot, or seriously injure someone.^{61,62,63} Schools with VSTAG threat assessment programs also see fewer expulsions, suspensions, and fewer arrests.⁶⁴ Importantly, studies have shown that VSTAG threat assessment programs generally do not have a disproportionate impact on students of color.⁶⁵ Of course, schools should monitor and collect their own data to ensure that communities of color and students with disabilities are not disproportionately impacted in local threat assessment programs.

Key Features of a Successful Threat Assessment Program

There are several keys to establishing a successful threat assessment program that schools should consider when they establish these programs.

⁵⁹ United States Secret Service and United States Department of Education. Threat assessment in schools: A guide to managing threatening situations and to creating safe school climates. <https://bit.ly/2o1nWG8>. Published May 2002.

⁶⁰ National Threat Assessment Center. Enhancing school safety using a threat assessment model: An operational guide for preventing targeted school violence. United States Secret Service and U.S. Department of Homeland Security. <https://bit.ly/2NKlwqD>. Published July 2018.

⁶¹ Cornell D, Maeng J, Burnette AG, et al. Student threat assessment as a standard school safety practice: Results from a statewide implementation study. *School Psychology Quarterly*. 2018; 33(2): 213-222.

⁶² Cornell D, Maeng J, Burnette AG, Datta P, Huang F, Jia Y. Threat assessment in Virginia Schools: Technical report of the threat assessment survey for 2014-2015. Curry School of Education, University of Virginia. <https://at.virginia.edu/2UzNpEm>. Published 2016.

⁶³ Cornell DG, Korrie A, Xitao F. A randomized controlled study of the Virginia Student Threat Assessment Guidelines in kindergarten through grade 12. *School Psychology Review*. 2012; 41(1): 100-115.

⁶⁴ Id.

⁶⁵ Id.

Identify Threats

Effective threat assessment programs must have a mechanism to identify and collect information about threats of violence. The U.S. Secret Service recommends schools establish tip-lines that can be used to promote the sharing and collection of information about threats.⁶⁶ Schools may also consider using a program like Sandy Hook Promise's "Know The Signs" and "Say Something" campaigns, which train students on warning signs and encourage them to report potentially violent behavior.⁶⁷ Where appropriate, social media monitoring software can be used to scan social media sites for threats and potential warning signs. Having a mechanism to identify threats is key to ensuring those threats can be successfully addressed by a threat assessment team.

Determine If a Student Has Access to Guns

Since the most common sources of guns used in school gun violence are the home or the homes of family or friends, threat assessment teams must work to identify whether students at risk of violence have access to firearms. This practice is recommended by the U.S. Secret Service.⁶⁸ Threat assessment teams can build this practice into their standard procedures for gathering information when investigating a threat. There are several non-intrusive ways that this information can be gathered including: talking to parents and students and examining social media posts to determine if a student has access to firearms.

Ensure That Sufficient Counselors Are Provided to Assist Students

As part of an effective threat assessment strategy, and to ensure successful student outcomes and violence reduction overall, schools need to ensure that students have sufficient access to counselors.

Counselors help guide our children in some of their most important decisions. They can serve as a critical resource for them as they navigate the education system and the

⁶⁶ National Threat Assessment Center. Enhancing school safety using a threat assessment model: An operational guide for preventing targeted school violence. United States Secret Service and U.S. Department of Homeland Security. <https://bit.ly/2NKlwqD>. Published July 2018.

⁶⁷ Sandy Hook Promise. Know the signs programs. <https://bit.ly/2S9fgPa>.

⁶⁸ National Threat Assessment Center. Enhancing school safety using a threat assessment model: An operational guide for preventing targeted school violence. United States Secret Service and U.S. Department of Homeland Security. <https://bit.ly/2NKlwqD>. Published July 2018.

challenges of emotional and social development. Counselors may also be among the first to know when students are experiencing problems or when they are at a risk for violence. Counselors can guide students through emotional or behavioral problems and can serve as a key point of intervention and information gathering for threat assessment programs.

Yet data compiled by the National Association for College Admissions Counseling and the American School Counselor Association show that the national student-to-counselor ratio is much higher than best practices dictate. Currently, on average, each counselor handles about 482 students.⁶⁹ The recommended best practice is that each counselor be responsible for no more than 250 students.⁷⁰ To protect our schools and ensure that threat assessment programs are effective, legislatures need to fund — and schools need to prioritize — an appropriate number of counselors in schools.

IMPLEMENT BASIC SECURITY UPGRADES

In 2017, as the sound of gunshots echoed across campus, school administrators at Rancho Tehama Elementary School in Tehama County, CA made a critical decision. They immediately put their campus on lockdown, ushering students and teachers inside, locking internal doors, and locking out anyone who would try to enter.⁷¹ As a shooter approached, crashing through an external gate, he was unable to access the school building. Frustrated, he gave up and left school grounds before ultimately being stopped by law enforcement.⁷²

Physical security is a critical intervention point to keep guns out of schools. The most effective physical security measures — the ones that are agreed on by most experts — are access control measures that keep shooters out of schools in the first place. As a secondary measure, internal door locks, which enable teachers to lock doors from the inside, can work to deter active shooters who do achieve access, protecting students and allowing law enforcement time to neutralize any potential threat.

⁶⁹ National Association for College Admission Counseling, American School Counselor Association. State-by-state student-to-counselor ratio report: 10-year trends. <https://bit.ly/2lpw77Y>.

⁷⁰ Id.

⁷¹ Thulin L. School lockdown saved students' lives during Northern California shooting rampage. Slate. November 15, 2017. <https://bit.ly/2GbvEZ>.

⁷² Id.

Of course, one of the biggest challenges with security upgrades is maintaining a welcoming school environment. Schools cannot become prisons. Everytown, AFT, and NEA endorse basic security measures universally recommended by school safety experts, like access control and internal door locks, while recommending that schools also consider other expert-endorsed security measures based on local conditions.

Access Control

As the shooter arrived on the campus of Marjory Stoneman Douglas High School, in Parkland, FL, several critical access control failures gave him easy access to the school. He was dropped off outside of a perimeter fence. This fence had a gate that was open and left unstaffed.⁷³ The shooter took advantage of this and entered the school campus. As he entered Building 12, where the fatal shooting happened, he exploited another critical safety failure as the door was left unlocked and accessible by all.⁷⁴ In fact the Marjory Stoneman Douglas Public Safety Commission found that “[t]he overall lack of uniform and mandated physical site security requirements resulted in voids that allowed [the shooter] initial access to MSDHS and is a system failure.”⁷⁵

Most experts, including the Marjory Stoneman Douglas High School Public Safety Commission and the Sandy Hook Advisory Commission, agree that access control should be a component of any school security plan.^{76,77} Preventing unauthorized access to schools through fencing, single access points, and by simply ensuring doors are locked can keep shooters out of schools. State legislatures should provide funding for access control measures for schools to make sure that would-be shooters cannot have easy access to schools.

Interior Door Locks

In both Sandy Hook and Parkland, teachers had to step outside of their classrooms while the shooting was underway in order to lock their doors. This exposed the educators and

⁷³ Marjory Stoneman Douglas High School Public Safety Commission. Initial report submitted to the Governor, Speaker of the House of Representatives and Senate President. See page 42. <https://bit.ly/2t4NFiY>. Published January 2, 2019.

⁷⁴ Id. See page 43.

⁷⁵ Id. See page 42.

⁷⁶ Marjory Stoneman Douglas High School Public Safety Commission. Initial report submitted to the Governor, Speaker of the House of Representatives and Senate President. See page 42. <https://bit.ly/2t4NFiY>. Published January 2, 2019.

⁷⁷ Sandy Hook Advisory Commission. Final report of the Sandy Hook Advisory Commission presented to Governor Dannel P. Malloy, State of Connecticut. <https://bit.ly/1C5aeU3>. Published March 6, 2015.

students to danger. Doors that were left unlocked were unsecured and vulnerable. That is why school safety experts, like the Sandy Hook Advisory Commission, agree that schools should make sure that classroom doors lock from the inside as well as the outside.⁷⁸

Interior door locks can mean the difference between life and death in an active shooter situation. Everytown, AFT, and NEA recommend that all schools equip doors with interior door locks to help prevent shooters from gaining access to classrooms and to add an additional layer of protection from an active shooter.

ESTABLISH EMERGENCY PLANNING AND PREPARATION

When an incident of gun violence does occur on school grounds, planning and preparation are key to ensuring an effective response. Everytown, AFT, and NEA recommend that schools, in collaboration with law enforcement, plan for the unlikely event of a gun violence emergency or active shooter incident.

Security experts universally agree that schools need to have an effective emergency plan in place. Emergency plans can serve as an additional point of intervention by enabling law enforcement, students, or staff to respond quickly to and neutralize any threat. The Federal Emergency Management Agency maintains a six-point guide for developing high-quality emergency response plans for schools. This guide stresses collaboration and advance planning to help mitigate emergency incidents.⁷⁹

For active shooter incidents, the guide notes that “...it is critical that schools work with first responders, emergency management staff, and all community partners to identify, prepare, prevent, and effectively respond to an active shooter situation in a coordinated fashion.”⁸⁰ Doing so can help save lives. Recommendations for effective planning include efforts to ensure that schools work with law enforcement and first responders to provide information about the school’s layout and security measures, that staff and law enforcement work together to ensure that they can identify the nature of a threat, and that schools plan out their lockdown and evacuation procedures.⁸¹

⁷⁸ Sandy Hook Advisory Commission. Final report of the Sandy Hook Advisory Commission presented to Governor Dannel P. Malloy, State of Connecticut. <https://bit.ly/1C5aeU3>. Published March 6, 2015.

⁷⁹ U.S. Department of Education, Office of Elementary and Secondary Education, Office of Safe and Healthy Students. Guide for developing high-quality school emergency operations plans. <https://bit.ly/2Gnz764>. Published June 2013.

⁸⁰ Id. See page 56.

⁸¹ Id. See page 57.

Many experts also encourage training for students and staff on how to respond to an active shooter incident. Currently, Everytown, AFT, and NEA endorse training for adult staff on how to respond to active shooter situations. This training might include training on lockout procedures, evacuation procedures, and emergency medical training. However, given the concerns raised by parents, students, and medical professionals about the impact that lockdown and active shooter drills can have on student development, including the risk for depression and anxiety and the risk for lasting symptoms,⁸² our organizations refrain from endorsing training for students and believe schools should consider this impact before conducting live drills with children.

CREATE SAFE AND EQUITABLE SCHOOLS

Creating safe schools also requires that schools foster healthy schools and communities. This requires schools to look externally and internally to build strong partnerships inside of schools and in the community as a whole. As schools implement school-based intervention strategies, including the ones outlined above, schools need to make sure they are helping students resolve problems, rather than overly relying on punishment or using methods meant for intervention as punishment. It will also be critically important for schools and school districts to monitor and evaluate how threat assessment implementation is impacting school discipline practices.

Zero-tolerance policies are an attempt to make schools safe and orderly, but that approach has not worked. In that connection, schools need to review their discipline policies to make sure they are not unduly punishing students and to make sure that staff are trained on appropriate ways to manage their classrooms and implicit biases. As part of a comprehensive strategy Everytown, AFT, and NEA recommend that school communities look inside their schools to make sure they are encouraging effective partnerships between students and adults while also looking externally to ensure that they are a key community resource.

⁸² Rich S, Cox JW. School lockdowns: How many American children have hidden from gun violence? *Washington Post*. December 26, 2018. <https://wapo.st/2Sb0bML>.

Community Schools

A key means of creating safe schools is to keep neighborhood schools intact and make them “community schools” — the focal point and heart of their communities. Everytown, AFT, and NEA recommend that schools utilize state, district and federal support and fund programs that help them partner with community members to move beyond the normal confines of a school and become a true community school, particularly in communities that experience high rates of gun violence.

To accomplish this schools should work in partnership with local governments, labor, management and the community, to help become places that provide valuable services that help lift students and their families. By moving beyond the normal confines of the school and partnering with local stakeholders, community schools provide real solutions to the unique problems of the students and families they serve. Community schools aren’t just centers of education; they’re the new heart of the community itself that help create better conditions for both teaching and learning. They’re a place where teachers, families, community members and service providers can come together in coordinated, purposeful and results-focused partnerships.

These schools can become the centers of their communities by providing the services to students, families and neighbors that best serve their needs, while at the same time promoting stable, healthy neighborhoods. In schools facing high levels of violence in and outside of the school building a community school might utilize district, state, and federal support to fund programs that do things like: provide alternatives to out-of-school suspensions that offer meaningful educational opportunities for students; reduce suspension rates and break the school-to-prison pipeline; increase access to mentoring and counseling services both inside and outside school, starting in preschool; and incorporate inclusive restorative justice into discipline policies.

School Resource Officers

Whether schools should employ trained law enforcement professionals as armed school resource officers (SROs) is a decision that must be made on the local level in consideration of the unique social and cultural needs of a school and a determination that an SRO will meet school public safety needs. However, schools that are going to employ SROs should

ensure that they are trained and utilized in a way that encourages greater transparency and accountability.

Actions that districts and communities can take in this regard include supporting community policing and using cultural competency training as a way to rebuild relationships between law enforcement/SROs and the communities and students they serve. Schools can also consider using the following rubric which was developed by the federal government to guide their employment of SROs.

The Safe School-based Enforcement Through Collaboration, Understanding, and Respect (SECURE) rubric suggests schools should do the following when employing a SRO:

1. Create sustainable partnerships and formalize memorandums of understandings (MOU) that outline clear roles and responsibilities among school districts, local law enforcement agencies, juvenile justice entities, and civil rights and community stakeholders;
2. Ensure that MOUs meet constitutional and statutory civil rights requirements;
3. Recruit and hire effective SROs and school personnel;
4. Keep SROs and school personnel well trained;
5. Continually evaluate SROs and school personnel, and recognize good performance.⁸³

Following this rubric can help mitigate concerns about impacts that placing law enforcement officers in schools can have on school climate and students of color.

⁸³ U.S. Department of Education, U.S. Department of Justice. Safe school-based enforcement through collaboration, understanding, and respect (SECURE) local implementation rubric. <https://bit.ly/2BlkBZ2>.

ARMING TEACHERS IS DANGEROUS

The most dangerous idea in the American education system is that arming teachers or school staff is an effective solution to an active shooter incident. Everytown, AFT, and NEA strongly urge, as a matter of student safety, that schools reject attempts to arm teachers and instead focus on proven solutions that intervene to prevent shootings.

Arming teachers puts our children at greater risk and does nothing to stop active shooters or other forms of school gun violence. While the desire for action is understandable, the popular notion of a well-trained teacher acting as a last line of defense is not based in any experience, or research.

Is an armed teacher supposed to protect their children in their classroom? Will they be able to identify and shoot one of their own students? How will they react in a crisis situation? Will they be able to shoot accurately? In a crisis, how will law enforcement be able to distinguish between a lawfully carrying teacher and a bad guy? While those who implement the idea may be sincere in their search for a solution, arming teachers raises more questions than answers, and evidence suggests that arming teachers will do nothing to keep our kids safe. It is argued that armed teachers are cost-effective replacements for law enforcement, but arming teachers would cost billions of dollars for salaries, training, and equipment and armed teachers are never acceptable replacements for trained law enforcement.

Arming Teachers Is Opposed by Law Enforcement, Parents and Teachers

Most parents, teachers, and law enforcement oppose arming teachers. Law enforcement, those we charge with protecting our schools, strongly oppose arming teachers. The National Association of School Resource Officers and the president and chief executive officer of the Major Cities Police Chiefs Association have all indicated their opposition to arming teachers.^{84,85,86}

⁸⁴ National Association of School Resource Officers. NASRO opposes arming teachers. February 22, 2018. <https://bit.ly/2K7iAq3>.

⁸⁵ Toppo G. 132 hours to train teachers on guns: Is it enough? *USA Today*. March 8th, 2018. <https://bit.ly/2SvCdes>.

⁸⁶ Paterson BE. America's police chiefs call BS on arming teachers. *Mother Jones*. March 8, 2018. <https://bit.ly/2HjsDT3>.

Parents and teachers also oppose arming teachers. A March 2018 survey of almost 500 U.S. teachers found that 73 percent oppose proposals to arm school staff.⁸⁷ Another survey found that 63 percent of parents of elementary, middle, and high school students oppose arming teachers.⁸⁸

However, there is evidence that the message about “well-trained” teachers is catching on with policymakers and some schools. The Federal School Safety Commission recently became the first federal entity to endorse arming teachers and school staff.⁸⁹ A number of state legislatures are considering the idea of armed teachers and many schools have looked to arming teachers or school staff as a solution to school gun violence. A recent report from Vice News found at least 466 school districts have chosen to arm school staff, 215 of them since February 2018, the month of the Parkland shooting.⁹⁰ Everytown, AFT, and NEA believe schools should reject this risky practice.

The Notion of a Highly Trained Teacher Carrying a Gun Is a Myth

The notion that only highly trained teachers will be carrying guns in schools is a myth. Law enforcement personnel who carry guns on a daily basis receive hundreds of hours of initial training and are generally required to continue their training throughout their careers. The average number of initial training hours that a law enforcement officer receives at a basic training academy is 840.⁹¹ On average recruits receive 168 hours of training on weapons, self-defense, and the use of force.⁹²

In the ten states that have laws that are designed to allow for armed school personnel, those armed personnel receive significantly less training. The laws vary widely, but not a single one of them requires teachers or school staff to undergo training that is akin to that completed by a full-time law enforcement officer. In fact, some of the states don’t have any minimum hourly training requirement at all. For example, in Kansas, school districts are

⁸⁷ Brenan M. Most U.S. teachers oppose carrying guns in schools. *Gallup*. March 16, 2018. <https://bit.ly/2MPTRV5>.

⁸⁸ PDK Poll. School security: Is your child safe at school? September 2018. <https://bit.ly/2P6HXux>.

⁸⁹ Federal Commission on School Safety. Final report of the Federal Commission on School Safety. <https://bit.ly/2SVPqK6>. Published December 18, 2018.

⁹⁰ Owen T. Exclusive: How Parkland created a rush to arm teachers and school staff across the country. *Vice News*. January 9, 2019. <https://bit.ly/2UB90fy>.

⁹¹ Reaves BA. State and local law enforcement training academies, 2013. U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. <https://bit.ly/2pg0whl>. Published July 2016.

⁹² *Id.*

free to set their own policy to allow staff to carry guns.⁹³ There is no required minimum training. The same is true in Georgia, where the law provides that armed personnel must be trained in specific subject-matter areas but does not require them to meet any minimum number of training hours.⁹⁴ Several school districts are exploiting vagaries in the law to arm teachers, with no state oversight. A gap in Texas law led to the establishment of programs commonly known as the “Guardian” program. These programs let school districts set their own policy, without any required minimum training.⁹⁵

The fact is that even some of the most highly trained law enforcement officers in the country, those of the New York City Police Department, see their ability to shoot accurately decrease significantly when engaged in gunfights with perpetrators.⁹⁶ To have a teacher make split-second, life-or-death decisions to protect children and themselves or try to take down an active shooter is unrealistic. Given this, the notion that a teacher or school staff member will be able to effectively respond to an active shooter incident is extremely doubtful.

Students Will Access Teachers’ Guns

The simple fact is that more access to firearms is strongly correlated with additional risk. When more guns are placed into schools, children will be more likely to access them.

Research strongly supports the idea that if guns are carried into schools by teachers, children are more likely to access teachers’ guns. One study showed that the majority of children are aware of where their parents store their guns and that more than one third reported handling their parents’ guns, many doing so without the knowledge of their parents.⁹⁷ Nearly a quarter of parents did not know that their children had handled the gun in their house.⁹⁸ It is likely that when guns carried by teachers and staff are put into schools, children will know where they are and will access them. And we know that when children access guns, the risks of death or harm significantly increase. In fact, irrespective

⁹³ K.S.A. § 75-7c10(d)(1).

⁹⁴ O.C.G.A. § 16-11-130.1.

⁹⁵ Samuels A. Texas schools that want to arm their employees have two choices. *Star-Telegram*. July 14, 2018. <https://bit.ly/2MNH2PT>.

⁹⁶ Rostker B. D, Hanser L. M, Hix W. M, Jensen C, & Morral A. R. Evaluation of the New York City Police Department firearm training and firearm-discharge review process. Rand Corporation. 2008.

⁹⁷ Baxley F, Miller M. Parental misperceptions about children and firearms. *Archives of Pediatrics & Adolescent Medicine*. 2006; 160(5): 542-547.

⁹⁸ *Id.*

of age, access to a firearm, triples the risk of death by suicide and doubles the risk of death by homicide.⁹⁹

Access is not only a risk, it is a reality. There have been several incidents where guns carried into schools were misplaced or children accessed them — guns left in bathrooms¹⁰⁰ or locker rooms,¹⁰¹ even guns that fell out while a teacher did a backflip.¹⁰² There are also multiple cases where guns were stolen from teachers by students or misplaced and later found in the hands of students.^{103,104} The fact is that more guns in schools increases the chances a child will access them.

The Risk of Shootings Increases

Child access is not the only risk. The risk of an unintentional or intentional shooting increases when civilians are allowed to carry guns in schools. There have been several incidents of guns intentionally or unintentionally discharged on school grounds by school staff. This includes intentional shootings, such as a janitor who killed two of his colleagues at a performing arts school in Florida,¹⁰⁵ and firearm suicides by faculty or staff at schools.¹⁰⁶ It also includes a number of unintentional incidents, by both school resource officers in schools¹⁰⁷ and teachers who accidentally discharged their firearms.¹⁰⁸

Armed Staff Will Complicate Law Enforcement's Response

Responding to an active shooter incident can be complex. Reports and analysis of mass shootings continuously show communication errors, narrowly avoided friendly-fire

⁹⁹ Anglemeyer A, Horvath T, Rutherford G. The Accessibility of Firearms and Risk for Suicide and Homicide Victimization Among Household Members: A Systematic Review and Meta-analysis. *Annals of Internal Medicine*. 2014; 160: 101–110.

¹⁰⁰ Metrick B. Ex-teacher charged for leaving gun in school bathroom, police say. *USA Today*. September 13, 2016. <https://bit.ly/2G9jlfE>.

¹⁰¹ Associated Press. No charges after Isabella Co. sheriff accidentally leaves gun at school. *Detroit Free Press*. April 3, 2018. <https://bit.ly/2GtNfeb>.

¹⁰² Rojas J. Student: Substitute teacher was doing back flip when gun fell out. *Bay News 9*. October 24, 2018. <https://bit.ly/2t4SIFE>.

¹⁰³ Harten D. Police: Jacksonville High student steals gun from teacher. *Arkansas Democrat Gazette*. January 17, 2012. <https://bit.ly/2V3psWX>.

¹⁰⁴ Madden R. Police find teacher's stolen gun with student. Fox 2 Now. October 25, 2018. <https://bit.ly/2S9hqy7>.

¹⁰⁵ Seltzer A. BREAKING: Man arrested in 2013 murder of Dreyfoos school janitors. *The Palm Beach Post*. May 25, 2017. <https://pbpo.st/2RE4R8V>.

¹⁰⁶ McCray V. Lithia Springs shooting intentional, teacher ID'd. *Atlanta Journal Constitution*. August 21, 2017. <https://on-ajc.com/2M6D42h>.

¹⁰⁷ Schrott M. Officer accidentally discharges weapon at George Washington Middle School. *Alexandria Times*. March 13, 2018. <https://bit.ly/2BnC8zT>.

¹⁰⁸ Larson A. Seaside High teacher accidentally fires gun in class, students injured. KSBW. March 14, 2018. <https://bit.ly/2Be9cub>.

incidents, and a lack of coordination during responses to active shooter incidents. To introduce a new variable into this equation — an armed teacher — into this equation will only serve to further complicate law enforcement’s response to an active shooter incident. As former Dallas Police Chief David Brown said following the shooting of five law enforcement officers in Dallas where the response was complicated by people openly carrying firearms: “We don’t know who the good guy is versus the bad guy when everyone starts shooting.”¹⁰⁹

Liability and Insurance

Insurance companies are hesitant to insure schools that arm teachers or staff because they understand the financial and legal risks associated with doing so. When several districts in Kansas sought to arm teachers, the insurance companies informed them that they would not insure such a dangerous practice. Even where schools are able to obtain insurance, it is often at a higher premium.¹¹⁰ This is because insurance companies realize that guns carried by teachers pose numerous safety risks.

Schools that have or are considering arming teachers and staff continue to put remarkably little thought into the legal liability they incur by doing so. These policies, which are often developed behind closed doors, are frequently poorly drafted and inadequately vetted. This leaves teachers and school districts legally exposed. Not only may they be civilly liable, but teachers who carry guns on the basis of a school policy may also expose themselves to criminal liability if the policy is in any way inconsistent with state law. Assuming there is an inconsistency, it is also unlikely that a school’s insurance policy would indemnify the school from monetary claims. Further, even if the policy is crafted with legal precision, the likelihood that a school district, school, or teacher will be sued if a student or another person is hurt by an armed teacher is high.

Some states have sought to address this by specifically immunizing armed teachers or staff from liability claims or by arguing that existing school immunity provisions bar claims against them or cap the amount of damages that they would be liable for. In fact, these

¹⁰⁹ Hennessy-Fiske M. Dallas police chief: Open carry makes things confusing during mass shootings. *Los Angeles Times*. July 11, 2016. <https://lat.ms/2GpxGUw>.

¹¹⁰ Hiltzik M. One big problem with the idea of arming teachers: Insurance companies won't play along, and for good reason. *Los Angeles Times*. February 26, 2018. <https://lat.ms/2BkRxBb>.

provisions do not operate as a complete bar to lawsuits. States also cannot exempt schools from federal civil rights liability. Schools can and will be sued in federal court and they will not be able to use state immunity provisions to protect themselves from claims.

CONCLUSION

Using the comprehensive plan outlined in this report, policymakers and schools can prevent active shooter incidents — and gun violence more broadly — in their classrooms. These solutions are proven effective and form a thorough strategy that works by providing a point of intervention at all levels of a shooter's escalation to violence and by creating a system where people with dangerous histories can't easily access guns. Targeted gun violence prevention policies can intervene when a shooter is intent on getting their hands on a gun. The school-based strategies work to intervene when a shooter is showing warning signs that they may become violent. Finally, the planning and security strategies present a last opportunity for intervention and ensure that a school is prepared to quickly respond to and neutralize any incident.

Unlike reactive solutions focused on armed staff and teachers, which serve only to put our children in more danger, these strategies are widely supported by experts and backed by evidence. Our leaders must take responsible action to keep our schools safe — and this report offers them a framework for doing so.

APPENDIX: GUNS IN SCHOOLS LEGAL OVERVIEW

As a general matter, the vast majority of states prohibit civilians from carrying guns in elementary, middle, and high schools.

While the laws involving firearms and other weapons on K-12 school campuses, are incredibly nuanced, there are two general categories of laws that enable people to carry guns in schools:

Ten states have laws explicitly aimed at arming school personnel: **Florida, Georgia, Kansas, Missouri, North Dakota, Oklahoma, South Dakota, Tennessee, Texas, Wyoming.**

In all of these states, there are optional programs that schools can use to arm teachers and school staff. Generally, these individuals must have a handgun carry permit, undergo some form of training, and be approved by the school district and/or the school.

Eight states generally allow permit holders to carry guns in public schools: **Delaware, Hawaii, Kansas, Mississippi, New Hampshire, Oregon, Rhode Island, Utah.**

In these states, permit holders can carry in schools as a general matter of law, although, there may be individual school policies that prevent them from doing so.

There are an additional number of states where a small number of schools have used exceptions in the law to arm teachers or other school staff. These states include: **Alabama, Arkansas, Colorado, Idaho, Indiana, Minnesota, Montana, Ohio,¹¹¹ Texas, Washington.¹¹²**

¹¹¹ The authority of Ohio school districts to arm teachers without full peace officer training is currently the subject of litigation.

¹¹² There is no comprehensive information available on which states have school districts that have armed teachers. This information is gathered from media reports and other publicly available sources and it is not intended to be an exhaustive list.

EXHIBIT 21

REDUCING GUN VIOLENCE IN AMERICA

Informing Policy with
Evidence and Analysis

Edited by

DANIEL W. WEBSTER
and **JON S. VERNICK**

Foreword by

MICHAEL R. BLOOMBERG



Reducing Gun Violence in America

This page intentionally left blank

Reducing Gun Violence in America

Informing Policy with Evidence and Analysis

EDITED BY

Daniel W. Webster, ScD, MPH,

and Jon S. Vernick, JD, MPH

Center for Gun Policy and Research

Johns Hopkins Bloomberg School of Public Health

The Johns Hopkins University Press
Baltimore

© 2013 The Johns Hopkins University Press
All rights reserved. Published 2013
Printed in the United States of America on acid-free paper
9 8 7 6 5 4 3 2 1

The Johns Hopkins University Press
2715 North Charles Street
Baltimore, Maryland 21218-4363
www.press.jhu.edu

Library of Congress Control Number: 2013930408
A catalog record for this book is available from the British Library.

ISBN 13: 978-1-4214-1110-1 (pbk. : alk. paper)
ISBN 10: 1-4214-1110-5 (pbk. : alk. paper)
ISBN 13: 978-1-4214-1111-8 (electronic)
ISBN 10: 1-4214-1111-3 (electronic)

*Special discounts are available for bulk purchases of this book.
For more information, please contact Special Sales at 410-516-6936 or
specialsales@press.jhu.edu.*

The Johns Hopkins University Press uses environmentally friendly book materials, including recycled text paper that is composed of at least 30 percent post-consumer waste, whenever possible.

*To victims of gun violence and
to those who work daily
to reduce it*

This page intentionally left blank

Contents

Foreword	xi
<i>Michael R. Bloomberg</i>	
Preface	xix
<i>Ronald J. Daniels and Michael J. Klag</i>	
Acknowledgments	xxi
Introduction	xxv
<i>Daniel W. Webster and Jon S. Vernick</i>	
 Part I: Gun Policy Lessons from the United States: Keeping Guns from High-Risk Individuals	
1 Firearms and Violent Death in the United States	3
<i>Matthew Miller, Deborah Azrael, and David Hemenway</i>	
2 The Limited Impact of the Brady Act: Evaluation and Implications	21
<i>Philip J. Cook and Jens Ludwig</i>	
3 Preventing Gun Violence Involving People with Serious Mental Illness	33
<i>Jeffrey W. Swanson, Allison Gilbert Robertson, Linda K. Frisman, Michael A. Norko, Hsiu-Ju Lin, Marvin S. Swartz, and Philip J. Cook</i>	
4 Evidence for Optimism: Policies to Limit Batterers' Access to Guns	53
<i>April M. Zeoli and Shannon Frattaroli</i>	

viii *Contents*

5	Reconsidering the Adequacy of Current Conditions on Legal Firearm Ownership <i>Katherine A. Vittes, Daniel W. Webster, and Jon S. Vernick</i>	65
6	Broadening Denial Criteria for the Purchase and Possession of Firearms: Need, Feasibility, and Effectiveness <i>Garen J. Wintemute</i>	77
7	Comprehensive Background Checks for Firearm Sales: Evidence from Gun Shows <i>Garen J. Wintemute</i>	95
8	Preventing the Diversion of Guns to Criminals through Effective Firearm Sales Laws <i>Daniel W. Webster, Jon S. Vernick, Emma E. McGinty, and Ted Alcorn</i>	109
9	Spurring Responsible Firearms Sales Practices through Litigation: The Impact of New York City’s Lawsuits against Gun Dealers on Interstate Gun Trafficking <i>Daniel W. Webster and Jon S. Vernick</i>	123
10	Curtailing Dangerous Sales Practices by Licensed Firearm Dealers: Legal Opportunities and Obstacles <i>Jon S. Vernick and Daniel W. Webster</i>	133

P a r t I I . M a k i n g G u n L a w s E n f o r c e a b l e

11	Enforcing Federal Laws against Firearms Traffickers: Raising Operational Effectiveness by Lowering Enforcement Obstacles <i>Anthony A. Braga and Peter L. Gagliardi</i>	143
----	--	-----

P a r t I I I . G u n P o l i c y L e s s o n s f r o m
t h e U n i t e d S t a t e s : H i g h - R i s k G u n s

12	America’s Experience with the Federal Assault Weapons Ban, 1994–2004: Key Findings and Implications <i>Christopher S. Koper</i>	157
13	Personalized Guns: Using Technology to Save Lives <i>Stephen P. Teret and Adam D. Mernit</i>	173

Part IV. International Case Studies of Responses to Gun Violence	
14	Gun Control in Great Britain after the Dunblane Shootings <i>Michael J. North</i> 185
15	Rational Firearm Regulation: Evidence-based Gun Laws in Australia <i>Rebecca Peters</i> 195
16	The Big Melt: How One Democracy Changed after Scrapping a Third of Its Firearms <i>Philip Alpers</i> 205
17	Brazil: Gun Control and Homicide Reduction <i>Antonio Rangel Bandeira</i> 213
Part V. Second Amendment	
18	The Scope of Regulatory Authority under the Second Amendment <i>Lawrence E. Rosenthal and Adam Winkler</i> 225
Part VI. Public Opinion on Gun Policy	
19	Public Opinion on Proposals to Strengthen U.S. Gun Laws: Findings from a 2013 Survey <i>Emma E. McGinty, Daniel W. Webster, Jon S. Vernick, and Colleen L. Barry</i> 239
	Consensus Recommendations for Reforms to Federal Gun Policies 259
	Biographies of Contributors 263
	Index 275

This page intentionally left blank

Foreword

On December 14, 2012, a deranged young man pulled into the parking lot of the Sandy Hook Elementary School in Newtown, Connecticut, and then shot his way into the building with a high-capacity semi-automatic rifle. The slaughter of 6 adults and 20 children really broke the country's heart, and for many Americans this is the straw that has broken the camel's back.

Since the Sandy Hook massacre, more than 100 mayors from across the country have joined the bipartisan coalition Mayors Against Illegal Guns. The total number of mayors involved is now more than 800. As of January 14, 2013, roughly one million Americans have signed on to the coalition's "I Demand a Plan" campaign against gun violence. Vice President Joe Biden will announce his recommendations for action to President Barack Obama this week. The vice president knows that as horrific as Sandy Hook has been, as have all the other seemingly endless episodes of mass violence, we experience that level of carnage, or worse, every single day across our country, *because every day of the year, an average of 33 Americans are murdered with guns.*

Here's another way to think about what that means. On January 21, 2013, President Obama took the oath of office for his second term. Unless we take

action, during those four years some 48,000 Americans will be killed with guns—nearly twice as many people as were killed in combat during the entire Vietnam War. I have made it clear to the vice president that our bipartisan coalition of mayors is supporting seven measures—three that need legislation and four that require only executive action. We’re hopeful that the vice president and president will support all seven.

First and most urgently, we need the president and Congress together to require background checks for all gun sales, including private sales at gun shows and online. These private sales now account for more than 40 percent of all gun sales nationally, which means that in 2012 alone, there were more than six million gun sales that happened with no background checks. Many of those guns are handguns, which are used in about 90 percent of all firearms murders. Across the United States, more than 80 percent of gun owners, and more than 90 percent of Americans, support requiring background checks for all gun sales. There’s really no debate here. It’s common sense. We have laws on the books that require a background check when dealers sell guns. It’s time for the president and Congress to make that the law of the land for all sales. The forty percent to which the law does not apply means the law is basically a sham.

Second, Congress should make gun trafficking a federal crime. In New York City, 85 percent of the weapons that we recover from crime scenes come from out-of-state sources, but federal laws designed to curb illegal sales across borders are incredibly weak. Criminals who traffic in guns get a slap on the wrist. We’ve made New York the safest big city in the nation, in part by adopting tough gun laws and proactively enforcing them. Every state in the Union has citizens killed by guns coming from other another state, and every state is powerless to stop the mayhem. Until Congress gets tough on trafficking, guns will continue flowing to our streets from states with much looser gun laws.

The third legislative measure that the White House should support is limiting the availability of military-style weapons and of high-capacity magazines with more than 10 rounds. These guns and equipment are not designed for sport or home defense. They are designed to kill large numbers of people quickly. That’s the only purpose they have. They belong on the battlefield, in the hands of our brave professionally trained soldiers, not on the streets of our cities, suburbs, or rural areas, as retired military leaders like Colin Powell and Stanley McChrystal have said.

Many of the weapons in this category were previously banned under the federal assault weapons law that expired in 2004. That law was, incidentally,

first initiated and passed by Vice President Biden. He is the right person to have been appointed by the president to come up with what we should do next. Regulating assault weapons certainly falls within the bounds of the Second Amendment. So does everything else we're urging.

This is not a constitutional question; it's a question of political courage. The U.S. Supreme Court, the entity that defines what the Constitution means, has ruled that reasonable regulations are consistent with the Second Amendment. When the gun lobby raises concerns over protection of the Second Amendment, it is nothing but a red herring. And it's time for Second Amendment defenders in Congress to call them on it.

The three measures that I've discussed—requiring background checks for all gun sales, making gun trafficking a federal crime, and limiting military-style assault weapons and high-capacity magazines—will require leadership from both the president and members of Congress. But there are other steps President Obama can take without congressional approval—any time he chooses, with the stroke of a pen. Vice President Biden understands this, and we hope his recommendations will include at least these next four steps that we've urged him to take.

In the first of these four steps, the president can order all federal agencies to submit their relevant data to the national gun background check database. Every missing record is a potential murder in the making. If the data aren't in the database, those people that use the database don't get what they need, allowing gun sales to go ahead in cases where we all agree—and federal law says—they shouldn't.

Second, the president can direct the Justice Department to make a priority of prosecuting convicted criminals who provide false personal information during gun purchase background checks. Yes, even criminals buy from dealers, knowing there's going to be a background check, except that they lie when they do so. As a matter of fact, during 2010 there were more than 76,000 cases referred by the FBI to the Justice Department. Do you know how many were prosecuted out of 76,000 in 2010, the last year for which we have data? Forty-four. Not 44,000, but 44 out of 76,000. This is a joke. It's a sad joke, and it's a lethal joke.

These are felony cases involving criminals trying to buy guns, and yet our federal government is prosecuting less than one-tenth of one percent of them. It is shameful, and it has to end, and the president can do that by just picking up the phone and saying to the Justice Department: This is your job, go do it or I'll get somebody that will.

As a third step, the president can make a recess appointment to get someone to head the Federal Bureau of Alcohol, Tobacco, Firearms and Explosives. The ATF, as it's called, hasn't had a director for six years. Can you imagine how much outrage there'd be if we'd been without a Homeland Security Secretary for six years? You can't have an agency without somebody running it that's going to allow it to do the job for which it was, and that job is to protect everyone in this city, state, and country—including those we love the most, our children, and those we have the greatest responsibility to, the police officers who run into danger when the rest of us are running the other way.

The president, and this is our fourth recommendation, can stop supporting what's called the Tiahrt order. Todd Tiahrt is a congressman from Wichita who got the Congress to pass a law that keeps the public in the dark about who gun traffickers are and how they operate. There can be no excuse for shielding criminals from public view.

At the bidding of the gun lobby, Congress has tied the hands of the Bureau of Alcohol, Tobacco, Firearms and Explosive and has prevented it from releasing critical data to law enforcement authorities and to the public. Unfortunately, the ATF is not alone is being gagged by Congress when it comes to the issue of guns.

The bipartisan coalition of Mayors Against Illegal Guns released a report, "Access Denied" detailing how Congress, bowing to the gun lobby, has systematically denied the American people access to information about guns and gun violence. Most egregiously and outrageously, Congress has severely restricted the scientists at the Centers for Disease Control and Prevention from studying the epidemic of gun violence, and they've put similar restrictions on the scientists at the National Institutes of Health. Congress has no business dictating what public health issues scientists can and should study.

At Johns Hopkins the motto is, The truth shall make you free. When elected officials try to muzzle scientific research and bury the truth, they make our free society less free and less safe. Today, because of congressional restrictions, CDC funding for firearms injury research totals \$100,000, out of an annual budget of nearly \$6 billion. The National Institutes of Health is estimated to spend less than \$1 million on firearms injury research, out of an annual budget of \$31 billion. To put that in perspective, the NIH spends \$21 million annually researching headaches. But it spends less than \$1 million on all the gun deaths that happen every year. If that doesn't give you a headache, it should.

There are 31,000 gun deaths every year in America, including about 19,000 suicides, many of which are children—every parent’s nightmare. In New York City, our suicide rate is less than half the national average, and one of the differences is that New York has tough gun laws. Nationally, 51 percent of suicides are by gun. In New York City, it is only 16 percent of suicides. The gun lobby callously says that someone who wants to kill him or herself will find a way to do it. In many cases, they are tragically wrong. We can prevent thousands of these senseless deaths with smart gun regulations, and we’re proving it in New York City.

Unfortunately, American scientists are not the only people Congress has attempted to silence. In 2010, again at the gun lobby’s bidding, Congress included language in a funding bill that prevented military officers and doctors, as well as mental health counselors, from even discussing firearms ownership with severely depressed service members. There is a suicide crisis going on right now in our military. It’s tough seeing and doing what we ask our soldiers to do. We have an all-volunteer army, but they come back and many of them really do have a problem. Congress, instead of trying to help, is just doing everything it can to make it worse. Our men and women in uniform deserve better. Thankfully, after mayors and retired military leaders urged Congress to rescind this prohibition, they did—but not until December of 2012, and only after too many men and women in uniform had taken their own lives with guns.

Enough is enough. It’s time for Congress and the White House to put public health above special interest politics. And it’s time for Congress to stop gagging our scientists, military leaders, and law enforcement officers—and stop trying to hide the truth from the American people. That’s why this summit was so important. It is especially fitting that it was hosted at the Johns Hopkins Bloomberg School of Public Health, where so much outstanding and important work is being done, in areas ranging from malaria research and environmental health to tobacco control and road safety. It’s all designed around the school’s motto, *Protecting Health, Saving Lives—Millions at a Time*. Reducing gun violence will have that kind of an impact, too.

A few years ago, Daniel Webster, director of the School’s Center for Gun Policy and Research, conducted a study of an initiative in New York City that aimed to identify the most problematic out-of-state gun dealers, based on crime data, conducting undercover investigations of their sales practices and

suing those who sold guns to our straw purchasers. Straw purchasers are those who lie about who is the actual purchaser of the gun, standing in for somebody who could not pass a background check. Twenty-four of the most problematic dealers settled or were put under a court monitor. Dr. Webster found that in New York City the likelihood of recovering a gun at a crime scene from one of these dealers dropped almost overnight by 84 percent.

Ninety-nine percent of the gun dealers in our country do obey the law; one percent do not, and those are the ones that we have to go after. And the results are dramatic and almost instantaneous. Our investigation never would have happened without the data that allowed us to identify the problematic dealers. And yet, if it were up to the NRA, we would never have had access to it. More guns would have flowed onto our streets and, in all likelihood, more people would have been murdered.

The undercover investigations we've conducted are just one example of how we've worked to crack down on gun violence. At our urging, the New York state legislature enacted the toughest penalties in the nation for illegal possession of a handgun: a 3½-year mandatory minimum prison sentence. We have also worked with our city council to adopt a law enabling the NYPD to keep tabs on gun offenders in our city, in the same way that they track sex offenders. We enforce those laws and other laws rigorously, which is an important reason New York is the safest big city in the country. In 2012, New York City had the fewest murders in nearly half a century (comparable records started to be kept back in 1963). We've never had a year remotely as safe as this past one.

As hard as we've worked, however, and as much as we've achieved, the reality remains that, in New York during 2012, there were still 418 murders in the City, and a lot of the people that were killed were kids. While shooting incidents are down in New York City, as well as murders, I recently visited three NYPD officers who'd been shot by criminals in two separate incidents on the same night. Thankfully, the officers are all expected to fully recover. But I think the events of that night really do demonstrate a flaw in an argument we've heard lately. That argument is that the solution to "bad guys with guns is good guys with guns." The problem is that sometimes the good guys get shot. Sometimes, in fact, they get killed. And I think the hardest part of my job, the part that I dread the most as mayor, is talking to the family of a police officer at a hospital to tell them that their husband, wife, mother, father, son or daughter won't ever be coming home again.

The tragic fact is that all across America today, fathers and mothers, wives and husbands, friends and neighbors will experience that kind of pain and loss in their lives because of gun violence. The rate of firearms homicides in America is 20 times higher than it is in other economically advanced nations. We have got to change that—and it has to start now, with real leadership from the White House.

If you haven't done so, go to DemandAPlan.org and join the campaign for gun safety reform, or call your senators or your congressmen and say, "We're not going to take this. Even if *you* vote the right way, your associates in Congress aren't voting the right way. And since I don't get a chance to influence them, but you want my vote, you do something about it. It is your responsibility to do it as much as it is the responsibility of the other senators and the other congressmen." Let us hope that Washington gives the issue the attention that it deserves. This is going to make a real difference between what our lives are like today and a safe future for our kids.

Michael R. Bloomberg, Mayor of New York City
*Excerpted from opening remarks given at the Summit on
Reducing Gun Violence in America at the Johns Hopkins
Bloomberg School of Public Health, January 14, 2013*

This page intentionally left blank

Preface

One month—to the hour—after the harrowing and unfathomable massacre of 20 children and 6 adults in a Newtown, Connecticut, elementary school, Johns Hopkins University convened a summit that brought together preeminent researchers on gun violence from across the country and around the world. This was a moment when advocates, lobbyists, and politicians on both sides of the gun-control debate were beginning to mobilize and spar. In this unruly mix, Johns Hopkins seized the opportunity to discharge a critical role of research universities and provided principled scaffolding for the debate. We wanted to use the opportunity to cut through the din of the shrill and the incendiary, the rancorous and the baseless, and provide rigorous, research-based considerations of the most effective gun regulations and the appropriate balance between individual rights and civic obligation.

At Johns Hopkins, our scholars and researchers have been investigating the public health effects of gun violence for well over two decades. For the past seventeen years, the Center for Gun Policy and Research has provided a home for that study, producing nationally recognized research and recommendations aimed at understanding and curtailing the impact of gun violence.

Given the national historical backdrop of a bleak record of stunted policy reform in this area, some may have considered this summit to be another exercise in futility. The skeptic's fear is that good ideas for gun-policy reform are no match for the formidable interests that oppose gun control legislation—even after an event as cataclysmic as Newtown.

But our decidedly more optimistic view is predicated on the belief that this country is not slavishly tethered to the current matrix of inadequate national gun laws. Rather, despite a long history of failed legislative and policy reform and of opportunities inexplicably squandered, progress is possible. This view is illustrated both by the experiences of other countries and those of the United States.

At the summit, speakers from Australia, Scotland, and Brazil discussed the adoption of significant new policies in the wake of horrific moments of gun violence. These nations have never had constitutional guarantees protecting individuals' rights to bear arms, their political institutions vary greatly from those in the United States, and "gun culture" is an alien concept. But there are telling lessons to be gleaned from the approaches these countries took to address the wanton loss of life from gun violence.

In the United States, there is no denying the sea change in public sentiment that has buttressed public health reforms in areas as diverse as seat belt usage, drunk driving, and lead exposure. From the passage of civil rights legislation to the regulation of tobacco products, we have observed enough nontrivial policy change in recent decades to recognize that the apparent iron grip of status quo forces can be shattered and our policy can progress.

We owe great appreciation to Daniel Webster and Jon Vernick, of the Johns Hopkins Center for Gun Policy and Research, who framed the questions at the heart of this issue, organized the summit, and edited this book, all with extraordinary sophistication and speed. They were supported by a team of committed Johns Hopkins staff who set aside daily obligations to support this urgent cause. To each of them, and to the Johns Hopkins University Press, which published this book in unprecedented time, we are grateful.

Ronald J. Daniels, President, Johns Hopkins University

Michael J. Klag, Dean, Johns Hopkins Bloomberg
School of Public Health

Acknowledgments

This book—published in only ten days—would be nothing more than an ambitious wish without the extraordinary efforts of many people.

We owe an immense debt of gratitude to Johns Hopkins University President Ron Daniels, who, in the wake of the Newtown tragedy, urged us to seize the moment and bring the depth and rigor of empirical research to one of the most complex and fractious issues our country has ever faced. His leadership and vision epitomize the spirit of Johns Hopkins and our obligation to spread knowledge beyond the realm of academe and into the streets, where everyday citizens live the public health challenges we study.

We are grateful also to Dean Michael Klag of the Bloomberg School of Public Health, who has been an unflagging supporter of the Center for Gun Policy and Research for many years, even and especially when public attention for our research was in short supply. His enthusiastic support for the Summit and the book proved essential to making both a reality.

A few days before the December holidays, we contacted more than twenty of the world's top experts on gun policy, some scattered around the globe, and asked them to present their research and experience at a January summit

that would inform important policy decisions and to write chapters for a companion volume that would be published the same month. These colleagues and friends—many of whom have devoted their careers to the study of violence and gun policy—answered the call without hesitation, interrupting family time during the holidays to join us in this important work.

We appreciate the valuable guidance provided by Stephen Teret, the founding director of the Johns Hopkins Center for Gun Policy and Research, in addition to his important chapter in the book. Thank you to Alicia Samuels, our Center’s communications director, for ensuring the outcomes of this Summit reached key audiences. We are also grateful to the work of the many Center faculty who contributed valuable chapters to the book. And we are in awe of Colleen Barry’s and Emma McGinty’s exceptional effort to design and carry out a survey of public opinion on gun policy of such exceptional depth and quality during the first two weeks of January 2013.

Our sincere thanks to New York City Mayor Michael R. Bloomberg, whose powerful opening remarks at the Johns Hopkins Summit on Reducing Gun Violence in America inspired courage and conviction. We are likewise grateful to Maryland Governor Martin O’Malley, who cleared his calendar to speak at the Summit in the opening days of the legislative session.

Our colleagues at the Bloomberg School rose to the considerable challenge of organizing a high-profile event with short notice. We express our deepest gratitude to Josh Else, Jim Yager, Jane Schlegel, Felicity Turner, Susan Sperry, and Susan Murrow, who set aside the considerable demands of their daily work to make the Summit happen, along with their colleagues David Croft, Brian Simpson, Lauren Haney, Chip Hickey, Rachel Howard, Scott Klein, Ross McKenzie, Robert Ollinger, Tim Parsons, Maryalice Yakutchik, Mike Smith, Jackie Powder Frank, John Replogle, Yolanda Tillett, Alyssa Vetro, and Natalie Wood-Wright. And thank you to the countless other faculty, staff, and students for their support and interest in our work.

We received incredible support from our colleagues on the Homewood Campus, especially Lois Chiang, Glenn Bieler, Tom Lewis, Eileen Fader, Dennis O’Shea, and Jill Williams. They, along with their colleagues Beth Felder, Melisa Lindamood, Dave Alexander, Doug Behr, Lauren Custer, Lisa DeNike, Amy Lunday, Erin Oglesby, Tracey Reeves, Greg Rienzi, Hilary Roxe, Tricia Schellenbach, Gus Sentementes, Glenn Simmons, Phil Sneiderman, and others, demonstrated the spirit of “One Hopkins” by traveling between various campuses and offices to get the job done.

The Johns Hopkins University Press director Kathleen Keane and editorial director Greg Britton welcomed this project from the moment it was proposed, and we extend special thanks to our editor Kelley Squazzo, who embraced the challenges of working with multiple contributors over thousands of miles to produce a book in record time. We thank the peer reviewers for their very helpful feedback on the chapters in this book. Editorial, design, and production colleagues Julie McCarthy, Martha Sewall, John Cronin, Sara Cleary, Michele Callaghan, Mary Lou Kenney, and Carol Eckhart tended this project with extraordinary care under immense time constraints. Marketing staff Becky Brasington Clark, Tom Lovett, Karen Willmes, Kathy Alexander, Claire McCabe Tamberino, Brendan Coyne, Robin Rennison, Robin Noonan, Jack Holmes, Susan Ventura, Alexis de la Rosa, Cathy Bergeron, and Vanessa Kotz did an extraordinary job with promotion.

Our deepest thanks go to our families, who sustain us and support this important work.

Daniel W. Webster, ScD, MPH

Jon S. Vernick, JD, MPH

This page intentionally left blank

Introduction

The role of guns in violence, and what should be done, are subjects of intense debate in the United States and elsewhere. But certain facts are not debatable. More than 31,000 people died from gunshot wounds in the United States in 2010.¹ Because the victims are disproportionately young, gun violence is one of the leading causes of premature mortality in the United States. In addition to these deaths, in 2010, there were an estimated 337,960 nonfatal violent crimes committed with guns,² and 73,505 persons were treated in hospital emergency departments for nonfatal gunshot wounds.^{3,4} The social and economic costs of gun violence in America are also enormous.

Despite the huge daily impact of gun violence, most public discourse on gun policy is centered on mass shootings in public places. Such incidents are typically portrayed as random acts by severely mentally ill individuals which are impossible to predict or prevent. Those who viewed, heard, or read news stories on gun policy might conclude the following: (1) mass shootings, the mentally ill, and assault weapons are the primary concerns; (2) gun control laws disarm law-abiding citizens without affecting criminals' access to guns;

(3) there is no evidence that gun control laws work; and (4) the public has no appetite for strengthening current gun laws. Yet all of the evidence in this book counters each of these misperceptions with facts to the contrary.

As Miller et al. point out in their essay, gun availability greatly increases the risk of violent death in America because many acts of gun violence involve spontaneous altercations that result in death or serious injury when a gun is readily available. Vittes et al. explain in their call for expanding disqualifying conditions for having handguns that this is especially true when these conflicts involve individuals with criminal histories, perpetrators of domestic violence, substance abusers, and youth.

Cook and Ludwig's essay reveals disappointing but not surprising findings of their evaluation of the Brady Law given that it leaves a substantial gap in federal gun control laws by omitting private transactions from background check and record keeping requirements. Papers by Webster et al. and Wintemute provide evidence that state laws that fill this gap by requiring universal background checks reduce diversions of guns to criminals.

Addressing gaps in the background check system are important because prohibiting firearm purchase and possession by high-risk groups appears to decrease violence. Swanson et al. document beneficial effects from prohibiting firearms for individuals with certain mental illnesses as long as appropriate records are shared with law enforcement agencies that screen gun buyers. Zeoli and Frattaroli share evidence that some firearm prohibitions for domestic violence offenders are saving lives, and Wintemute provides evidence that preventing violent misdemeanants from purchasing handguns reduces violence.

Some elected officials claim that they are looking out for gun owners when they pass measures deceptively named "Firearm Owners' Protection Act" or "Protection of Lawful Commerce in Arms Act." But essays by Vernick and Webster and by Braga and Gagliardi demonstrate that these laws and others like them are designed solely to protect gun sellers against measures that would otherwise hold them accountable for practices that divert guns to criminals. Current federal laws make it very difficult to prosecute, sue, revoke the licenses of rogue gun dealers, or even share data about which gun manufacturers and retailers are connected to unusually large numbers of guns used by criminals. Studies have shown that when gun dealers experience greater regulation and oversight by law enforcement and are vulnerable to lawsuits

for illegal sales practices, far fewer of the guns they sell end up in the hands of criminals.

Koper reviews his evaluation of the 1994 federal ban on assault weapons and high-capacity ammunition magazines. That ban was designed to remove military-style weapons and make it harder for multiple rounds to be fired without reloading. Unfortunately, the assault weapon ban was easy to evade and millions of existing high-capacity ammunition magazines were grandfathered. The law was allowed to expire in 2004, but Koper's findings can teach us how to improve such laws in the future.

Firearms themselves can also be made safer. Teret and Mernit describe the benefits of safe gun designs, particularly personalized guns designed to be operable only by an authorized user. They discuss the history of these technologies, their present-day feasibility, and ways to promote their adoption.

The United States is not the only nation to have suffered from mass shootings or to address an endemic gun violence problem. Mass shootings in Dunblane, Scotland, and Port Arthur, Tasmania, led to major changes in the gun laws of the United Kingdom and Australia. Essays by North, Peters, and Alpers describe these new laws. Brazil had some of the highest rates of gun violence in the world. Yet here, too, comprehensive changes to gun laws were associated with reductions in rates of violence. *Bandeira* discusses this success story. Although bans on certain handguns (as in the UK) or bans and mass buy-backs of specific long guns (in Australia) are unlikely to occur in the United States, the authors discuss the lessons U.S. advocates and policymakers can learn from these successes in other nations.

For many years, some groups have claimed that the Second Amendment to the U.S. Constitution stands as an obstacle to most gun laws. *Rosenthal and Winkler* debunk this myth with careful legal analysis of recent U.S. Supreme Court and lower court opinions. The recommendations provided in this book should withstand constitutional scrutiny.

Public opinion is also an important determinant of whether any particular evidence-based policy becomes law. *McGinty et al.* report on a newly conducted national public opinion poll of 33 different policies. Most were supported by strong majorities of the public, including a majority of gun owners.

The book concludes with consensus recommendations from the book's contributors. These recommendations address the full range of topics covered in this book. If implemented, these recommendations have the potential to

xxviii *Introduction*

dramatically reduce the number of gun deaths in the United States, enhancing the quality of life for all Americans.

Daniel W. Webster, ScD, MPH

Jon S. Vernick, JD, MPH

Notes

1. Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. National Center for Injury Control and Prevention, Centers for Disease Control and Prevention (producer). Available from: URL: <http://www.cdc.gov/injury/wisqars/index.html>. [2012, Mar. 15].

2. Truman JL. Criminal Victimization, 2010. National Crime Victimization Survey. NCJ 235508, Washington, DC: United States Department of Justice, Bureau of Justice Statistics, Sept. 2010.

3. Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. National Center for Injury Control and Prevention, Centers for Disease Control and Prevention (producer). Available from: URL: <http://www.cdc.gov/injury/wisqars/index.html>. [2012, Mar. 15].

4. Vyrostek SB, Annett JL, Ryan GW. Surveillance for Fatal and Non-Fatal Injuries—United States, 2001. *MMWR*. 2004; 53(SS07):1–57.

Part I / Gun Policy Lessons from the United States

Keeping Guns from High-Risk Individuals

This page intentionally left blank

1

Firearms and Violent Death in the United States

Matthew Miller, Deborah Azrael,
and David Hemenway

Firearm-Related Deaths in the United States

In 2010, there were more than 31,000 firearm deaths in the United States: 62% were suicides, 36% were homicides, and 2% were unintentional (2%) (CDC 2012a). Almost as many Americans die from gunfire as die from motor vehicle crashes (almost 34,000 in 2010). Americans under age 40 are more likely to die from gunfire than from any specific disease (CDC 2012a).

Homicide

The United States is not a more violent country than other high-income nations. Our rates of car theft, burglary, robbery, sexual assault, and aggravated assault are similar to those of other high-income countries (van Kesteren, Mayhew, and Nieuwbeerta 2001); our adolescent fighting rates are also similar (Pickett

Matthew Miller, MD, ScD, MPH, is deputy director of the Harvard Injury Control Research Center and associate professor of Injury Prevention and Health Policy at the Harvard School of Public Health. Deborah Azrael, PhD, has been a member of the firearms research group at the Harvard School of Public Health for more than 20 years. David Hemenway, PhD, is an economist and professor at the Harvard School of Public Health and director of the Harvard Injury Control Research Center.

4 *Matthew Miller, Deborah Azrael, and David Hemenway*

Table 1.1 Homicide, suicide, and unintentional gun deaths among 5–14 year olds: The United States versus 25 other high-income populous countries (early 2003)

	Mortality rate ratio
<hr/>	
Homicides	
Gun homicides	13.2
Non-gun homicides	1.7
Total	3.4
Suicides	
Gun suicides	7.8
Non-gun suicides	1.3
Total	1.7
Unintentional firearm deaths	10.3

Source: Richardson and Hemenway 2011

et al. 2013). However, when Americans are violent, the injuries that result are more likely to prove fatal. For example, the U.S. rate of firearm homicide for children 5 to 14 years of age is thirteen times higher than the firearms homicide rate of other developed nations, and the rate of homicide overall is more than three times higher (Table 1.1).

U.S. homicide rates vary cyclically over time. Current rates are at a 30-year low, but as recently as 1991 rates were nearly twice as high (CDC 2012a). Changes in homicide rates over the past several decades are largely attributable to changes in firearm homicide rates, mostly driven by changes in firearm homicide rates among adolescent and young men in large cities (Hepburn and Hemenway 2004, Blumstein and Wallman 2000, Cork 1999, Cook and John 2002).¹

The U.S. homicide rate is much higher in urban than in rural areas, as are rates of all violent crime. Nine out of ten homicide offenders are male, and 75% of victims are male. African Americans are disproportionately represented among both perpetrators and victims.²

Suicide

Compared with other high-income countries, the U.S. adult suicide rate falls roughly in the middle. Among younger persons, however, our suicide mortality is relatively high: for children under 15 years of age, the overall suicide

rate in the United States is 1.6 times that of the average of other high-income countries, largely accounted for by a firearm suicide rate eight times that of the average of these countries (Richardson and Hemenway 2011).

Over the past several decades, suicide rates have been more stable than have rates of homicide (Miller, Azrael, and Barber 2012). Nevertheless, after declining from a peak of 12.9/100,000 in 1986 to 10.4 in 2000, driven largely by a decline in the rate of firearm suicide, the suicide rate has increased over the past decade to 12.4/100,000 in 2010, mostly due to an increase in suicide by hanging (Miller, Azrael, and Barber 2012, CDC 2012a).

Age, sex, race, and other demographic characteristics—including marital status, income, educational attainment, and employment status—all influence suicide mortality (Nock et al. 2008). Suicide rates are higher, for example, for white and Native Americans than for black, Hispanic, and Asian Americans (CDC 2007). A consistent finding across numerous studies is that the strongest individual-level risk factor for a fatal suicidal act is having previously attempted suicide; other strong risk factors include psychiatric and substance abuse disorders (Shaffer et al. 1996).

In contrast to homicide rates, suicide rates are higher in rural than in urban areas almost entirely due to higher rates of firearm suicide in rural areas.

Unintentional Firearm Deaths

Approximately 675 Americans per year were killed unintentionally with firearms between 2001 and 2010 (CDC 2007). Data from the National Violent Death Reporting System show that two-thirds of the accidental shooting deaths occurred in someone's home, about half of the victims were younger than 25 years, and half of all deaths were other-inflicted. In other-inflicted shootings, the victim was typically shot accidentally by a friend or family member—often an older brother (Hemenway, Barber, and Miller 2010).

Firearm Ownership in the United States

The United States has more private guns per capita (particularly more handguns) and higher levels of household gun ownership than other developed countries (Killias 1993, SAS 2007).

Most of what we know about gun ownership levels in the United States over the past several decades comes from the General Social Survey (GSS 2010),

a relatively small biannual survey of U.S. adults. Data from the GSS show that the percentage of households with firearms has fallen from approximately 50% in the late 1970s to 33% today. Changing household demographics are believed to explain the decline in the household ownership of guns chiefly due to a fall in the number of households with an adult male (Smith 2000). Notably, however, the percentage of individuals owning firearms has remained relatively constant over the past several decades (GSS 2010).

The GSS does not speak to the number of guns in civilian hands or the distribution of guns within households. For this information, researchers have turned to data from two medium-sized national surveys conducted a decade apart. These surveys suggest that the number of guns in civilian hands grew from approximately 200 million in 1994 to 300 million in 2004—and that the average gun owner now owns more guns than previously (Hepburn et al. 2007, Cook and Ludwig 1997).

Compared with other Americans, gun owners are disproportionately male, married, older than 40, and more likely to live in nonurban areas. Their long guns (rifles, shotguns) are owned mainly for sport (hunting and target shooting). People who own only handguns typically own the guns for protection against crime (Hepburn et al. 2007, Cook 1979).

In 2001, 2002, and 2004, but not before or since, information on household gun ownership from the General Social Survey was supplemented by information from the National Behavioral Risk Factor Surveillance System (CDC 1997). The BRFSS is of sufficient size (more than 200,000 respondents annually) that household gun ownership could, for the first time, be determined at the state level for all 50 states and for some Metropolitan Statistical Areas.

Prior to these three iterations of the BRFSS, researchers generally used proxies to measure firearm ownership rates at the state and sub-state level. A validation study by Azrael, Philip, and Miller (2004) found that from among all proxies, the fraction of suicides that are committed with firearms (FS/S) correlates most strongly and consistently with cross-sectional survey-based measures of household firearm ownership at the county, state, and regional levels.

Household firearm ownership is probably a good measure of the accessibility of guns used in suicides, since most suicides involving firearms occur in the home (Kellermann et al. 1992, CDC 2012b) and involve a firearm owned by a member of the household (Kellermann et al. 1992). Household gun owner-

ship levels seem also to be the key exposure variable for firearm homicides that take place in the home, where women, children and older adults are particularly likely to be killed. The most common perpetrator in such instances is a family member (CDC 2012b). By contrast, older adolescent and young adult males are more often killed outside the home by guns owned by a non-family member.³

In this essay, we focus on studies that assess the relationship between gun prevalence and violent death. As such, the essay does not examine studies of gun carrying nor any literature on illegal gun markets. It also does not address research that investigates the relationship between firearm regulations and violent death. Note, however, that firearm prevalence and firearm regulation are highly collinear. Strong regulations may limit firearm ownership, and low levels of firearm ownership make it easier to pass stronger regulations.

This essay is also not an exhaustive review of the literature examining the association of firearm availability and violent death. (For more comprehensive reviews, see Hepburn and Hemenway 2004, Miller and Hemenway 1999, and Brent 2001.) Rather, it briefly summarizes (a) international ecologic studies comparing the United States to other countries, (b) ecologic studies of U.S. regions, states, and metropolitan areas, and (c) individual case-control and cohort studies.

Studies included in this brief review met a minimal threshold of attempting to control for important confounders: studies had to compare likes to likes. For case-control studies of homicide, that means—at a minimum—controlling for age, gender, and neighborhood; in suicide studies, for age, sex, and psychiatric risk factors for suicidal behavior. For international studies of homicide, it means comparing high-income countries to high-income countries. International comparisons of adult suicide rates are confounded by large differences in religion, culture and recording practices (i.e., the social meaning and cultural acceptance of adult suicide), as evidenced by tenfold differences in suicide rates across high-income nations. Thus, the only international studies of suicide included focus on the suicides of children—which all countries hold to be tragedies. For ecologic studies in the United States, making “like to like” comparisons means comparing states to states with similar levels of urbanization (or, for homicide, similar crime rates), cities to cities, and rural areas to rural areas.⁴

Firearms and Homicide

Ecologic Studies

Killias (1993) evaluated rates of violence in 14 developed countries: 11 in Europe, along with the United States, Canada, and Australia. He used data from the 1989 International Crime Survey, a telephone survey of 14 countries and 28,000 respondents, to measure firearm prevalence. Respondents were asked whether there were any firearms in their household and, if so, whether any were a handgun or a long gun. Military firearms were excluded. In this study, which did not include control variables, rates of firearm ownership and homicide were positively correlated, while rates of firearm ownership and non-firearm homicide were not.

A study by Hemenway and Miller (2000) included 26 high-income nations with populations greater than one million. To measure gun availability, the authors used two proxies, including FS/S. No control variables were included in the analysis. Firearm availability was strongly and significantly associated with homicide across the 26 countries.

A follow-up study (Hemenway, Shinoda-Tagawa, and Miller 2002) examined homicide rates among women across high-income countries. The validated proxy (FS/S, or the percentage of suicides committed with a firearm) was used to estimate firearm ownership in each country. Urbanization and income inequality were included as control variables. The United States accounted for 70% of all female homicide victims in the study and had the highest firearm ownership rates. The U.S. homicide rate for women was five times higher than that of all of the other countries combined; its female firearm homicide rate was eleven times higher.

U.S. Studies

Cook (1979) conducted a cross-sectional analysis of 50 large cities in the United States to explore the relationship between gun availability and robbery, including robbery-murder. Using data on the number of robberies in 1975, Cook examined how firearm availability (as proxied by Cook's index) was related to robbery and robbery-murder rates, controlling for measures of the effectiveness of the criminal justice system, population density, and other regional and state differences. Increased gun availability was not associated with overall robbery rates, but it was positively associated with the proportion of robber-

ies that involved a gun—and with the per capita robbery-murder rate, through an increased rate of gun robbery.

Miller et al. (2002) evaluated the relationship between levels of firearm ownership at the state and regional level and the incidence of homicide from 1988 to 1997 for 50 states and 9 regions. At the state level, they used the percentage of suicides with a firearm as a proxy for ownership and they measured gun availability at the regional level with data from the GSS. Five potential confounders were included: poverty, urbanization, unemployment, alcohol consumption, and (non-homicide) violent crime rates. In the multivariate analyses, a positive and significant association between gun ownership and homicide rates was found for the entire population and for every age group (except ages 0–4), primarily due to higher firearm homicide rates.

A similar study (Miller et al. 2007) used survey estimates of household gun ownership for each state from the Behavioral Risk Factor Surveillance System. It examined data from 2001 to 2003 and controlled for state-level rates of aggravated assault, robbery, unemployment, urbanization, alcohol consumption, poverty, income inequality, the percentage of the population that was black, and the percentage of families headed by a single female parent. Again, states with higher rates of household firearm ownership had significantly higher homicide victimization rates for men, for women, and for children. The association was driven by gun-related homicide victimization rates; non-gun-related victimization rates were not significantly associated with rates of firearm ownership.

Individual Level Studies

Ecologic studies provide evidence about whether more guns in the community are associated with more homicides in the community. Case-control and cohort studies provide data more germane to the question of whether a gun in the home increases or reduces the risk of homicide victimization for members of the household.

Kellermann et al. examined approximately 400 homicide victims from three metropolitan areas who were killed in their homes (Kellermann et al. 1993). All died from gunshot wounds. In 83% of the homicides, the perpetrator was identified; among these cases, 95% of the time, the perpetrator was not a stranger. In only 14% of all the cases was there evidence of forced entry. After controlling for illicit drug use, fights, arrests, living alone, and whether the home was rented,

Table 12 NVDRS 2005–2010

	Firearm			Non-firearm		
	<i>N</i>	Occurred in a house/apt	Occurred at victim's residence	<i>N</i>	Occurred in a house/apt	Occurred at victim's residence
Homicides by age group						
0–4 yrs	81	75%	67%	1,025	90%	77%
5–14 yrs	257	72%	51%	205	78%	67%
15–24 yrs	5,679	37%	16%	1,385	47%	27%
25–34 yrs	4,906	44%	24%	1,479	56%	39%
35–64 yrs	5,003	56%	41%	3,716	62%	50%
65+ yrs	470	74%	69%	719	79%	76%
Suicides by age group						
0–4 yrs	—			—		
5–14 yrs	105	97%	88%	301	91%	88%
15–24 yrs	3,332	75%	64%	3,769	69%	65%
25–34 yrs	4,034	76%	67%	4,743	70%	65%
35–64 yrs	15,634	78%	74%	16,568	72%	70%
65+ yrs	6,019	89%	88%	2,168	80%	83%

Note: Unknowns for age (0.7%), house/apt (1.4%), home (3.6%) were set aside.

the presence of a gun in the home remained strongly associated with an increased risk for homicide in the home. Gun ownership was most strongly associated with an increased risk of homicide by a family member or intimate acquaintance.⁵

Whereas most men are murdered away from home, most children, older adults, and women are murdered at home (Table 1.2). A gun in the home is a particularly strong risk factor for female homicide victimization—with the greatest danger for women coming from their intimate partners.

The heightened risk of femicide is illustrated in a subgroup analysis of female homicide victimization from Kellermann's 1993 case-control study of homicide in the home. A spouse, a lover, or a close relative murdered most of the women decedents, and the increased risk for homicide from having a gun in the home was attributable to these homicides (Bailey, Flewelling, and Rosenbaum 1997). A case-control study by Wiebe et al. (2003) also found that the risk of homicide associated with living in a home with guns was particularly high for women (who were almost three times more likely to become homicide victims compared with women living in homes without guns). Here too, a gun in the home was a risk factor for homicide by firearm but not for homicide by other means.

Other case-control studies have also found that a gun in the home is a risk for homicide in the home, with especially heightened risk for women (Cummings et al. 1997, Dahlberg, Ikeda, and Kresnow 2004). Results from perpetrator-based case-control homicide studies also find that gun ownership is a risk for homicide perpetration. For example, a study of women murdered by intimate partners found that compared with a control group of living battered women, a gun in the house was present for 65% of perpetrators of murder versus 24% of perpetrators of nonfatal abuse. Access to a firearm by the battered woman had no protective effect (Campbell et al. 2003).

Cohort Studies

There are no studies that follow a large cohort of individuals with known characteristics, comparing homicide victimization rates of those with a gun in the home and those without.

Firearm Prevalence and Suicide

Firearm suicide rates and overall suicide rates in the United States are higher where guns are more prevalent (Miller, Hemenway, and Azrael 2007, Kubrin and Wadsworth 2009). By contrast, rates of suicide by methods other than firearms are not significantly correlated with rates of household firearm ownership (Miller, Hemenway, and Azrael 2007). This pattern has been reported in ecologic studies that have adjusted for several potential confounders, including measures of psychological distress, alcohol and illicit drug use and abuse, poverty, education, and unemployment (Miller, Azrael, and Barber 2012, Miller, Hemenway, and Azrael 2007).

Household firearm ownership has also been consistently found to be a strong predictor of suicide risk in studies that examined individual-level data. U.S. case-control studies find that the presence of a gun in the home or purchase from a licensed dealer is a risk factor for suicide (Bailey et al. 1997, Brent et al. 1993, Brent et al. 1994, Brent et al. 1991, Brent et al. 1988, Conwell et al. 2002, Cummings et al. 1997, Kellermann et al. 1992, Grassel et al. 2003, Kung, Pearson, and Lui 2003, Wiebe 2003). The relative risk is large (two- to tenfold), depending on the age group and, for younger persons, how firearms in the home are stored (Miller and Hemenway 1999, Brent et al. 1991, Kellermann et al. 1992).

The only large U.S. cohort study to examine the firearm–suicide connection found that suicide rates among California residents who purchased handguns

from licensed dealers were more than twice as likely to die by suicide as were age/sex matched members of the general population, not only immediately after the purchase but throughout the six-year study period (Wintemute et al. 1999). Here, too, the increase in suicide risk was attributable entirely to an excess risk of suicide with a firearm (Wintemute et al. 1999).

Drawing causal inferences about the relation between firearm availability and the risk of suicide from existing case-control and ecologic studies has been questioned on the grounds that these studies may not adequately control for the possibility that members of households with firearms are inherently more suicidal than members of households without firearms (NRC 2005). Additional cited limitations include the possibility of differential recall (by cases compared with controls) of firearm ownership and comorbid conditions, and reverse causation (whereby suicidal persons purchase firearms with the idea of committing suicide).

It is very unlikely, however, that the strong association between firearms and suicide reported consistently in U.S. studies is either spurious or substantially overstated. First, individual-level studies have often controlled for measures of psychopathology (Bailey et al. 1997, Brent et al. 1994, Brent et al. 1993, Brent et al. 1988, Conwell et al. 2002, Cummings et al. 1997, Kellermann et al. 1992, Wiebe 2003).

Second, directly answering the reverse causation critique, the risk of suicide associated with a household firearm pertains not only to gun owners but to *all* household members (Cummings et al. 1997, Kellermann et al. 1992, Wintemute et al. 1999); the relative risk is larger for adolescents than for the gun owner; and for the gun owner the risk persists for years after firearms are purchased (Cummings et al. 1997, Kellermann et al. 1992, Wintemute et al. 1999).

Third, studies that have examined whether people who live in homes with guns have higher rates of psychiatric illness, substance abuse, or other known suicide risk factors generally fail to find any indication of heightened risk (Oslin et al. 2004, Kolla, O' Connor, and Lineberry 2011). For example, four case-control studies found comparable rates of psychiatric illness and psychosocial distress among households with versus without firearms (Kellermann et al. 1992, Ilgen et al. 2008, Miller et al. 2009, Sorenson and Vittes 2008, Betz, Barber, and Miller 2011).

Fourth, there appears to be a hierarchy of suicide risk among children and young adults, depending on how securely household firearms are stored, suggesting a dose-response relationship (Grossman et al. 2005).

Finally, the consistency in magnitude, direction, and specificity of method-related risk observed in both the many individual-level and ecologic studies (the latter not being subject to recall bias or the reverse causation criticism) leads to only one conclusion: a gun in the home increases the likelihood that a family member will die from suicide.

Unintentional Firearm Deaths

Not surprisingly, ecologic and case-control studies find that where there are more guns and more guns poorly stored, there are more unintentional firearm deaths (Miller, Azrael, and Hemenway 2001, Wiebe 2003, Grossman et al. 2005). U.S. children aged 5 to 14 have eleven times the likelihood of being killed accidentally with a gun compared with similarly aged children in other developed countries (Table 1.2) (Richardson and Hemenway 2011).

Conclusion

The United States, with its many guns and highly permissive gun laws, faces a far more serious problem of lethal firearms violence than other high-income nations. The relative magnitude of our problem is illustrated in Table 1.1. This table, which compares U.S. children aged 5–14 with children of other developed countries, illustrates the stark fact that U.S. children are *thirteen* times more likely to die from a firearm homicide and *eight* times more likely to die of a firearm suicide than children in comparable developed nations. There is no evidence that U.S. children are more careless, suicidal, or violent than children in other high-income nations. Rather, what distinguishes children in the United States from children in the rest of the developed world is the simple, devastating fact that they die—mostly by firearms—at far higher rates.

Within the United States itself, the evidence is similarly compelling: where there are more guns, there are more violent deaths—indeed, many more. The magnitude of this relationship is illustrated in Table 1.3, which compares the number of lives lost between 2001 and 2007 to homicide, suicide, and unintentional firearm accidents by sex and age groups in states with the highest compared with the lowest gun ownership rates. The consistency of findings across different populations, using different study designs, and by different researchers is striking. No credible evidence suggests otherwise.

Table 13 Violent deaths in states with the highest versus lowest gun ownership levels (BRFSS 2004); Mortality Data WISQARS 1999–2007

	High-gun states ^a	Low-gun states ^b	Ratio
Aggregate population of adults, 2001–2007	356 million	358 million	1.0
Proportion of households with firearms	50%	15%	3.3
Percentage of adult population reporting depression, past 12 months (NSDUH 2008–2009)	3.7%	3.7%	1.0
Percentage of adult population reporting suicidal ideation, past 12 months (NSDUH 2008–2009)	6.6%	6.5%	1.0
Number of nonlethal violent crimes in 2010 (UCR 2010)	165,739	148,287	1.1
Suicide			
Women			
Firearm suicide	4,148	563	7.4
Non-firearm suicide	4,633	4,575	1.0
Total suicide	8,781	5,138	1.7
Men			
Firearm suicide	26,314	7,163	3.7
Non-firearm suicide	11,592	12,377	0.9
Total suicide	37,906	19,540	1.9
Men ages 15–29			
Firearm suicide	5,803	1,308	4.4
Non-firearm suicide	3,192	2,671	1.2
Total suicide	8,995	3,979	2.2
5–14 year olds			
Firearm suicide	166	15	11.1
Non-firearm suicide	225	154	1.5
Total suicide	391	169	2.3
Adults 65+ years old			
Firearm suicide	6,374	1,714	3.7
Non-firearm suicide	1,182	2,270	0.5
Total suicide	7,556	3,984	1.9
Homicide			
Men			
Firearm homicide	13,755	7,799	1.8
Non-firearm homicide	5,031	3,963	1.3
Total homicide	18,786	11,762	1.6
Women			
Firearm homicide	3,165	998	3.2
Non-firearm homicide	2,855	2,132	1.3
Total homicide	6,020	3,130	1.9

Table 13 (Continued)

	High-gun states ^a	Low-gun states ^b	Ratio
5–14 year olds			
Firearm homicide	259	100	2.6
Non-firearm homicide	212	169	1.3
Total homicide	471	269	1.8
Men 15–29			
Firearm homicide	6,971	4,900	1.4
Non-firearm homicide	1,187	1,334	0.9
Total homicide	8,158	6,234	1.3
Adults 65+ years old			
Firearm homicide	620	139	4.5
Non-firearm homicide	794	534	1.5
Total homicide	1,414	673	2.1
Unintentional firearm deaths	109	677	6.2

Note: All data are from 1999–2007 because cell counts were suppressed beginning in 2008; terrorism-related homicides are not counted.

^aLouisiana, Utah, Oklahoma, Iowa, Tennessee, Kentucky, Alabama, Mississippi, Idaho, North Dakota, West Virginia, Arkansas, Alaska, South Dakota, Montana, Wyoming

^bHawaii, New Jersey, Massachusetts, Rhode Island, Connecticut, New York

Firearm policy is often focused on guns used in crime. What is notable about the studies reviewed here, however, is the consistency of the story they tell about *all* firearms—not just those used in crime. In the United States, there are more firearm suicides than firearm homicides, and women, children, and older adults are more likely to die by gunfire from a household gun (typically, legally acquired and possessed) than from illegal guns.

The first step in ameliorating a public health problem is to identify what the problem is. For the purposes of this essay, the problem is that, year after year, many more Americans are dying by gunfire than people in any other high-income nation. Good firearm policy has the potential to reduce the toll of lethal firearm violence in the United States. Efforts to reduce this uniquely American problem will, however, be less effective than they could be if good policy is not accompanied by a shift in the kind of discussions politicians, academicians, and citizens engage in about firearms. Science can provide the content—and better science based on better data, better content. The best chance for durable and large-scale reductions in lethal violence in the United States is for all of us to commit to keeping the conversation about the costs and benefits of guns in American society civil, ongoing, and factually grounded.

Acknowledgments

The text, but not the figures reported, in this essay draw in part on prior reviews written previously by the authors, often supported by the Joyce Foundation.

Notes

1. Researchers attribute the decline in the 1990s to different causes, including reduced unemployment, increased policing, and a decline in and stabilization of illegal drug markets (Wintemute 2000). Declines in the last decade have not yet been well explained.

2. Homicide rates have been consistently higher in the southern and western regions of the United States. This is especially true for firearm homicides (CDC 2012a).

3. Measuring the availability of guns in the context of these homicides is more problematic, not least because researchers (Webster, Vernick, and Hepburn 2001, MAIG 2008) have shown that guns involved in these deaths often move across state lines from states with permissive gun laws to states with fewer guns and stronger laws.

4. Studies included in this review were those previously included in review articles by two of the authors, updated to include new articles meeting the criteria specified in these reviews which have appeared in the research literature since the time those review papers were published.

5. The study did not provide evidence about whether a gun from the home was used in any of the homicides. However, the idea that a gun in the home increased the risk of death was supported by several observations. First, the link between gun ownership and homicide was due entirely to a strong association between gun ownership and homicide by firearm; homicide by other means was not significantly linked to having a gun in the home. Second, gun ownership was most strongly associated with homicide at the hands of a family member or intimate acquaintance (i.e., guns were not significantly linked to an increased risk of homicide by non-intimate friends, unidentified persons, or strangers). Third, there was no evidence of a protective effect of keeping a gun in the home—even in the small subgroup of cases that involved forced entry.

References

- Azrael, D., J. C. Philip, and M. Miller. 2004. "State and local prevalence of firearms ownership measurement, structure, and trends." *Journal of Quantitative Criminology* 20 (1):43–62.
- Bailey, S., R. Flewelling, and D. Rosenbaum. 1997. "Characteristics of students who bring weapons to school." *Journal of Adolescent Health* 20 (4):261–270.
- Bailey, J. E., A. L. Kellerman, G. Somes, J. G. Banton, F. Rivara, and N. B. Rushforth. 1997. "Risk factors for violent death of women in the home." *Archives of Internal Medicine* 157 (7):777–782.

- Betz, M. E., C. Barber, and M. Miller. 2011. "Suicidal behavior and firearm access: Results from the second injury control and risk survey." *Suicide and Life-Threatening Behavior* 41 (4):384–391.
- Blumstein, A., and J. Wallman. 2000. *The crime drop in America*. New York: Cambridge University Press.
- Brent D. A. 2001. "Firearms and suicide." *Ann. N. Y. Acad. Sci.* 932:225–39.
- Brent, D. A., et al. 1988. "Risk factors for adolescent suicide: A comparison of adolescent suicide victims with suicidal inpatients." *Archives of General Psychiatry* 45 (6):581–588.
- Brent, D. A., J. A. Perper, C. J. Allman, G. Moritz, M. E. Wartella, and J. P. Zelenak. 1991. "The presence and accessibility of firearms in the homes of adolescent suicides: A case-control study." *JAMA* 266 (21):2989–2995.
- Brent, D. A., J. A. Perper, G. Moritz, M. Baugher, J. Schweers, and C. Roth. 1994. "Suicide in affectively ill adolescents: A case-control study." *Journal of Effective Disorders* 31 (3):193–202.
- Brent, D. A., J. A. Perper, G. Moritz, M. Baugher, J. Schweers, and C. Roth. 1993. "Firearms and adolescent suicide: A community case-control study." *American Journal of Diseases of Children* 147 (10):1066–1071.
- Campbell, J. C., D. Webster, J. Koziol-McLain, C. Block, D. Campbell, et al. 2003. "Risk factors for femicide in abusive relationships: Results from a multisite case control study." *American Journal of Public Health* 93 (7):1089–1097.
- CDC. 1997. Rates of homicide, suicide, and firearm-related death among children—26 industrialized countries. In *Morbidity and Mortality Weekly Report*. Centers for Disease Control and Prevention.
- CDC. 2007. Centers for Disease Control WISQARS injury mortality report. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.
- CDC. 2012a. Centers for Disease Control and Prevention, National Center for Health Statistics: Compressed Mortality File 1999–2009. Edited by CDC. CDC WONDER Online Database, compiled from Compressed Mortality File 1999–2009.
- CDC. 2012b. Surveillance for violent deaths—National Violent Death Reporting System, 18 states, 2012. Centers for Disease Control and Prevention.
- Conwell, Y., P. R. Duberstein, K. Connor, S. Eberly, C. Cox, and E. D. Caine. 2002. "Access to firearms and risk for suicide in middle-aged and older adults." *American Journal of Geriatric Psychiatry* 10 (4):407–416.
- Cook, P. J. 1979. "The effect of gun availability on robbery and robbery murder." In *Policy studies review annual*, edited by R. H. Haveman and B. B. Zellner, 743–781. Beverly Hills, CA: Sage.
- Cook, P. J., and H. L. John. 2002. "After the epidemic: Recent trends in youth violence in the United States" In *Crime and justice: A review of research*, ed. Michael Tonry, 117–153. Chicago: University of Chicago Press.
- Cook, P. J., and J. Ludwig. 1997. *Guns in America: National survey on private ownership and use of firearms* (NCJ 1654476). Washington, DC: U.S. Department of Justice.
- Cork, D. 1999. "Examining time-space interaction in city-level homicide data: Crack markets and the diffusion of guns among youth." *Journal of Quantitative Criminology* 15 (4):379–406.

- Cummings, P., T. D. Koepsell, D. C. Grossman, J. Savarino, and R. S. Thompson. 1997. "The association between the purchase of a handgun and homicide or suicide." *American Journal of Public Health* 87 (6):974–978.
- Dahlberg, L. L., R. M. Ikeda, and M. J. Kresnow. 2004. "Guns in the home and risk of a violent death in the home: Findings from a national study." *American Journal of Epidemiology* 160 (10):974–978.
- Grassel, K. M., G. J. Wintemute, M. A. Wright, and M. P. Romero. 2003. "Association between handgun purchase and mortality from firearm injury." *Injury Prevention* 9:48–52.
- Grossman, D. C., B. A. Mueller, C. Riedy, M. D. Dowd, A. Villaveces, J. Prodzinski, J. Nakagawara, J. Howard, N. Thiersch, and R. Harruff. 2005. "Gun storage practices and rise of youth suicide and unintentional firearm injuries." *JAMA* 293 (6):707–714.
- GSS. 2010. "General Social Survey."
- Hemenway, D., C. Barber, and M. Miller. 2010. "Unintentional firearm deaths: A comparison of other-inflicted and self-inflicted shootings." *Accident Analysis and Prevention* 42 (2):1184–1188.
- Hemenway, D., & Miller, M. (2000). "Firearm availability and homicide rates across 26 high-income countries." *Journal of Trauma, Injury, Infection, and Critical Care*, 49(6), 985–988.
- Hemenway, D., T. Shinoda-Tagawa, and M. Miller. 2002. "Firearm availability and female homicide victimization rates among 25 populous high-income countries." *Journal of the American Medical Women's Association* 57:1–5.
- Hepburn, M., M. Miller, D. Azrael, and D. Hemenway. 2007. "The US gun stock: results from the 2004 national firearms survey." *Injury Prevention* 13:15–19.
- Hepburn, L. M., and D. Hemenway. 2004. "Firearm availability and homicide: A review of the literature." *Aggression and Violent Behavior* 9:417–440.
- Ilgen, M. A., K. Zivin, R. J. McCammon, and M. Valenstein. 2008. "Mental illness, previous suicidality, and access to guns in the United States." *Psychiatric Services* no. 59 (2):198–200.
- Kellermann, A. L., and F. P. Rivara. 2012. "Silencing the Science on Gun Research." *JAMA* ():1–2. doi: 10.1001/jama.2012.208207.
- Kellermann, A. L., F. Rivara, N. B. Rushforth, J. Banton, D. T. Reav, J. Francisco, A. B. Locci, J. Prodzinski, B. B. Hackman, and G. Somes. 1993. "Gun ownership as a risk factor for homicide in the home." *New England Journal of Medicine* 329 (15):1084–1091.
- Kellermann, A. L., F. P. Rivara, G. Somes, D. T. Reav, J. Francisco, J. Banton, J. Prodzinski, C. Fligner, and B. B. Hackman. 1992. "Suicide in the home in relation to gun ownership." *New England Journal of Medicine* 327 (7):467–472.
- Killias, M. 1993. "International correlations between gun ownership and rates of homicide and suicide." *Canadian Medical Association Journal* 148 (10):1721–1725.
- Kolla, B. P., S. S. O' Connor, and T.W. Lineberry. 2011. "The base rates and factors associated with reported access to firearms in psychiatric inpatients." *General Hospital Psychiatry* 33 (2):191–196.
- Kubrin, C. E., and T. Wadsworth. 2009. "Explaining suicide among blacks and whites: How socio-economic factors and gun availability affect race-specific suicide rates." *Social Science Quarterly* (90):1203–1227.

- Kung, H. C., J. L. Pearson, and X. Lui. 2003. "Risk factors for male and female suicide decedents ages 15–64 in the United States: Results from the 1993 National Mortality Followback Survey." *Social Psychiatry and Psychiatric Epidemiology* 39 (8):419–426.
- MAIG (Mayors Against Illegal Guns). 2008. The movement against illegal guns in America.
- Miller, M., D. Azrael, and C. Barber. 2012. "Suicide mortality in the United States: the importance of attending to method in understanding population-level disparities in the burden of suicide." *Annual Review of Public Health* 33:393–408.
- Miller, M., D. Azrael, and D. Hemenway. 2001. "Firearm availability and unintentional firearm deaths." *Accident Analysis and Prevention* 33 (4):447–484.
- Miller, M., C. Barber, D. Azrael, D. Hemenway, and B. E. Molnar. 2009. "Recent psychopathology, suicidal thoughts and suicide attempts in households with and without firearms: Findings from the National Comorbidity Study Replication." *Injury Prevention* 15 (3):183–187.
- Miller, M., and D. Hemenway. 1999. "The relationship between firearms and suicide: A review of the literature." *Aggression and Violent Behavior* 4 (1):59–75.
- Miller, M., D. Hemenway, and D. Azrael. 2007. "State-level homicide victimization rates in the US in relation to survey measures of household firearm ownership, 2001–2003." *Social Science & Medicine* 64 (3):656–664.
- Miller, M., S. J. Lippmann, D. Azrael, and D. Hemenway. 2007. "Household firearm ownership and rates of suicide across the 50 states." *Journal of Trauma Injury, Infection and Critical Care* 62 (4):1029–1035.
- Nock, M. K., G. Borges, E. J. Bromet, C. B. Cha, R. C. Kessler, and S. Lee. 2008. "Suicide and suicidal behavior." *Epidemiology Reviews* 30 (1):133–154.
- NRC. 2005. National Research Council: Firearms and violence: A critical review. Washington, DC: National Academies Press.
- Oslin, D.W., C. Zubritsky, G. Brown, M. Mullahy, and A. Puliafico. 2004. "Managing suicide in late life: Access to firearms as a public health risk." *American Journal of Geriatric Psychiatry* 12 (1):30–36.
- Pickett, W., F. J. Elgar, F. Brooks, M. de Looze, and K. Rathman. 2013. "Trends and socioeconomic correlates of adolescent physical fighting in 30 Countries." *Pediatrics* 131 (1):18–26.
- Richardson, E. G., and D. Hemenway. 2011. "Homicide, suicide, and unintentional firearm fatality: Comparing the United States with other high-income countries, 2003." *Journal of Trauma Injury, Infection and Critical Care* 70 (1):238–243.
- SAS. 2007. "Completing the count: Civilian firearms: Annexe I: Seventy-nine countries with comprehensive civilian ownership data." In *The small arms survey: Guns in the city*, ed. Small Arms Survey Geneva. Cambridge, UK: Cambridge University Press.
- Shaffer, D., M. S. Gould, P. Fisher, P. Trautman, and D. Moreau. 1996. "Psychiatric diagnosis in child and adolescent suicide." *Archives of General Psychiatry* 53(4):339–348.
- Smith, T. W. 2000. 1999 National gun policy survey of the National Opinion Research Center: Research findings. Chicago, IL: National Opinion Research Center, University of Chicago.
- Sorenson, S. B., and K. A. Vittes. 2008. "Mental health and firearms in community-based surveys: Implications for suicide prevention." *Evaluation Review* 32 (3):239–256.

- van Kesteren, J., P. Mayhew, and P. Nieuwebeerta. 2001. Criminal victimization in seventeen industrialized countries: Key findings from the 2000 international crime victims survey. In *Netherlands Ministry of Justice: Research and Documentation Centre Netherlands*.
- Webster, D., J. Vernick, and L. Hepburn. 2001. "Relationship between licensing, registration, and other gun sales laws and the source state of crime guns." *Injury Prevention* 7 (3):184–189. doi: 10.1136/ip.7.3.184.
- Wiebe, D. J. 2003. "Homicide and suicide risks associated with firearms in the home: A national case-control study." *Annals of Emergency Medicine* 41 (6):771–782.
- Wintemute, G. J. 2000. "Guns and gun violence." In *The crime drop in America*, ed. A. Blumstein and J. Wallman. Cambridge: Cambridge University Press.
- Wintemute, G. J., C. A. Parham, J. J. Beaumont, M. Wright, and C. Drake. 1999. "Mortality among recent purchasers of handguns." *New England Journal of Medicine* 341 (21):1583–1589.

The Limited Impact of the Brady Act

Evaluation and Implications

Philip J. Cook and Jens Ludwig

Federal firearms law divides the population into two groups: those prohibited from legally possessing a firearm due to their criminal record or certain other disqualifying conditions and everyone else. The vast majority of the adult public is allowed to acquire and possess all the firearms they want, thus preserving the personal right to “keep and bear arms” that has been established by recent U.S. Supreme Court rulings.¹ But that right, like all rights, has limits. People with serious criminal records or severe mental illness may reasonably be deemed at such high risk of misusing firearms that public-safety concerns take precedence over gun rights. While in practice it is impossible to keep all members of high-risk groups disarmed in a gun-rich environment, a selective prohibition may cause some reduction in gun misuse and save enough lives to be worthwhile.

Philip J. Cook, PhD, is the ITT / Terry Sanford Professor of Public Policy and professor of economics and sociology at Duke University, and he is the co-director of the National Bureau of Economic Research working group on the economics of crime. Jens Ludwig, PhD, MA, is the McCormick Foundation Professor of Social Service Administration, Law and Public Policy at the University of Chicago, director of the University of Chicago Crime Lab, and co-director of the National Bureau of Economic Research working group on the economics of crime.

The effectiveness of this selective-prohibition approach may depend on how it is enforced. The two mechanisms in use to discourage disqualified people from obtaining guns are deterrence through the threat of criminal prosecution (“felon in possession” cases) and regulation of firearms transactions. The current regulatory framework was created by the Gun Control Act of 1968 (GCA), which required that those in the business of selling guns obtain a federal firearms license (FFL) and that interstate shipments of guns be limited to licensees. Anyone purchasing a gun from an FFL is required by the GCA to fill out a form 4473 stating that he or she did not have a felony conviction or other disqualifying condition, although under federal law dealers were not required to verify the information reported by the prospective buyer.

The GCA’s requirement was greatly strengthened by subsequent legislation, the Brady Handgun Violence Prevention Act, implemented in 1994. The Brady Act required that FFLs conduct a background check on would-be buyers—the buyer’s signature on a 4473 was no longer enough. This new regulation was enacted with high hopes of reducing gun violence, despite its limitations. Most gun crimes are committed with weapons that were not purchased from dealers, but rather acquired through off-the-books transactions. Such transactions are generally permitted and not regulated by the Brady Act. However, some disqualified individuals do attempt to buy guns from FFLs, and the *Brady* background checks have blocked over 2 million sales since the law was implemented (Bowling et al. 2010).

On March 2, 2000, President Bill Clinton declared at a news conference that “the Brady Bill is saving people’s lives and keeping guns out of the wrong hands,” a claim justified in part by the substantial number of people who had been denied handguns as a result of the law.² During the first five years of the Brady Act, 312,000 applications to purchase handguns from dealers (2.4% of the total) were denied due to a felony record or other disqualifying characteristic (Bowling et al. 2010). Other would-be buyers with criminal records may have been deterred from even attempting to buy a firearm. The logic is clear: Since guns are more lethal than knives and other likely substitutes, any reduction in criminal gun use due to *Brady* would likely translate into a net reduction in homicides (Zimring 1968, 1972).

The same year that President Clinton claimed success we published an evaluation of the Brady Act in the *Journal of the American Medical Association* (Ludwig and Cook 2000). Our conclusion was less positive—we found no evidence of a reduction in the homicide rate that could be attributed to

Brady. We also considered the possibility that *Brady* reduced the overall suicide rate, but found no discernible impact on that outcome either. In presenting these findings, we cautioned that our statistical method rested on certain untested (though in our judgment, reasonable) assumptions, and that our null results still left some room for the possibility that *Brady* had an effect, albeit small, and either positive or negative. Further, even if our null results are correct for the early years of *Brady*, they do not preclude the possibility that a different regulatory scheme might be more effective in achieving the purpose. Indeed, the Brady Act itself incorporated potentially important changes that were implemented in December 1998. While the initial “interim” phase, from 1994 to 1998, was limited to handgun purchases, the second “permanent” phase expanded the background check requirement to include purchasers of rifles and shotguns. Perhaps more importantly, the interim phase required a five-day waiting period from application to delivery of the handgun, while the permanent phase replaced the waiting period with a new system, known as the National Instant Criminal Background Check System (NICS). Our evaluation focused entirely on the interim phase.

In this essay we provide a summary of our evaluation, discussing its strengths and limitations, and then go on to consider two questions that are vital to the current debate: (1) What are the most important limitations of the current selective prohibition system?; and (2) How could this general approach be strengthened?

Background and Findings

James Brady, press secretary to President Reagan, was shot during an assassination attempt against the president in March 1981. Together with his wife, Sarah, Brady became a leader of the gun control movement, and through Handgun Control, Inc. worked for seven years to achieve passage of what became known as the Brady Handgun Violence Prevention Act. The first set of provisions was implemented in February 1994, requiring that FFLs conduct a background check and wait for five business days before transferring a handgun to a customer. Only 32 states were directly affected by these provisions, because the other 18 states and the District of Columbia already met the minimum requirements of the Act. In effect these provisions created a sort of natural experiment, with 32 states in the “change” or “treatment” condition, and the 18 no-change states serving as “controls.” Our evaluation took

advantage of this experiment-like setting to estimate the causal effect of the Brady Act on certain outcomes.

Our main outcome measure was the homicide rate from the Vital Statistics records. While other types of crime are also of interest, the data on homicides are more detailed and far more accurate than for the other violent crimes, such as robbery and assault. (The main limitation of the Vital Statistics data for our purposes is the lack of information on perpetrators.) We also analyzed the effects of the *Brady* regulations on suicide. The focus of our analysis for both homicide and suicide was on adult victims, and in particular for those 21 years of age and older. The primary rationale for this age limitation is that the Brady Act would logically have little or no effect on access to guns by those under 21; federal law sets 21 as the minimum age to purchase a handgun from an FFL, and the age of the customer was subject to check even before *Brady* by a requirement that he or she show identification. Of course, limiting the homicide outcome to adult victims does not provide exactly what we would like to have, namely rates of homicide *committed* by those age 21 or over; *Brady* regulations are aimed at the potential perpetrators rather than the victims. But in practice teenage killers select teenage victims, and few homicide victims aged 21 years or over are shot by perpetrators under 21 years of age (Cook and Laub 1998). It turns out that limiting the analysis to adults is not only logical given the nature of the intervention, it also enhances the validity of our evaluation method, since it helps avoid potential biases introduced by the volatility of juvenile homicides during our sample period that was associated with the rise and fall in crack-market activity (Blumstein 1995; Cork 1999).

The importance of having a control group for evaluating the effect of *Brady* on the “treatment” states’ homicide rates is that other factors were at play, and homicide rates were dropping nationwide in the 1990s. In particular, the national homicide rate dropped by 34% from 1990 to 1998. Most of the crime drop during the 1990s (which was by no means limited to homicide) has been attributed to causes that are unrelated to changes in firearm regulations. Among the factors that have been suggested to explain the crime drop of the 1990s are increased imprisonment and spending on police, the waning of the crack cocaine “epidemic” that began in the mid-1980s, and, more controversially, the legalization of abortion in the early 1970s (Blumstein and Wallman 2000; Levitt 2004; Cook and Laub 2002). In any event, an evaluation of the Brady Act based only on the trend in homicide rates in

the *Brady* treatment states would mistakenly attribute to the Brady Act the effects of all of the other forces that were driving crime rates down over the 1990s.

Our assumption that the 18 states that were not directly affected by the Brady Act provide a valid control group is supported by the remarkable similarity in pre-*Brady* trends in adult homicide rates. Evidently other causal factors did exert similar impacts on the *Brady* treatment and control states. Thus if the trends in homicide rates (and especially gun homicide rates) had diverged between the two groups after *Brady*, then it would be plausible to attribute that divergence to the new regulations introduced by the Act. Our evaluation approach is further supported by the fact that the law in question was exogenous to the individual states—there is no “self-selection” problem here, as might arise if we were evaluating laws that were changed by the act of individual state legislatures (perhaps in response to state-specific changes in crime).

A distinct concern in evaluating the effects of the Brady Act is that the new law may have reduced gun running from the treatment to control states, in which case comparing the two groups of states might understate the overall effects of the law (Weil 1997). The concern here is that homicide rates in the “control” states were in fact affected by the intervention. Some support for this concern comes from ATF trace data in Chicago showing that the fraction of crime guns in the city that could be traced to the *Brady* treatment states declined dramatically following implementation of the law (Cook and Braga 2001). However, the proportion of homicides in Chicago committed with guns did not change over this period, despite the substantial changes in gun-trafficking patterns (Cook and Ludwig 2003). One explanation of these results is that traffickers were able to substitute in-state sources for out-of-state sources at little extra cost. If correct, they suggest that while *Brady* did affect trafficking to the control states, the effect was not of much consequence for gun availability to those at risk of violence in those states.

Here are the specifics of our quantitative evaluation. We utilize a “difference in difference” approach that compares the pre- and post-*Brady* changes for the treatment and control groups. The econometric technique is panel regression analysis utilizing specification (1) below, where Y_{it} represents a mortality measure for state (i) in period (t), and X_{it} represents a set of control variables.³ The model includes separate dichotomous indicator variables for each state, d_p , to

capture unmeasured state-specific “fixed effects” that cause the level of violence to differ across states, a set of year indicator variables, g_t , that capture changes in the overall rate of violence in the U.S. conditional on the observed covariates, and the indicator variable T_{it} that is equal to 1 in the treatment states following implementation of the Brady Act and equal to 0 otherwise. From Vital Statistics data, we had available four years of post-*Brady* data (1994 to 1997). For comparability, we define the pre-*Brady* period as the four years prior to the law’s implementation (1990 to 1993).

$$Y_{it} = b_0 + b_1 X_{it} + b_2 T_{it} + d_i + g_t + e_{it} \quad (1)$$

Since state-specific fixed effects are included in the model, the key coefficient of interest (b_2) reflects the difference between the treatment and control states in the change in violence rates from the pre- to post-*Brady* periods. The coefficient b_2 captures any one-time shift in the rate of gun violence in the treatment versus control states around the time of the Brady Act, and should be negative if *Brady* reduced gun violence.

Equation (1) was estimated via weighted least squares, a technique that corrects for heteroskedasticity in the stochastic term by pre-multiplying the dependent and explanatory variables by the square root of the state’s population. We calculated Huber-White standard errors to adjust for the non-independence of observations from the same state.

The findings from this regression analysis are summarized in Table 2.1. We find no statistically discernible difference in homicide trends between the *Brady* (treatment) and non-*Brady* (control) states among people aged 21 and older. While our point estimates are negative, they are even more negative for non-gun homicide than for gun homicide (and in every case statistically insignificant). In this pattern of results we see no case for a causal effect of *Brady*. The 95% confidence interval for one version of our estimates ranges from an increase of 8% to a reduction of 13%.⁴

Of course the Brady Act may have affected outcomes other than homicide. In particular, the waiting period required during phase one of *Brady* may have slowed handgun acquisition by some people experiencing a suicidal impulse. As shown in Table 2.1, our analysis of suicide rates found some evidence that *Brady* may have reduced gun suicide rates among people aged 55 and older. However, these gains were at least partially offset by an increase in non-gun suicides (perhaps due to weapon substitution), so whether waiting periods reduced overall suicides among this age group is unclear.

Table 2.1 Effects of the Brady Act on homicide and suicide changes from pre- to post-Brady period in treatment relative to control states (Standard-error estimates in parentheses)

	Victims aged 21 and older	Victims aged 55 and older
Homicide (rate per 100,000)	-0.36 (0.64)	-0.09 (0.27)
Gun homicide rate	-0.14 (0.52)	0.05 (0.10)
Non-gun homicide rate	-0.22 (0.15)	-0.14 (0.20)
% homicides committed with gun	1.1 (1.0)	3.3 (2.4)
Suicide (rate per 100,000)	-0.12 (0.27)	-0.54 (0.37)
Gun suicide rate	-0.21 (0.19)	-0.92** (0.25)
Non-gun suicide rate	0.09 (0.13)	0.38* (0.20)
% suicides committed with gun	-0.3 (0.5)	-2.2** (0.9)

Source: Cook and Ludwig (2003). The original results reported in Ludwig and Cook (2000) were based on a data set with several minor errors which we subsequently corrected.

Note: The pre-Brady period is defined as 1990 to 1993 and post-Brady period as 1994 to 1997. Regressions are calculated by estimating equation (2) in text using state population as weights to adjust for heteroskedasticity.

**Statistically different from zero at the 5% p-value

*Statistically different from zero at the 10% p-value

How do we reconcile our findings of no detectable impacts on homicide with administrative records on the numbers of people denied handguns as a result of Brady background check requirements? About 2.4% of potential handgun buyers were denied handguns during the interim phase of the Brady Act as a result of background checks (Bowling et al. 2010). One explanation is that the type of person who is disqualified from legally buying a gun but shops at an FFL anyway tends to be at relatively low risk for misusing a gun (compared with other disqualified individuals). Data from California show that individuals who were denied purchase of a handgun due to a felony record have 23% fewer violent-crime arrests than those who have been arrested but not convicted for a felony, and thus were able to successfully purchase a handgun from an FFL (Wright, Wintemute and Rivara 1999). Yet the follow-up arrest rates for both groups are fairly low, and only around 3% of violent-crime arrests are for homicide (Wright and Wintemute 1999). Projecting the California data to the nation suggests that those 312,000 convicted felons who were denied a handgun in Brady states in the interim phase (from 1994 to 1998) would have committed about 60 fewer homicides as a result.

Discussion

Suppose that our null findings are correct and that the first phase of the Brady Act had little or no impact on homicide or suicide rates. What are the likely explanations, and what can we conclude about the possibility of saving lives through the Gun Control Act's ban on gun possession by certain high-risk groups?

The most prominent of the likely explanations is simply that by limiting the background-check requirement to sales by FFLs, the Brady Act's background-check requirement had no direct effect on the vast majority of transactions that provide criminals with guns. Surveys of prisoners in the 1980s show that only one-fifth obtained their guns directly from a licensed gun dealer (Wright & Rossi, 1994), even though at that time dealers in most states were not required to conduct background checks to verify the buyer's eligibility.⁵ Most crime guns are obtained from people who are not licensed FFLs through private transactions that are largely unregulated under existing federal law—that is, these crime guns are obtained in the off-the-books secondary gun market.

While this “private sale loophole” is the most compelling explanation for limited impact of the Brady Act, there are several other considerations that should be taken into account. First, a majority of adults who end up using a gun in crime are not disqualified from possessing a gun. Cook, Ludwig and Braga (2005) find that nearly three in five homicide offenders in Illinois in 2001 did not have a felony conviction within the 10 years prior to the homicide. Not that they had spotless records—only one-quarter of homicide offenders had not been arrested at least once during the 10 years prior to the homicide. Expanding the crime-related disqualification criteria to include, say, conviction of any violent misdemeanor (rather than the current disqualification, which is limited to felonies and misdemeanor domestic violence) could help in this respect.

Second, even if a disqualified person did seek to buy guns from an FFL after *Brady*, there is a good chance of success, simply because the relevant records are often incomplete or difficult to access. In recognition of this problem Congress established the National Criminal History Improvement Program (NCHIP) to provide grants and technical assistance to the states to improve the quality and immediate accessibility of criminal history records and related information. This federal investment resulted in an 83% increase in

the criminal records accessible for background checks by 2003 (Ramker 2006), thereby increasing the chance that a disqualified person would be identified as such through the NICS process. NCHIP has continued to provide modest funding for improving records and was supplemented in 2007 by a new program focused on assisting states to incorporate mental health records in the NICS system. A few states have made large gains in this respect, but most do not yet have a reliable system in place for submitting relevant records on severe mental illness or drug abuse (Mayors Against Illegal Guns 2011).

In sum, the limitations of the current system for screening firearms buyers to prevent gun crimes include, in order of importance, the private sales loophole, the fact that a large share of gun criminals are not disqualified, and the incomplete coverage of the databases utilized in the NICS. The same limitations apply if the screening system is intended to prevent gun suicides, although for suicides the relative importance of these three changes differs: those at risk of suicide may be more likely to obtain guns from FFLs (in which case the private-sales loophole would be less important) but much less likely to be disqualified under current standards.⁶

There has been considerable interest in closing the private-sales loophole by simply requiring that all gun sales, whether in the primary or secondary market, be subject to background checks. California has instituted such a system for firearms transactions, which must go through an FFL who then charges a fee for conducting the background check. Such a system, were it to be enforceable, would make it more difficult for disqualified people to obtain a gun. The fundamental question is how to enforce such a system. California requires that handguns be registered to their owner, which is useful in holding owners accountable for the disposition of their handguns. Even without a registration requirement, a universal background check system could be enforced in a variety of ways, including law-enforcement oversight of gun shows and undercover “buy and bust” operations by the police. Whether the California system is successful in reducing gun violence has not been established (but see Webster, Vernick, and Bulzacchelli 2009).

While the prospects are dim for decisive victories against gun violence through modest improvements in the regulation of gun transfers, the stakes are very high. Even just a one percent reduction in gun homicides and suicides would amount to over 300 lives saved—enough to justify a billion-dollar program by the usual reckoning of the value of life. The findings from our evaluation of the Brady Act certainly do not rule out the possibility that it saved

several times that many lives during each of the early years, and hence was worthwhile. Neither our evaluation method nor any other that we know of would be precise enough to detect such a proportionally small effect.

Acknowledgments

The original research reported in this essay was supported by a grant from the Joyce Foundation. The authors thank Bob Malme, Chris Clark, Heath Einstein, Meghan McNally, and Esperanza Ross for valuable research assistance, and Roseanna Ander, Steve Hargarten, David Hemenway, Arthur Kellermann, Debby Leff, Willard Manning, James Mercy, John Mullahy, William Schwab, Daniel Webster, Garen Wintemute, and Mona Wright for useful comments. All opinions and any errors are the authors'.

Notes

1. *District of Columbia v. Heller* (554 US 570 (2008)) established a personal right to keep a handgun in the home for self-defense purposes. *McDonald v. Chicago* (561 US 3025 (2010)) extended this right beyond federal jurisdiction to encompass state and local governments.

2. Brady Campaign to Prevent Gun Violence, 'Saving Lives by Taking Guns Out of Crime: The Drop in Gun-Related Crime Deaths Since Enactment of the Brady Law,' Executive Summary, downloaded from <http://www.bradycenter.org/xshare/Facts/brady-law-drop-in-crime.pdf>

3. In our reported specification, we controlled for state-level changes in the following factors that may influence rates of crime and violence: consumption of alcohol per capita (measured in gallons of ethanol), percentage of the population living in metropolitan areas, percentage of the population living below the official poverty line and income level per worker (in 1998 constant dollars) percentage who are African American, and the percentage of the population falling into 7 different age groups.

4. In this version we used the log form of the dependent variable in each of the regressions. The results using other specifications are similar.

5. For a more recent estimate of the percent of crime guns obtained directly from an FFL, see the essay by Webster, Vernick, McGinty, and Alcorn (in this volume).

6. In a personal communication dated January 14, 2013, Mallory O'Brien, Director of the Milwaukee Homicide Review Commission, reports evidence that suicides, unlike violent criminals, are quite likely to obtain their guns directly from an FFL. "From January 1, 2010 to December 31, 2012, firearms were recovered from 59 suicide victims in the City of Milwaukee. ATF eTrace data was used to determine: first purchaser, time to event and firearm type. ATF was able to successfully trace firearms

for 52 of the victims. In 31 (60%) cases the suicide victim purchased the firearm from a licensed firearm dealer. Ten of these victims who purchased the firearm from an FFL used the weapon within a year of the event.”

References

- Blumstein, Alfred. 1995. “Youth Gun Violence, Guns, and the Illicit-Drug Industry,” *Journal of Criminal Law and Criminology* 86: 10–36.
- Blumstein, Alfred and Joel Wallman, eds. 2000. *The Crime Drop in America*. New York: Cambridge University Press.
- Bowling, Michael, Ronald J. Frandsen, Gene A. Lauver, Allina D. Boutilier, Devon B. Adams. 2010. *Background Checks for Firearms: Statistical Tables*. Bureau of Justice Statistics Bulletin NCJ 231679.
- Brady Campaign to Prevent Gun Violence. 2002. “Saving Lives by Taking Guns Out of Crime: The Drop in Gun-Related Crime Deaths Since Enactment of the Brady Law,” Executive Summary, downloaded from www.bradycampaign.org/facts/research/savinglives.asp, accessed on April 17.
- Cook, Philip J. and Anthony A. Braga. 2001. “A Comprehensive Firearms Tracing: Strategic and Investigative Uses of New Data on Firearms Markets,” *Arizona Law Review* 43(2): 277–310.
- Cook, Philip J. and John H. Laub. 1998. “The Unprecedented Epidemic of Youth Violence” in *Crime and Justice: An Annual Review of Research*. Michael H. Moore and Michael Tonry, Editors (Chicago: University of Chicago Press), 26–64.
- Cook, Philip J. and John H. Laub. 2002. “After the Epidemic: Recent Trends in Youth Violence in the United States” in *Crime and Justice: A Review of Research*, edited by Michael Tonry. Chicago: University of Chicago Press, 117–153.
- Cook, Philip J. and Jens Ludwig. 2003. “The Effects of the Brady Act on Gun Violence” in Bernard E. Harcourt (ed.) *Guns, Crime, and Punishment in America*. New York: NYU Press: 283–298.
- Cook, Philip J., Stephanie Molliconi, and Thomas B. Cole. 1995. “Regulating Gun Markets.” *The Journal of Criminal Law and Criminology* 86(1): 59–92.
- Cork, Daniel. 1999. “Examining Time-Space Interaction in City-Level Homicide Data: Crack Markets and the Diffusion of Guns Among Youth.” *Journal of Quantitative Criminology* 15 (4): 379–406.
- Levitt, Steven D. 2004. “Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not.” *Journal of Economic Perspectives*, 18(1): 163–190.
- Ludwig, Jens and Philip J. Cook. 2000. “Homicide and suicide rates associated with the implementation of the Brady Handgun Violence Prevention Act.” *Journal of the American Medical Association* 284(5): 585–591.
- Mayors Against Illegal Guns. 2011. *Fatal Gaps: How missing records in the federal background check system put guns in the hands of killers*. http://mayorsagainstilllegalguns.org/downloads/pdf/maig_mimeo_revb.pdf
- Ramker, Gerard F. 2006. *Improving Criminal History Records for Background Checks, 2005*. Bureau of Justice Statistics Program Report NCJ 211485.

- Webster Daniel W, Jon S Vernick, and MT Bulzacchelli. 2009. "Effects of state-level firearm seller accountability policies on firearms trafficking." *Journal of Urban Health*; 86:525–537.
- Weil, Douglas S. 1997. *Traffic Stop: How the Brady Act Disrupts Interstate Gun Trafficking*. Washington, DC: Center to Prevent Handgun Violence.
- Wright, James D. and Peter H. Rossi. 1986. *Armed and Considered Dangerous: A Survey of Felons and Their Firearms*, New York: Aldine de Gruyter.
- Wright, Mona A., Garen J. Wintemute, and Frederick P. Rivara. 1999. "Effectiveness of Denial of Handgun Purchase to Persons Believed to Be at High Risk for Firearm Violence." *American Journal of Public Health* 89(1): 88–90.
- Wright, Mona A. and Garen J. Wintemute. 1999. Unpublished calculations. Davis, CA: Violence Prevention Research Program, University of California at Davis Medical Center.
- Zimring, Franklin E. 1968. "Is Gun Control Likely to Reduce Violent Killings?" *The University of Chicago Law Review* 35: 721–737.
- Zimring, Franklin E. 1972. "The Medium is the Message: Firearm Calibre as a Determinant of Death from Assault," *Journal of Legal Studies*. 1: 97–124.

Preventing Gun Violence Involving People with Serious Mental Illness

Jeffrey W. Swanson, Allison Gilbert Robertson,
Linda K. Frisman, Michael A. Norko, Hsiu-Ju Lin,
Marvin S. Swartz, and Philip J. Cook

The December 2012 tragedy at Newtown may soon settle in the collective memory of senseless rampages by unstable young men. But in the immediate aftermath, the question of what might have been done to prevent those 28 untimely deaths may galvanize the attention of policymakers desperate to respond. Shall we now hold mental health systems more accountable for failing

Jeffrey W. Swanson, PhD, is a professor in the Department of Psychiatry and Behavioral Sciences at Duke University School of Medicine. Allison Gilbert Robertson, PhD, MPH, is an assistant professor in the Department of Psychiatry and Behavioral Sciences at Duke University School of Medicine. Linda K. Frisman, PhD, is a research professor with the University of Connecticut School of Social Work and a senior research scientist with the Connecticut Department of Mental Health and Addiction Services. Michael A. Norko, MD, MAR, is an associate professor of psychiatry in the Law and Psychiatry Division at Yale University School of Medicine and director of Forensic Services for the Connecticut Department of Mental Health and Addiction Services. Hsiu-Ju Lin, PhD, is an associate research professor in the School of Social Work at the University of Connecticut and the principal data analyst for the Research Division at the Connecticut Department of Mental Health and Addiction Services. Marvin S. Swartz, MD, is a professor and head of the Division of Social and Community Psychiatry and director of Behavioral Health for the Duke University Health System. Philip J. Cook, PhD, is the ITT/Terry Sanford Professor of Public Policy and professor of economics and sociology at Duke University, and he is the codirector of the National Bureau of Economic Research working group on the economics of crime.

to find, treat, or confine people who incline to violence? Should we fault the loose enforcement of federal firearms restrictions, and a loophole-ridden system of background-checks, for failing to keep guns out of the hands of dangerous people? Does the problem lie with the laws themselves, with their blunt and archaic definitions that leave risky people untouched while sweeping up legions of the harmless?

Cogent answers to these questions—and any guidance for the reforms they might imply—must first acknowledge that a multiple-casualty shooting by a disturbed individual is a statistically rare and virtually unpredictable event (Nielssen et al. 2009; Swanson 2011). As such, a singular horrific incident plays an important but ambiguous role in the national conversation on gun violence and in the emergent policy discussion on what to do about it. On the one hand, gun policy scholars hope that the tragedy will focus public consciousness on the pervasive problem of firearms-related injury and mortality. On the other hand, mental health stakeholders and advocates reasonably worry that viewing the public health epidemic of firearm violence through the lens of a massacre of schoolchildren—an act nobody can imagine a sane person committing—is to misplace emphasis on an atypical and presumed psychopathology while ignoring the larger, complex, and more salient causes of a broad societal scourge (Appelbaum and Swanson 2010).

In this essay, we take as a starting place the inherent tension between public safety and civil rights in considering mental illness as a significant concern for firearms policy and law. This means grappling with the full range of social benefits and costs that may accrue in casting a wide net with a broad mesh to find a few dangerous people among the many with largely non-dangerous disorders of thought, mood, and behavior. Whatever the evidence suggests about people with mental illness and violence—and for most there is no linkage—they are often portrayed as dangerous in the mass media and perceived as such by the general public (Pescosolido et al. 1999). Fear stokes avoidance and social rejection, which in turn beget discrimination. And if they are no longer “one of us,” coercion, loss of privacy, and unwarranted deprivation of liberty become easy to justify. Ironically, this alienates people with serious but treatable mental health conditions and encumbers their desire to seek help with worry about what that might entail. A public policy of categorical exclusion based on the presumed dangerousness of one group may serve the public interest but not without overreaching and not without social cost.

We acknowledge that the exigencies of policymaking must sometimes outpace the evidence for what works. But it is also true that crisis-driven law is not always carefully deliberated and that the results can make things worse and be difficult to undo. Prudence, then, makes it crucial that available empirical research contribute as much as possible to the policymaking process, even if the existing research is messy, incomplete, and not wholly generalizable. In that spirit, we present new findings from an empirical study of the effectiveness of federal gun prohibitions in reducing the risk of violent crime in a Connecticut sample of more than 23,000 people with serious mental illness. Using merged administrative records from the state's public mental health and criminal justice systems for the years 2002 through 2009, our quasi-experimental analysis spans the periods before and after Connecticut began reporting mental health records to the National Instant Criminal Background Check System (NICS) in 2007. We consider implications of our research results for possible (and perhaps newly feasible) policy reforms to reduce gun violence.

In 1968, Congress passed the Gun Control Act, which categorically prohibited people from buying firearms if they had ever been involuntarily committed to a mental hospital or “adjudicated as a mental defective” (Simpson 2007). (The latter term is gratuitous and should be amended. It has almost no clinical meaning today, and many mental health stakeholders find the language stigmatizing and offensive.) As defined more specifically in the regulations, the exclusion covers people who have been determined by an authoritative legal process to be dangerous or incompetent to manage their own affairs due to a mental illness. It also covers individuals found incompetent to stand trial or acquitted by reason of insanity.

The legacy of the 1968 Gun Control Act prohibitions remains with us today, long after civil commitment reforms and deinstitutionalization have run their course, radically reducing and reshaping the ranks of the involuntarily committed (Appelbaum 1994; Fisher and Grisso 2010). The categories of exclusion were encoded in federal regulations and retained in the 1994 Brady Violence Prevention Act, which instituted background checks—now increasingly conducted through the NICS—to screen out prohibited persons who may attempt to buy guns from a licensed gun dealer. The mental health prohibitions, in particular, are based on a set of assumptions that may have sounded reasonable 45 years ago, but today invite careful scrutiny in light of voluminous research evidence that has accumulated over the ensuing decades.

The suspect assumptions are these: that serious mental illnesses—of the sort that landed people in mental hospitals against their will—were strongly and causally associated with risk of violent behavior; that people with these dangerous mental health conditions will inevitably come to the attention of psychiatrists, who could then reliably discern the risk of violence and confine the appropriate patients to a mental hospital; that, once discharged, involuntarily treated psychiatric patients will always carry with them some risk of relapse to their dangerous mental health conditions and, thus, should be categorically prohibited from obtaining firearms; and, finally, that the law could effectively deter prohibited individuals from purchasing firearms from a licensed gun dealer—either because they would not try to buy a gun or because they would truthfully disclose their gun-disqualifying mental health histories in the attempt and, thus, be stopped. In order for the logic of the law to work effectively, *all* of these assumptions had to hold true; they were links in a chain of prevention. As it turned out, all of the assumptions were flawed.

Subsequent epidemiological research showed that mental illness contributes little to population violence over all (Fazel and Grann 2006; Swanson 1994; Van Dorn, Volavka, and Johnson 2012). The very small proportion of people with mental illnesses who are inclined to be dangerous often do not seek treatment before they do something harmful; they therefore do not acquire a gun-disqualifying record of mental health adjudication (or a criminal record, either) that would show up in a background check. Psychiatrists, using clinical judgment, cannot accurately foresee which patients will be violent (Lidz, Mulvey, and Gardner 1993) and commit many patients for reasons unrelated to violence risk. States vary widely in commitment criteria and the dangerousness standards that underlie them (Fisher and Grisso 2010). The federal background checks only affect persons who buy guns through a federally licensed gun dealer, while a substantial proportion of firearms transfers are private transactions (Cook and Ludwig 1997). And many people have access to guns in the home, even if they would not legally be able to purchase a gun (North Carolina State Center for Health Statistics 2001).

Some advocates believe the answer to preventing gun rampages by disturbed individuals lies in extending the reach of states' reporting to the NICS (Mayors Against Illegal Guns 2011). Unfortunately, there is no evidence to suggest that merely filling the NICS with more records of people with gun-disqualifying mental health histories would have any measurable impact on reducing firearm violence in the population or, for that matter, on preventing

mass shootings. Indeed, there would seem to be plenty of circumstantial evidence to the contrary. Still, what has been missing is a direct empirical evaluation of the law and policy in a single state, using longitudinal individual-level outcome data that would enable us to compare results for people with serious psychiatric disorders who have been subjected to the law's strictures and exposed to the NICS-reporting policy with those who have not. What follows is a report of the findings of such a study in Connecticut.

Effectiveness of Firearms Prohibitions in Reducing Violence among People with Serious Mental Illness in Connecticut, 2002–2009: Findings from a New Research Study

Connecticut began reporting mental health records to the NICS in early 2007. The Department of Public Safety is responsible for forwarding to the NICS all data regarding gun-prohibited persons. This now occurs by automatic transfer of gun-disqualifying mental health records through a “black box” system, so that confidential psychiatric records are not released to anyone outside of the state mental health authority. The state uploaded 3,062 mental health records to NICS in its first year of reporting, and by 2013 nearly 14,000 records had accumulated in the database. Presumably, the persons whose records were newly made available to the gun background check system had subsequently diminished access to new guns; insofar as they might otherwise have acquired and used guns to commit violent crimes, their risk of committing a violent crime should also have diminished. What has been the impact, if any, in reduced violent crime by gun-disqualified persons with serious mental illness in the state? Our study addressed that question.

Data

Administrative records for adults with serious mental illness spanning 8 years were assembled and merged from Connecticut's public mental health and criminal justice agencies. All research activities involving the use of private health information for this study were reviewed and approved by the relevant jurisdictional Institutional Review Boards (IRBs). Merged records from January 2002 through December 2009 were assembled for 23,292 adults meeting the following criteria: (1) diagnosis of schizophrenia, bipolar disorder, or major depressive disorder and (2) hospitalization in a state psychiatric hospital—either voluntarily or involuntarily—during the study period. Two

study cohorts were constructed for comparison: persons with at least one of the four types of mental health adjudications reported to NICS (involuntary commitment, incompetent to stand trial, insanity acquittals, and conservatorships); and persons with at least one voluntary psychiatric hospitalization but no mental health adjudications. Data were structured in person-month format.

The sample is representative of the population of persons diagnosed with a serious mental illness who use services in the public mental health care system and who either have a history of mental health adjudication or have been hospitalized voluntarily in a state-operated facility for a mental health or co-occurring substance abuse disorder. As such, the sample would not generalize well to the population of all persons in the community who meet criteria for a mental illness or those who have less severe conditions not requiring inpatient treatment or who have private health insurance. The study sample is likely to have more severe and disabling psychiatric conditions, higher rates of substance abuse comorbidity, and a higher proportion who are involved with the criminal justice system. The base rate of violent crime in the sample is much higher than estimates of crime in community samples of persons with mental illness. Records of arrest include all available information but may not have captured lifetime arrests, especially for crime events occurring remotely in the individual's past.

Measures

The primary outcome variable was arrest for any violent crime (firearms-related or otherwise) within a given month. Violent crimes included murder, manslaughter, arson, kidnapping, sexual assault, other assault, robbery, and burglary. Ideally, we would have employed firearms charges as our primary outcome, but only arrests that resulted in conviction were available for analysis. Independent analysis from the Office of Legislative Research in Connecticut has shown that about 92% of firearms violations (e.g., illegal possession, transfer, use of a firearm in a crime, etc.) in the state do not result in convictions, due to plea bargaining and consolidation of charges (Reinhart 2007). Firearms conviction per se is thus an insensitive measure of gun-related crime. Instead, we used violent crime conviction as a proxy for gun use in crime. Violent crime is an important public health and safety outcome—arguably the distal goal of reducing the illegal use of guns—and the two variables are correlated.

Categorical variables were constructed to indicate whether a gun-disqualifying mental health record was present in a given month, whether a criminal disqualifier was in effect (record of felony conviction, misdemeanor

drug crime, or misdemeanor domestic violence offense), and whether the observation month occurred before or after NICS reporting began in Connecticut. Age, sex, race, primary psychiatric diagnosis, and co-occurring substance use diagnoses were included as covariates.

Analysis

We used multivariable categorical regression with repeated measures to estimate effects on violent crime events. The dependent variable was lagged to ensure proper temporal ordering and to avoid confounding the occurrence of gun-disqualifying events with outcome events. We tested the change in risk of violent offending from before to after NICS reporting began. We also tested, in separate regressions not shown, the differences in violent crime risk in people who were disqualified versus not disqualified, for the pre- and post-NICS periods. We controlled for covarying effects of individuals' coincident criminal disqualification and clinical and demographic characteristics as described above. We adjusted the analysis for time at risk by removing observations when individuals were hospitalized or incarcerated. We adjusted for the non-independence of intraperson observations over time.

Results

The mean age of participants was 36 years, and a majority were male (62.5%). The racial-ethnic composition of the sample was 62.7% non-Hispanic white, 18.4% African American, 16.6% Hispanic, and 2.3% other racial-ethnic groups. Regarding primary psychiatric diagnosis, 28.1% had schizophrenia, 30.6% had bipolar disorder, and 41.2% had depression. Across diagnostic groups, 85.9% had a co-occurring alcohol or illicit drug abuse problem at some time during the study period. The prevalence of substance abuse comorbidity is higher in this sample than would be found in a community-representative sample, due in part to the inclusion criterion of hospitalization in a state facility, which would tend to select individuals who have had more complex and severe psychiatric problems.

Table 1 shows the numbers of individuals and proportions of the sample that were disqualified from purchasing a firearm during any time in the study period by type of disqualification. About 40% of the sample was disqualified either for mental health adjudication or a criminal record. Disqualification due to a criminal record was far more common than losing gun rights due to a mental health record (34.9% vs. 7.0%). Of the 1,634 individuals in the study with a

Table 1. Prevalence of gun-disqualifying mental health and criminal records in sample of people with serious mental illness

Type of gun-disqualifying record	N	Percent
Involuntary civil commitment	1,086	(4.7%)
Incompetent to stand trial	464	(2.0%)
Not guilty by reason of insanity	29	(0.1%)
Conservatorship	152	(0.7%)
Any mental health disqualification	1,634	(7.0%)
Criminal disqualification	8,129	(34.9%)
Any criminal or mental health disqualification	9,246	(39.7%)
Both criminal and mental health disqualification	512	(2.2%)
Not disqualified	14,046	(60.3%)

mental health disqualification, 512 (313%) were dually disqualified on the basis of a criminal record. The large majority (93.7%) of the participants who were convicted of a gun-disqualifying crime during the study period were never involuntarily committed or otherwise disqualified due to a mental health record.

A substantial proportion of the sample (39.0%) was convicted of a violent crime at some time during the 8-year study period. The proportion of these crimes that involved use of guns is unknown, but 4% of the sample received a conviction specifically on a gun charge, such as illegal possession of a firearm. Table 2 shows the unadjusted frequencies of violent crime events as a proportion of the person-month observations available for analysis, by status of disqualification from firearms, for observations before and after NICS reporting began. In the full sample, there was a small decline in the estimated annualized rate of violent crime associated with NICS reporting in those with a mental health disqualification—from 7.8% to 6.5%, a proportional decline of 17%. In the subgroup of observations without any criminal disqualifications, the corresponding decline was greater—from 6.7% before NICS to 3.2% after NICS, a proportional decline of 53%. These unadjusted results are consistent with a NICS reporting effect, although they do not prove a causal relationship. An appropriate quasi-experimental test of statistical significance requires a robust multi-variable analysis.

Table 3 displays the multivariable regression analysis for the full sample. Having a gun-disqualifying criminal record did not reduce the likelihood of

Table 2. Unadjusted frequencies of violent crime by gun-disqualifying mental health status and NICS policy exposure (person-month level of analysis)

	N person- months	Number of violent crime months	Percent of person- months with violent crime	Estimated annualized percent of group with violent crime
FULL SAMPLE ¹				
Gun-disqualifying mental health record and NICS policy exposure				
Legally disqualified, before NICS reporting began	44,345	289	0.65	7.8
Legally disqualified, after NICS reporting began	51,254	278	0.54	6.5
Not legally disqualified, before NICS reporting began	1,314,007	7,066	0.54	6.5
Not legally disqualified, after NICS reporting began	778,678	3,776	0.48	5.8
<i>Total</i>	2,188,284	11,409	0.52	6.3
NOT-CRIMINALLY-DISQUALIFIED SUBSAMPLE ²				
Gun-disqualifying mental health record and NICS policy exposure				
Legally disqualified, before NICS reporting began	34,842	194	0.56	6.7
Legally disqualified, after NICS reporting began	35,248	93	0.26	3.2
Not legally disqualified, before NICS reporting began	1,128,574	5,552	0.49	5.9
Not legally disqualified, after NICS reporting began	537,325	1,753	0.33	3.9
<i>Total</i>	1,735,989	7,592	0.44	5.2

¹ Includes all person-months with community tenure; months spent hospitalized or incarcerated were removed from analysis.

² N=452,292 person-month observations were removed for the subsample analysis due to a gun-disqualifying criminal history.

Table 3. Adjusted odds ratios for monthly violent crime associated with legal restrictions on firearms access for people with serious mental illness in Connecticut from 2002-2009, before and after initiation of state policy of reporting gun-disqualifying mental health records to the National Instant Check System

	Adjusted Odds Ratio	95% Confidence Interval	Statistical Significance
Gun-disqualifying criminal record			
No criminal disqualification [reference category]	[1.00]		
Criminal disqualification	1.60	(1.52 - 1.68)	***
Gun-disqualifying mental health record and NICS policy exposure			
Legally disqualified, before NICS reporting began [reference category]	[1.00]		
Legally disqualified, after NICS reporting began	0.92	(0.76 - 1.13)	ns
Not legally disqualified, before NICS reporting began	0.76	(0.65 - 0.88)	***
Not legally disqualified, after NICS reporting began	0.78	(0.67 - 0.91)	***
Primary psychiatric diagnosis			
Major depression [reference category]	[1.00]		
Schizophrenia	0.90	(0.84 - 0.96)	***
Bipolar disorder	1.13	(1.07 - 1.20)	**

Substance abuse

No co-occurring alcohol or illicit drug use disorder [reference category]	[1.00]	
Any co-occurring alcohol or illicit drug use disorder	2.93	(2.57 - 3.34) ***

Demographic characteristics

Age in years	0.98	(0.97 - 0.98) ***
Sex		
Female [reference category]	[1.00]	
Male	2.00	(1.90 - 2.14) ***
Race/ethnicity		
Non-hispanic white [reference category]	[1.00]	
Black	1.77	(1.67 - 1.88) ***
Hispanic	1.20	(1.11 - 1.26) ***
Other race/ethnicity	0.41	(0.29 - 0.58) ***

Analytic model specifications: General estimating equations (GEE) logistic regression for repeated measures with a lagged dependent variable, controlling for time and adjusting for non-independence of intra-person observations.
 N=2,187,732 person-months observations

Statistical significance: ns - not significant; ***p<0.001;

future violent crime but rather increased the likelihood of a future violent offense by a factor of 1.6. The odds ratios for violent crime were significantly lower for people with no mental health adjudications, compared with those who were disqualified in the pre-NICS period. Among all those who were disqualified, the odds of violent crime did not significantly decline after NICS reporting began. The model also shows that violent crime was associated with having a substance use disorder, being younger, male, of African American or Hispanic background, and having bipolar disorder versus depression. These tend to be factors associated with crime in the population without mental disorders, assuming that racial-ethnic minority status is functioning here as a proxy indicator of social and economic disadvantage, which we did not measure directly. Bipolar disorder was positively associated with violent crime compared with depression. Schizophrenia was negatively associated with violent crime compared with depression (a finding also reported in the MacArthur Violence Risk Study; Monahan et al. 2001).

Table 4 shows the same analysis for the sample that was uniquely susceptible to the mental-health-related strictures in the federal law and the corresponding NICS reporting policy in Connecticut, without the potentially confounding effect of criminal history on violent crime recidivism. In this analysis, all of the observations were removed for any person-months in which an individual had a criminal disqualification in effect. This model shows a significant result of reduced violent offending among those with a disqualifying mental health record after NICS reporting began. The likelihood of violent crime was lower by a factor of 0.69 among those disqualified in the post-NICS-reporting period compared with those in the pre-NICS period. Indeed, the likelihood of violent crime in disqualified individuals whose records were reported to NICS was reduced to about the same level as seen in people who had never been disqualified. However, in groups who were never disqualified, the odds ratios for violent crime were approximately the same before and after the NICS policy was implemented—0.65 versus 0.62—suggesting, as would be expected, that NICS reporting did not affect people with no record to report to NICS.

Discussion and Implications for Policy

Considering our study population as a whole, we find little evidence that that Brady Act prohibitions serve to reduce the risk of violent crime. Indeed, having a gun-disqualifying criminal record serves as marker for significantly *in-*

creased risk of committing a future violent crime. To the extent that guns were involved in the commission of these crimes by people who could not legally buy a gun, it is clear that the perpetrators did not need to patronize a federally licensed gun dealer and undergo a background check; other ways, means, and suppliers abound for those willing to exploit them.

However, considering separately the subgroup of people with serious mental illness who do not have criminal records, our data seem to suggest that the Brady Law background checks can have some positive effect, if enforced. In those with a gun-disqualifying mental health record, risk of violent criminal offending declined significantly after Connecticut began reporting gun-disqualifying mental health records to the NICS.

These findings do not prove a causal relationship between the background check system and reduced violent crime. There may be other explanations, for example, that post-2007 improvements in the mental health and criminal justice system specifically affected people with gun-disqualifying mental health adjudications, resulting in improved treatment outcomes and a concomitant lower risk of criminal offending. The study has other limitations. We used violent crime as a proxy measure for gun use in crime. The research was conducted in a single state, and the findings may not generalize well to other states.

We conclude that the existing federal criteria for mental health prohibitions on firearms are far from perfect—they tend to be both overinclusive and underinclusive—but they are indeed correlated with increased risk of violent crime in this study. And here is at least some evidence, from one state, that having a mental health adjudication record archived in the NICS can significantly reduce risk of a first violent crime. Achieving comprehensive state reporting of mental health records to NICS may thus help reduce violent crime that is facilitated by guns and, thus, improve public safety.

However, this measured step will not prevent gun violence by dangerous individuals who today can easily skirt the background check system to obtain a firearm. It does nothing to prevent disqualified persons from using the guns they may already have. And even where it appears to work, the policy can affect only a small proportion of the population of persons with serious mental illness, because the base rate of mental health adjudication in Connecticut (as many states) is very low. Only about 7% of the sample had any disqualifying mental health adjudication, and an even smaller proportion—5%—were uniquely disqualified on the basis of a mental health history without also being

Table 4. Adjusted odds ratios for first violent crime associated with legal restrictions on firearms access for people with serious mental illness in Connecticut from 2002-2009, before and after initiation of state policy of reporting gun-disqualifying mental health records to the National Instant Check System: SUBSAMPLE WITH NO PRE-EXISTING FELONY CONVICTION OR OTHER GUN DISQUALIFYING CRIMINAL RECORD

	Adjusted Odds Ratio	95% Confidence Interval	Statistical Significance
Gun-disqualifying mental health record and NICS policy exposure			
Legally disqualified, before NICS reporting began [reference category]	[1.00]		
Legally disqualified, after NICS reporting began	0.69	(0.57 - 0.82)	***
Not legally disqualified, before NICS reporting began	0.65	(0.54 - 0.79)	**
Not legally disqualified, after NICS reporting began	0.62	(0.46 - 0.83)	***
Primary psychiatric diagnosis			
Major depression [reference category]	[1.00]		
Schizophrenia	0.80	(0.74 - 0.86)	***
Bipolar disorder	1.05	(0.98 - 1.13)	ns
Substance abuse			
No co-occurring alcohol or illicit drug use disorder [reference category]	[1.00]		
Any co-occurring alcohol or illicit drug use disorder	3.08	(2.68 - 3.54)	***

Demographic characteristics

Age in years	0.98	(0.97 - 0.98)	***
Sex			
Female [reference category]	[1.00]		
Male	2.18	(2.04 - 2.34)	***
Race/ethnicity			
Non-hispanic white [reference category]	[1.00]		
Black	1.89	(1.76 - 2.03)	***
Hispanic	1.30	(1.21 - 1.41)	***
Other race/ethnicity	1.26	(0.24 - 0.54)	***

Analytic model specifications: General estimating equations (GEE) logistic regression for repeated measures with a lagged dependent variable, controlling for time and adjusting for non-independence of intra-person observations.

N=1,735,437 person-months observations

Statistical significance: ns - not significant, ** p<0.01; ***p<0.001;

disqualified on the basis of a criminal history. In the non-criminally-disqualified subsample, those with a mental health disqualifier accounted for 3.0% of the sample and 3.4% of the violent crime. In the post-NICS period, they accounted for 6.2% of the sample and 5.0% of the violent crime. In contrast, 96% percent the crimes were committed by individuals who did not have a mental health disqualifier in effect, at least not at the time of the offense. These proportions suggest that background checks to enforce the federal mental health prohibitions—even if they are completely effective—will have a very small impact on overall violent crime in persons with serious mental illness; most of those at risk are unaffected by the law.

Revisions to the outdated federal criteria for mental health prohibitions on guns are needed. Minimum standards should be both *efficient* in prohibiting dangerous people from accessing guns and *fair* in preserving the rights of those who are not dangerous. Ideally, a balancing of safety and rights should inform more practical and less onerous rules for denying firearms rights to persons with mental illness who are dangerous, and the same balancing should inform parallel criteria for timely restoration of rights to persons with the mental illness who are no longer dangerous. Most important, then, changes to the prohibited category standards should focus on individual dangerousness, rather than relying on a presumed correlation between violence risk and membership in a category of persons with a mental health adjudication record, irrespective of its remoteness or the circumstances besides dangerousness that might have required it.

Innovative models of gun disqualification exist at the state level and could provide some guidance, at least in principle, for a more rational federal minimal standard. Indiana’s “dangerous persons” law (Parker 2010), for example, is not tied to involuntarily commitment or even necessarily to having a diagnosis of mental illness but rather to a determination of dangerousness. In addition, the law focuses on removing current access to guns rather than merely foreclosing the future purchase of a new gun. The Indiana law allows clinicians or the police to take steps to have firearms removed without a warrant from individuals who are assessed to pose a danger to themselves or others (Parker 2010). Another promising approach worthy of consideration is California’s law that allows seizure of guns from individuals with mental illness who are detained for dangerousness in a 72-hour hold, pending a judicial hearing in 14 days (Simpson 2007). The point of the law, in both cases, is to take a public health and safety approach to more accurately identify people

who pose an appreciable risk of harming themselves or others instead of apply a broad categorical exclusion that is both insensitive and nonspecific as a practical index of gun violence risk.

Our study results suggest that, among people with mental illness who have a history of criminal offending and involvement with the justice system, existing law and policy designed to prevent access to firearms through federally licensed gun dealers is likely to be of limited effectiveness. Efforts to prevent gun violence in known criminal offenders with mental illness should also focus on reducing socially determined criminogenic risk factors; improving community-based mental health outcomes; and decreasing criminal recidivism in mentally ill offenders through targeted programs such as mental health courts, jail diversion, and community reintegration services for persons with mental illness who have been incarcerated (Monahan and Steadman 2012; Swanson 2010). Added to those measures, we should surely advocate for a range of population-based, gun-safety reforms that remain possible within constitutional limits.

Finally, a word about what might be considered the “elephant in the room” for a serious discussion of mental illness and firearm mortality: it is not homicide but suicide. When we bring suicide into the picture of gun violence, mental illness legitimately becomes a strong vector of concern; it should become an important component of effective policy to prevent firearm violence. Suicides account for 61% of all firearm fatalities in the United States—19,393 of the 31,672 gun deaths recorded in 2010 (Centers for Disease Control and Prevention 2013). Suicide is the third leading cause of death in Americans aged 15 to 24, perhaps not coincidentally the age group when young people go off to college, join the military, and experience a first episode of major mental illness. The majority of suicide victims had identified mental health problems and a history of some treatment. “How did they get a gun?” is an important question to answer. “Where was the treatment, and why did it fail?” may be even more important.

Depression is the particular psychiatric illness most strongly associated with suicide. Social disadvantage plays a role both in the etiology of depressive illness and disparities in its treatment. Depression is not, however, a disorder that gets most individuals a gun-disqualifying record of involuntarily commitment. In other words, people suffering from the one mental health condition that is most closely and frequently linked to suicidality are unlikely to show up in a gun background check. Even if every state were to report all of its records of mental health adjudications to the NICS, this “gap” would not

close. But reporting to the authorities everyone who makes a suicide threat is probably not a good idea, either; it could merely drive people away from the treatment they need. Arguably, though, better access to evidence-based treatment for depression—particularly for low-income people, the elderly, and the unemployed (not to mention college students and returning veterans)—might prevent more firearm fatalities than would relying solely on improved NICS reporting to keep guns out of the hands of dangerous people.

acknowledgment

Funding for the research presented in this essay was provided by a grant from the National Science Foundation, with additional support from the Robert Wood Johnson Foundation Program on Public Health Law Research.

References

- Appelbaum, Paul. 1994. *Almost a Revolution: Mental Health Law and the Limits of Change*. New York: Oxford University Press.
- Appelbaum, Paul S., and Jeffrey W. Swanson. 2010. "Gun laws and mental illness: How sensible are the current restrictions?" *Psychiatric Services* 61: 652–654.
- Bonnie, Richard J., James S. Reinhard, Phillip Hamilton, and Elizabeth L. McGarvey. 2009. *Mental Health System Transformation After The Virginia Tech Tragedy*. *Health Affairs* 28: 793–804.
- Centers for Disease Control and Prevention. 2013. *Injury Prevention & Control: Data & Statistics Web-based Injury Statistics Query and Reporting System (WISQARSTM)*. Fatal Injury Data and Nonfatal Injury Data. <http://www.cdc.gov/injury/wisqars/index.html>
- Cook, Philip J., and Jens Ludwig. 1997. "Guns in America: National Survey on Private Ownership and Use of Firearms." National Institute of Justice, Research in Brief, Washington, DC: Department of Justice. <http://www.ncjrs.gov/pdffiles/165476.pdf>
- Fazel, Seena, and Martin Grann. 2006. "The Population Impact of Severe Mental Illness on Violent Crime." *The American Journal of Psychiatry* 163: 1397–1403.
- FBI. 2013. <http://www.fbi.gov/about-us/cjis/nics>
- Fisher, William, and Thomas Grisso. 2010. "Commentary: Civil Commitment Statutes—40 Years of Circumvention." *The Journal of the American Academy of Psychiatry Law* 38(3): 365–368.
- Lidz, Charles W., Edward P. Mulvey, and William Gardner. 1993. "The Accuracy of Predictions of Violence to Others." *The Journal of American Medical Association* 269: 1007–1011.

- Mayors Against Illegal Guns. 2011. "Fatal Gaps: How Missing Records in the Federal Background Check System Put Guns in the Hands of Killers." http://www.mayorsagainstillegalguns.org/downloads/pdf/maig_mimeo_revb.pdf
- Monahan, John, and Henry J. Steadman. 2012. "Extending Violence Reduction Principles to Justice-Involved Persons with Mental Illness." In *Applying Social Science to Reduce Violent Offending*, edited by Joel A. Dvoskin, Jennifer L. Skeem, Raymond W. Novaco, and Kevin S. Douglas, 245–261. New York: Oxford University Press.
- Monahan, John, Henry J. Steadman, Eric Silver, et al. 2001. *Rethinking Risk Assessment: The MacArthur Study of Mental Disorder and Violence*. New York: Oxford University Press.
- Nielsen, Olav, Dominique Bourget, Taina Laajasalo, et al. 2009. "Homicide of Strangers by People with a Psychotic Illness." *Schizophrenia Bulletin* 35: 1012–1021.
- Norko, Michael A., and Victoria M. Dreisbach. 2008. Letter to the Editor. *Journal of the American Academy of Psychiatry and the Law* 36: 269.
- North Carolina State Center for Health Statistics Behavioral Risk Factor Surveillance System. 2001. <http://www.schs.state.nc.us/schs/brfss/2001/us/firearm3.html>
- Parker, George. 2010. "Application of a Firearm Seizure Law Aimed at Dangerous Persons: Outcomes from the First Two Years." *Psychiatric Services* 61: 478–482.
- Pescosolido, Bernice A., John Monahan, and Bruce G. Link, et al. 1999. "The Public's View of the Competence, Dangerousness, and Need for Legal Coercion of Persons with Mental Health Problems." *American Journal of Public Health* 89: 1339–1345.
- Price, M., and D. M. Norris. 2008. "National Instant Criminal Background Check Improvement Act: Implications for Persons with Mental Illness." *Journal of the American Academy of Psychiatry and the Law* 36: 123–130.
- Reinhart, Christopher. 2007. "Case Statistics for Firearms Violations." OLR Research Report, 2007-R-0442, Connecticut Office of Fiscal Analysis Database. <http://worldcat.org/arcviewer/1/CZL/2007/08/02/0000070154/viewer/file1.html26782.75>
- Simpson, Joseph R. 2007. "Bad Risk? An Overview of Laws Prohibiting Possession of Firearms by Individuals with a History of Treatment for Mental Illness." *Journal of the American Academy of Psychiatry and the Law* 35: 330–338.
- Skeem, Jennifer, and John Monahan. 2011. "Current Directions in Violence Risk Assessment." *Current Directions in Psychological Science* 20: 38–42.
- Swanson, Jeffrey W. 1994. "Mental Disorder, Substance Abuse, and Community Violence: An Epidemiological Approach." In *Violence and Mental Disorder*, edited by J. Monahan and H. Steadman, 101–136. Chicago: University of Chicago Press.
- Swanson, Jeffrey W. 2010. "Explaining Rare Acts of Violence: The Limits of Population Research Evidence." *Psychiatric Services* 62: 1369–1371.
- Swanson, Jeffrey W. 2011. "Preventing the Unpredicted: Managing Violence Risk in Mental Health Care." *Psychiatric Services* 59: 191–193.
- Van Dorn, Richard A., Jan Volavka, and Norman Johnson. 2012. "Mental Disorder and Violence: Is There a Relationship beyond Substance Use?" *Social Psychiatry and Psychiatric Epidemiology* 47(3): 487–503.

This page intentionally left blank

Evidence for Optimism

Policies to Limit Battersers' Access to Guns

April M. Zeoli and Shannon Frattaroli

In 2010, at least 1,082 women and 267 men were killed by their intimate partners. Fifty-four percent of these victims were killed with guns (United States Department of Justice 2012). For at least the past twenty-five years, more intimate partner homicides (IPHs) have been committed with guns than with all other weapons combined (Fox and Zawitz 2009). Furthermore, women are more likely to be killed by an intimate partner than by any other offender group (Fox and Zawitz 2009; Moracco, Runyan, and Butts 1998). The evidence is clear: when a woman is killed, it is most likely to be at the hands of an intimate partner with a gun.

In this essay, we focus on policies to limit batterers' access to guns, the evidence that supports these policies, and evidence for improvement in their implementation and expansion. We begin with an overview of the evidence about gun usage in domestic violence and how batterers become known to

April M. Zeoli, PhD, MPH, is an assistant professor in the School of Criminal Justice at Michigan State University. Shannon Frattaroli, PhD, MPH, is an associate professor at the Johns Hopkins Bloomberg School of Public Health.

the justice system. Second, we discuss existing legislation to remove guns from batterers. We then present promising evidence about policies to limit batterers' access to guns and their relationship to IPH, and we discuss implementation and enforcement of those laws. We conclude with federal gun policy recommendations to prevent IPH.

Domestic Violence and Guns: A Brief Overview

Guns are the weapons of choice for IPH perpetrators. Domestic violence involving a gun is more likely to result in homicide than domestic violence that involves a knife, other weapon, or bodily force (Saltzman et al. 1992). Indeed, the risk of homicide increases when a violent intimate has access to a gun (Bailey et al. 1997; Kellerman et al. 1993), with one study estimating a fivefold increased risk (Campbell et al. 2003). Intimate partners are more likely to use guns to kill their female victims than are non-intimate partners who kill women (Arbuckle et al. 1996; Moracco et al. 1998). Moreover, there is growing evidence documenting the role of guns in nonfatal domestic violence perpetrated by men against women (Moracco et al. 2006; Rothman et al. 2005; Sorenson and Wiebe 2004; Tjaden and Thoennes 2000). These nonfatal uses of guns may warn of future fatal violence: batterers' use of weapons to threaten has been associated with a fourfold increased risk of homicide (Campbell et al. 2003).

There is a history of male-to-female domestic violence in the relationships of most women and men killed by their intimate partners (Bailey et al. 1997; Campbell et al. 2003; McFarlane et al. 1999; Smith, Moracco, and Butts 1998), making domestic violence against the female partner the leading risk factor for IPH (Campbell et al. 2007). Stalking may also be an important risk factor for IPH (Campbell et al. 2003), with one study reporting that 76% of homicide victims and 85% of attempted homicide victims were stalked by their abusers prior to the incident (McFarlane et al. 1999). Often this abuse is known to the authorities. Roughly half of women killed by their intimate partners had contact with the justice system to report violence and stalking within the year preceding their murders. These women reported domestic violence/stalking to the police, had their assailants arrested, filed criminal charges, and obtained domestic violence restraining orders (DVROs) against their batterers (McFarlane et al. 1999; Moracco, Runyan, and Butts 1998).

When women seek assistance from the justice system, they create opportunities for intervention that may prevent future violence and homicide. If

equipped with a comprehensive set of domestic violence laws, law enforcement may be better positioned to safeguard victims and save more lives. Laws that restrict batterers' access to guns are an essential component of any comprehensive approach to address domestic violence.

Current Federal Law: Responding to the Risks

Two provisions under federal law address the dangerous combination of batterers and guns. In 1994, Congress amended the Gun Control Act to prohibit individuals who are under qualifying DVROs from purchasing or possessing guns (18 U.S.C. § 922(g)(8)). To qualify, a DVRO must be issued after a court hearing about which the respondent was notified and in which he had the opportunity to participate. This type of DVRO is often referred to as *permanent*. Eligible DVRO respondents include the petitioner's current or former spouse, someone the petitioner shares a child with, or a current or former cohabitant (18 U.S.C. § 921(a)(32)).

In 1996, Congress amended the Gun Control Act to prohibit those convicted of domestic violence misdemeanors from purchasing or possessing guns (18 U.S.C. § 922(g)(9)). This expansion is a lifetime ban and includes any misdemeanor that "has, as an element, the use or attempted use of physical force, or the threatened use of a deadly weapon" and was committed by an intimate partner (18 U.S.C. § 921(a)(33)). The list of those included as intimate partners under the misdemeanor law is more expansive than the DVRO gun prohibition and includes parents or guardians as well as those "similarly situated to a spouse, parent or guardian" (18 U.S.C. § 921(a)(33)). Importantly, this law applies to law enforcement and the military and includes qualifying offenses that pre-date the law.

State-Level Domestic Violence Gun Legislation

Many states have laws limiting DVRO respondents' access to guns. State laws are often more inclusive than federal laws and some, for example, expand the definition of qualifying DVROs to include temporary DVROs. Courts usually consider and grant temporary DVROs before respondents have been notified of petitioners' requests for protection from abuse. This decision in the absence of the respondent is unusual in the U.S. justice system, but it is a direct response to the danger that DVRO petitioners face. Respondents to

DVROs have high rates of criminal justice system involvement (Klein 1996; Moracco et al. 2010; Vittes and Sorenson 2006) and often have committed severe domestic violence (Holt et al. 2003; Logan, Shannon, and Walker 2005; Sorenson and Shen 2005). Furthermore, women who seek DVROs often do so in the context of separation from their batterer (Logan et al. 2008), a time of heightened homicide risk (Campbell et al. 2007; Wilson and Daly 1993). Temporary DVROs allow victims to gain the protection a DVRO provides without requiring them to wait for a hearing.

Some states limit domestic violence misdemeanants' access to guns. These laws may also be more expansive than the federal legislation. One way in which both state DVRO and domestic violence misdemeanor gun restrictions increase coverage is by expanding the categories of intimate partners covered by the law, for example by including current or former dating partners. Current dating partners were responsible for 35 percent of IPHs committed between 1976 and 2005, but the share of IPHs committed annually by current dating partners has been increasing (Fox and Zawitz 2009). Additionally, one study found that more than half of DVRO applications were against current or former dating partners or fiancés and that applications against this group were more likely to mention guns than applications against current and former spouses combined (Vittes and Sorenson 2006).

There is great variation in state DVRO and domestic violence misdemeanor gun laws, including whether purchase of a gun is prohibited or only possession is prohibited. Not all states provide more coverage than the federal legislation, and many do not have these types of gun prohibitions. Because some states have only the federal law to rely on and because federal restrictions may be stronger than state restrictions, federal law is crucial.

Evidence

Federal legislative strategies to address the risks associated with armed batterers rely on the existing system of identifying and prosecuting violent intimates through the criminal justice system and the DVRO system in place in courts in all fifty states. This approach is consistent with the evidence: past abuse in a relationship is the best predictor of future abuse and is the leading risk factor associated with IPH. It is also consistent with our current approach to regulating access to guns. Prohibitions on purchase and possession are largely based on disqualifying behaviors, with criminal

nondomestic violence convictions constituting the largest category of prohibited purchasers denied through background checks (Federal Bureau of Investigation 2011).

Evaluating Impacts

Three studies have examined how state laws limiting access to guns for DVRO respondents and domestic violence misdemeanants affect IPH (Vigdor and Mercy 2003, 2006; Zeoli and Webster 2010). Vigdor and Mercy examined the effects of state DVRO and domestic violence misdemeanor gun restrictions on state-level IPH from 1982 to 1998 (2003), and again from 1982 to 2002 (2006). In both studies, DVRO laws were significantly associated with reductions in IPH risk, both for IPHs committed with guns and total IPHs. Further investigation uncovered that these reductions rested on the capacity of states to support background checks on would-be gun purchasers (Vigdor and Mercy 2003, 2006). This finding highlights the importance of ensuring that systems for implementing these laws are in place and supported: the prohibition against purchasing a gun can be effective only if background checks yield current, comprehensive, and accurate disqualifying information.

There was also a measurable difference in the effect of laws prohibiting gun purchases compared to laws prohibiting possession only (Vigdor and Mercy 2006). In states prohibiting purchase, total and gun IPH had an associated reduction of 10% to 12%; there was no measurable impact of possession-only laws. Purchase may be the more effective prohibited action because the restriction on possession relies on respondents to voluntarily surrender their guns or law enforcement to collect guns from newly prohibited respondents (Vigdor and Mercy 2006).

A later analysis of state domestic violence gun laws and IPH in 46 U.S. cities from 1979 to 2003 provides further evidence of the state DVRO laws' impact (Zeoli and Webster 2010). The 46 cities were in 27 states, 15 of which have DVRO gun prohibitions and 9 of which have domestic violence misdemeanor gun prohibitions. Cities in states with DVRO gun restrictions had 19% fewer IPHs and 25% fewer IPHs committed with guns compared to cities without those state laws (Zeoli and Webster 2010).

Taken together, these three studies provide compelling evidence that DVRO gun restrictions reduce IPH. Importantly, the results of all three studies show that those reductions are not limited to IPHs committed with guns, suggesting that there is no discernible substitution effect. Would-be killers do not replace

guns with other weapons to affect the same number of killings. Or, put another way, the evidence suggests that state DVRO gun prohibitions save lives.

Unlike the beneficial effects associated with DVRO laws, the three studies found no measurable impact on IPH of state laws restricting domestic violence misdemeanants' access to guns. This may be for a number of reasons. Misdemeanor convictions for domestic violence may be too few for researchers to detect an associated reduction in homicide (Vigdor and Mercy 2006). In addition, the statute under which a batterer is charged also may determine whether he is identified through a background check as prohibited or not, and many states do not have a specific domestic violence misdemeanor crime to charge (Vigdor and Mercy 2006). Finally, a lack of implementation and enforcement of the law may impact its effectiveness.

Implementation and Enforcement

With the evidence concerning laws that address the risks associated with guns and violent intimates came attention to the implementation and enforcement of these laws. DVRO policies have been a focus of this research, which offers empirical insight into why DVRO laws prohibiting purchase fare better than policies that only prohibit possession and provides strategies for strengthening the possession prohibition. We are unaware of any research examining how domestic violence misdemeanor prohibitions are implemented and enforced. However, we suspect there are similarities in the processes involved because both laws require that information about the prohibiting offense be included in the background check system and that processes for retrieving guns from newly disqualified individuals be in place.

One evaluation of North Carolina's DVRO gun law found no measurable reduction in intimate partner gun violence among petitioners post-law but also documented no change in DVROs requiring respondents to surrender their guns or cases where guns were recovered from respondents (Moracco et al. 2006). The conclusion from this study is not that the law is flawed but rather that the implementation of the law did not allow for a real test of its merits. The implementation failure is likely not unique to North Carolina. Indeed, several reports offer anecdotal evidence of neglected implementation (Attorney General's Task Force on Local Criminal Justice Response to Domestic Violence 2005; Frattaroli and Teret 2006; Gwinn 2006; Webster et al. 2010).

Behind the failures to implement the gun possession prohibition are opportunities to better ensure the prohibition is realized (Frattaroli and Teret

2006; Wintemute et al. 2012). It is essential to know whether a respondent possesses guns and, if so, how many. Such information can be obtained from state registries and gun sale databases (where they exist), DVRO petitions, and petitioners. One evaluation of an initiative to implement the California DVRO law concluded that while each source provides some unique data about respondents' guns, the information is still incomplete (Wintemute et al. 2012). Facilitating disclosure of information about guns by petitioners through the DVRO application and hearing processes is critical (Frattaroli and Teret 2006; Webster et al. 2010; Wintemute et al. 2012), and the value of complete registry or record-of-sales databases that capture all gun transactions (long guns and handguns; private sales and dealer sales) cannot be overstated for any effort to fully enforce DVRO possession prohibitions (Wintemute et al. 2012). Knowledge of which respondents may have firearms allows law enforcement to better prepare for interacting with the respondent safely, and it may increase the likelihood that guns are recovered (Wintemute et al. 2012).

Even with information about the presence of guns, that information does not always translate into DVROs issued with instructions to surrender guns (Frattaroli and Teret 2006; Sorenson and Shen 2005; Webster et al. 2010). Still, there is evidence that oversight may reduce underuse of the DVRO gun law. Following an examination of the state's DVRO database, the California Department of Justice sent letters to relevant local agencies that called attention to the low utilization of the gun prohibition on DVROs in the database (Seave 2006). A review of the data following this exchange revealed a reduction in the percentage of orders without a gun prohibition (Seave 2006).

Service of issued DVROs is also a major barrier to realizing a DVRO gun prohibition. For those orders that are served by law enforcement, the act of service offers a chance for officers to facilitate removal of guns to ensure compliance with the DVRO. The value of law enforcement access to record-of-sale databases and to information provided by the petitioner to the recovery of guns has been documented, as has the importance of trained officers tasked with handling these exchanges (Wintemute et al. 2012).

Given the findings from the above studies, we hypothesize that the documented effects associated with DVRO gun restrictions likely reflect an effect of the purchase prohibitions and not the possession prohibitions. While the implementation of this law is complex and involves participation from different agencies, these barriers are not insurmountable, as the California initiative demonstrates (Wintemute et al. 2012). Additionally, a recent report suggests

60 *April M. Zeoli and Shannon Frattaroli*

that a small number of localities are engaging in innovative strategies to ensure that DVRO laws are being used to improve public safety (Klein 2006). Between the emerging initiatives at the local level and the literature that is developing on this topic, the time is right for federal action to organize and encourage the efforts needed to reduce the documented risks that result when violent intimates have access to guns.

Policy Implications

There are many ways to strengthen federal law to reduce the violence documented at the start of this essay. Following is a list of recommendations that are evidence-informed and actionable—although not exhaustive.

Goal: Prevent DVRO respondents and DV misdemeanants from purchasing or possessing guns.

Policy: Require all gun purchasers to submit to a background check.

- Rationale: Under federal law, background checks are not required for sales from private sellers, providing prohibited batterers with easy access to guns. Requiring background checks for all gun sales will eliminate an important source of guns for prohibited batterers.

Policy: Incentivize states to automate DVRO and domestic violence misdemeanor records for reporting to background check systems.

- Rationale: Background check systems must be automated and updated regularly so that disqualifying information is included in the system and immediately available to gun sellers.

Policy: Incentivize states to create gun registries or gun purchase databases.

- Rationale: A mechanism to allow law enforcement to quickly learn whether a DVRO respondent or a person convicted of a domestic violence misdemeanor owns a gun would aid efforts to enforce existing prohibitions on gun possession among this group of people known to be violent.

Goal: Expand federal law to prohibit other categories of violent intimates from purchasing and possessing guns.

Policy: Extend the DVRO prohibition to include those covered by temporary DVROs.

- Rationale: The initial period after filing for a DVRO, during which a temporary DVRO is in place, is a dangerous time for petitioners. Federal law

should recognize and reduce this danger by extending the prohibition to include temporary DVROs.

Policy: Expand the definition of intimate partners.

- Rationale: Current and former dating partners should be included in federal law so all victims of violent intimate partners receive equal protection.

Policy: Extend federal gun prohibitions to cover those convicted of misdemeanor stalking.

- Rationale: Stalking is an important risk factor for intimate partner homicide. However, because misdemeanor stalking laws often do not include “the use or attempted use of physical force, or the threatened use of a deadly weapon,” the domestic violence misdemeanor gun prohibition does not apply.

Policy: Extend federal gun prohibitions to cover persons who have violated a DVRO (permanent and temporary) because of threatened or actual violence.

- Rationale: Those who violate court-issued DVROs because of violence may be especially dangerous and should be subject to the lifetime ban on gun purchase and possession to which domestic violence misdemeanants are subject.

Goal: Provide the resources and support needed for state and local systems to implement and enforce domestic violence gun prohibitions.

Policy: Establish and fund a center that will provide the training and technical assistance needed to realize full implementation of laws that prohibit DVRO respondents and misdemeanants from possessing guns.

- Rationale: Federal law enforcement authorities, with the help of model state programs such as the California Armed and Prohibited Persons System, are well-positioned to assist state and local law enforcement in developing their infrastructures to ensure these laws are realized for the benefit of public safety.

References

- Arbuckle, J., L. Olson, M. Howard, J. Brillman, C. Anctil, and D. Sklar. 1996. Safe at home? Domestic violence and other homicides among women in New Mexico. *Ann Emerg Med* 27: 210–15
- Attorney General’s Task Force on Local Criminal Justice Response to Domestic Violence. 2005. Keeping the promise: Victims’ safety and batterer accountability. Sacramento, CA: California Department of Justice.
- Bailey, J., A. Kellerman, G. Somes, J. Banton, F. Rivara, and N. Rushforth. 1997. Risk factors for violent death of women in the home. *Arch Intern Med* 157:777–82.

- Campbell, J.C., N. Glass, P.W. Sharps, K. Laughon, and T. Bloom. 2007. Intimate partner homicide: Review and implications of research and policy. *Trauma, Violence & Abuse* 8: 246–60.
- Campbell, J.C., D.W. Webster, J. Koziol-McLain, C. Block, D. Campbell, M.A. Curry, F. Gary, N. Glass, J. McFarlane, C. Sachs, P. Sharps, Y. Ulrich, S.A. Wilt, J. Manganello, X. Xu, J. Schollenberger, V. Frye, and K. Laughon. 2003. Risk factors for femicide in abusive relationships: Results from a multisite case control study. *American Journal of Public Health* 93: 1069–97.
- Federal Bureau of Investigation. 2011. National Instant Criminal Background Check System (NICS) operations. Washington, D.C.: U.S. Department of Justice.
- Fleury, R.E., C. Sullivan, and D. Bybee. 2000. When ending the relationship does not end the violence: Women's experiences of violence by former partners. *Violence Against Women* 6: 1363–83.
- Fox, J.A., and M.W. Zawitz. 2009. Homicide trends in the United States: Bureau of Justice Statistics. <http://bjs.ojp.usdoj.gov/content/homicide/homtrnd.cfm>.
- Frattaroli, S., and S.P. Teret. 2006. Understanding and informing policy implementation: A case study of the domestic violence provisions of the Maryland Gun Violence Act. *Evaluation Review* 30: 347–60.
- Gwinn, C. 2006. Domestic violence and firearms: Reflections of a prosecutor. *Evaluation Review* 30: 237–44.
- Holt, V.L., M.A. Kernic, M.E. Wolf, and F. Rivara. 2003. Do protection orders affect the likelihood of future partner violence and injury? *American Journal of Preventive Medicine* 24: 16–21.
- Kellerman, A., F. Rivara, N. Rushforth, J. Banton, D. Reay, J. Francisco, A. Locci, J. Prodzinski, B. Hackman, and G. Somes. 1993. Gun ownership as a risk factor for homicide in the home. *New England Journal of Medicine* 329: 1084–91.
- Klein, A.R. 1996. Re-abuse in a population of court-restrained male batterers: Why restraining orders don't work. In *Do arrests and restraining orders work?*, 192–213. Thousand Oaks, CA: Sage.
- . 2006. Enforcing domestic violence firearm prohibitions: A report on promising practices. Washington, D.C.: Office on Violence Against Women. http://www.bwjp.org/files/bwjp/articles/Enforcing_Firearms_Prohibitions.pdf.
- Kurz, D. 1996. Separation, divorce, and woman abuse. *Violence Against Women* 2: 63–81.
- Logan, T.K., L. Shannon, and R. Walker. 2005. Protective orders in rural and urban areas: A multiple perspective study. *Violence Against Women* 11: 876–911.
- Logan, T.K., R. Walker, L. Shannon, and J. Cole. 2008. Factors associated with separation and ongoing violence among women with civil protective orders. *Journal of Family Violence* 23: 377–85.
- McFarlane, J., J.C. Campbell, S.A. Wilt, C. Sachs, Y. Ulrich, and X. Xu. 1999. Stalking and intimate partner femicide. *Homicide Studies* 3: 300–16.
- Moracco, K.E., K. Andersen, R.M. Buchanan, C. Espersen, J.M. Bowling, and C. Duffy. 2010. Who are the defendants in domestic violence protection order cases? *Violence Against Women* 16: 1201–23.
- Moracco, K.E., K.A. Clark, C. Espersen, and J.M. Bowling. 2006. Preventing firearms violence among victims of intimate partner violence: An evaluation of a new North Carolina law: U.S. Department of Justice.

- Moracco, K.E., C.W. Runyan, and J.D. Butts. 1998. Femicide in North Carolina, 1991–1993: A statewide study of patterns and precursors. *Homicide Studies* 2: 422–46.
- Rothman, E.F., D. Hemenway, M. Miller, and D. Azrael. 2005. Batterers' use of guns to threaten intimate partners. *Journal of the American Medical Women's Association* 60: 62–68.
- Saltzman, L.E., J.A. Mercy, P. Ocarroll, M. Rosenberg, and P. Rhodes. 1992. Weapon involvement and injury outcomes in family and intimate assaults. *Journal of the American Medical Association* 267: 3043–47.
- Seave, P.L. 2006. Disarming batterers through restraining orders: The promise and the reality in California. *Evaluation Review* 30: 245–65.
- Smith, P.H., K.E. Moracco, and J.D. Butts. 1998. Partner homicide in context: A population-based perspective. *Homicide Studies* 2: 400–421.
- Sorenson, S.B., and H. Shen. 2005. Restraining orders in California: A look at state-wide data. *Violence Against Women* 11: 912–33.
- Sorenson, S.B., and D.J. Wiebe. 2004. Weapons in the lives of battered women. *American Journal of Public Health* 94: 1412–17.
- Tjaden, P., and N. Thoennes. 2000. Extent, nature, and consequences of intimate partner violence. Washington, DC: U.S. Department of Justice.
- United States Department of Justice. 2012. Uniform crime reporting program data: Supplementary homicide reports, 2010. Icpsr33527-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor].
- Vigdor, E.R., and J.A. Mercy. 2003. Disarming batterers: The impact of domestic violence firearm laws. In *Evaluating gun policy*, 157–214. Washington, DC: The Brookings Institution.
- . 2006. Do laws restricting access to firearms by domestic violence offenders prevent intimate partner homicide? *Evaluation Review* 30: 313–46.
- Vittes, K.A., and S.B. Sorenson. 2006. Are temporary restraining orders more likely to be issued when applications mention firearms? *Evaluation Review* 30: 266–82.
- Webster, D.W., S. Frattaroli, J.S. Vernick, C. O'Sullivan, J. Roehl, and J.C. Campbell. 2010. Women with protective orders report failure to remove firearms from their abusive partners: Results from an exploratory study. *Journal of Women's Health* 19: 93–98.
- Wilson, M.I., and M. Daly. 1993. Spousal homicide risk and estrangement. *Violence and Victims* 8: 3–16.
- Wintemute, G., S. Frattaroli, K.A. Vittes, B. Claire, M. Wright, and D.W. Webster. 2012. Firearms and domestic violence education and intervention project: Final report of process and outcome evaluations. Sacramento, CA: Violence Prevention Research Program, University of California, Davis.
- Zeoli, A.M., and D.W. Webster. 2010. Effects of domestic violence policies, alcohol taxes and police staffing levels on intimate partner homicide in large us cities. *Injury Prevention* 16: 90–95.

This page intentionally left blank

Reconsidering the Adequacy of Current Conditions on Legal Firearm Ownership

Katherine A. Vittes, Daniel W. Webster,
and Jon S. Vernick

An important objective of successful gun violence prevention policy is to keep guns from high-risk individuals without infringing on the rights of law-abiding citizens to use firearms for protection or recreation. Given the potential of laws designed to keep guns from dangerous individuals to save lives, the categories of individuals to be prohibited from possessing firearms merits careful consideration. The goals of this chapter are to (1) briefly review the current federal prohibitory criteria for firearm possession and the rationale for these prohibitions, (2) make the case for broadening these criteria to limit access to firearms among additional categories of individuals, and (3) put forth specific policy recommendations based on the available research evidence. This chapter does not address prohibitory criteria related to mental

Katherine A. Vittes, PhD, MPH, is a research associate at the Johns Hopkins Center for Gun Policy and Research. Daniel W. Webster, ScD, MPH, is a professor in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Jon S. Vernick, JD, MPH, is an associate professor and associate chair in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health.

health status and only touches on prohibitions for violent misdemeanants, because these are covered elsewhere in this volume.

Rationale for Current Conditions that Prohibit Firearm Possession

Recognizing that certain categories of individuals are at high risk for committing violence, federal law prohibits firearm possession by the following groups: felons; fugitives; persons convicted of a misdemeanor crime for domestic violence; those who are subject to certain restraining orders for domestic violence; unlawful users of or those addicted to controlled substances; those who have been found by a judge to be mentally incompetent, a danger to themselves or others as a result of mental illness, or have been involuntarily committed to a mental institution; those who have been dishonorably discharged from the military; illegal aliens; and persons who have renounced their U.S. citizenship. In addition, federal law sets 21 years as the minimum age at which a person can lawfully purchase a handgun from a federally licensed firearms dealer but sets 18 as the minimum legal age for handgun possession and for transfers of handguns from anyone who is not a licensed gun dealer (18 U.S.C. §922 (d) (2012)). No minimum possession age applies to long guns (rifles and shotguns) under federal law.

Research provides justification for restricting firearm possession for many of these groups. Convicted felons are much more likely to commit subsequent violent crimes—including homicide—than are nonfelons (Cook, Ludwig, and Braga 2005). Similarly, persons with a history of committing intimate partner violence are at increased risk for killing an intimate partner (Campbell et al. 2003) and for committing violence against nonfamily members (Etter and Birzer 2007; Fagan, Stewart, and Hansen 1983; Gayford 1975; Hotaling, Straus, and Lincoln 1989).

Research also supports restricting firearm possession for drug abusers. Illicit drug use and abuse is strongly associated with violent and criminal behavior (Afifi et al. 2012; Friedman 1998; Kelleher et al. 1994; Parker and Auerhahn 1998; Rivara et al. 1997; Walton-Moss et al. 2005) and suicide (Borges, Walters, and Kessler 2000; Borowsky, Ireland, and Resnick 2001; Rivara et al. 1997). For example, homicide offenders are nearly five times more likely to abuse drugs than are nonoffenders, and the use of illicit drugs is associated with a seven times higher risk of suicide (Rivara et al. 1997).

There also is strong evidence for restricting access to firearms by young people. Involvement in violent crime, either as a perpetrator or victim, increases dramatically during adolescence and in early adulthood (Fabio et al. 2006; Fox and Zawitz 2010). Brain structures related to risk taking and impulse control are developing throughout adolescence, and this may contribute to heightened risk of violent behavior among this age group (Johnson, Blum, and Giedd 2009; Steinberg 2004).

The Case for Broadening Firearm Prohibitions for High-Risk Persons

Federal law sets the minimum standards for legal firearm ownership, but many states have laws that disqualify additional categories of high-risk individuals. The differences across states are significant. For example, New Jersey prohibits firearm possession by anyone who has been convicted of a crime for which the penalty can be 6 months or more of imprisonment and sets the minimum legal age for handgun possession at 21 years. (Federal law sets age 18 as the minimum legal age to *possess* a handgun.) In contrast, 13 states have standards for legal firearm possession that either mirror or are weaker than federal standards. In these 13 states, individuals who are likely at high risk for committing violence against themselves or others can legally possess firearms.

A recent study, using data from a survey of inmates in state prisons, examined the criminal history and ages of 253 persons incarcerated for committing gun-related crimes in the 13 U.S. states with the least stringent criteria for legal firearm possession.¹ Sixty percent ($n = 151$) of the offenders in the study were legally permitted to possess firearms prior to committing the gun crime that led to their incarceration, including 4% who had prior misdemeanor convictions involving violence or firearms, 6% convicted of other misdemeanors, 5% convicted of a serious offense as a juvenile, and 13% who had prior arrests but no convictions. It is important to note that, if these 13 states had laws prohibiting firearm possession for these additional high-risk groups, nearly half of the 151 offenders ($n = 73$) who were legally in possession of firearms would have been prohibited when they committed the gun offense for which they were incarcerated (Vittes, Vernick, and Webster 2012). Some portion of these gun crimes might have been prevented if these offenders had been prohibited from possessing firearms when they committed the offenses for which they were incarcerated.

Few rigorous scientific studies directly examine whether laws prohibiting individuals in specific high-risk groups from purchasing or possessing firearms reduce criminal offending by prohibited individuals (Hahn et al. 2005; Welford, Pepper, and Petrie 2004). However, studies that examine the effects of prohibiting access to firearms by perpetrators of domestic violence suggest that these laws can effectively reduce violence. For example, Wintemute and colleagues (2001) examined a California law that expanded firearm prohibitions to include persons convicted of violent misdemeanors. The study found that misdemeanants who were denied purchase of a handgun due to a change in the law were less likely than handgun purchasers to commit subsequent violent and gun-related crime. Studies also have found that state laws prohibiting firearm possession by those subject to certain types of domestic violence restraining orders are associated with lower rates of intimate partner homicide (Vigdor and Mercy 2003, 2006; Zeoli and Webster 2010).

Despite the lack of specific evaluations of prohibitory criteria for firearm possession for some categories of individuals, ample evidence shows that certain categories of individuals are at increased risk for violent and criminal behavior. We draw upon this literature to make the case for broadening prohibitions for firearm possession to include alcohol abusers, persons less than 21 years of age, and adults convicted of serious crimes as juveniles.

Alcohol Abusers

Unlike illicit drug abusers, alcohol abusers are not prohibited from purchasing or possessing firearms under federal law. Yet, alcohol abuse is at least as strongly associated with the perpetration and victimization of violence (Afifi et al. 2012; Friedman 1998; Kelleher et al. 1994; Parker and Auerhahn 1998; Rivara et al. 1997; Sharps et al. 2001; Walton-Moss et al. 2005) and suicide (Borges, Walters, and Kessler 2000; Borowsky et al. 2001; Rivara et al. 1997). For example, a case-control study that examined risk factors for homicide and suicide in three large urban areas in the United States found that subjects who drank alcohol, had ever been in trouble at work for drinking, or were ever hospitalized for alcohol abuse were at increased risk for homicide and suicide compared with controls (Rivara et al. 1997). Another multicity case-control study found that victim and perpetrator alcohol abuse was strongly associated with nonfatal and fatal intimate partner violence (Sharps et al. 2001).

Several studies suggest that firearm owners may be at increased risk for abusing alcohol (Diener and Kerber 1979; Miller, Hemenway, and Wechsler 1999, 2002; Nelson et al. 1996; Wintemute 2011). This is especially concerning, given that alcohol has been shown to hamper shooting accuracy and impair judgment about when it might be appropriate to use a gun (Carr et al. 2009). A recent study that analyzed population-based survey data from eight U.S. states found that respondents who owned firearms were more likely than those who did not live in a home with a firearm to engage in binge drinking, drive under the influence of alcohol, and have at least 60 drinks per month. Heavy drinking was also more common among firearm owners who carried a gun for protection and stored a gun loaded and unlocked (Wintemute 2011). College students who own firearms are more likely than their unarmed counterparts to binge drink (Miller, Hemenway, and Wechsler 1999, 2002), to drive after binge drinking (Miller et al. 1999, 2002), to be arrested for driving under the influence of alcohol (Miller et al. 1999), and to damage property after drinking alcohol (Miller et al. 1999).

State laws vary with regard to firearm purchase and possession prohibitions for alcohol users or problem drinkers (Carr et al. 2010; Webster and Vernick 2009). Unfortunately, the state laws that do exist may be ineffective because they fail to provide precise definitions of who is disqualified, making them impossible to enforce (Webster and Vernick 2009). Pennsylvania is an exception in that it prohibits firearm purchase by persons who have been convicted of three or more drunk driving offenses within a five-year period. Webster and Vernick (2009) point out that Pennsylvania's law is particularly useful because it provides a definition of alcohol abuser that is sufficiently specific to allow for the identification of prohibited persons. It is also highly justifiable given the abundant evidence that repeat drunk driving offenders are a high-risk group. Not only have they demonstrated reckless behavior, people who drive under the influence are also more likely to abuse illicit drugs or alcohol and to have concurrent psychiatric disorders (Freeman, Maxwell, and Davey 2011; Lapham et al. 2001, 2006; Laplante et al. 2008), have lower self-control (Keane, Maxim, and Teevan 1993), and have higher rates of repeated arrests (Lucker et al. 1991).

Youth under Age 21

Under federal law, a person must be 18 years of age to purchase a long gun and 21 years of age to purchase a handgun from a federally licensed firearms

dealer. But persons 18 years of age and older may purchase a handgun from a private seller and may possess a handgun. And there is no minimum age to possess a long gun or to purchase one from a private seller. Yet, research shows that risk for violent perpetration and victimization continues into young adulthood. Young people between the ages of 18 and 20 have some of the highest rates of homicide offending, and age-specific homicide offending rates rise sharply in the late teens and peak at age 20 (*Homicide Trends in the U.S.* 2012).

Laws that set 21 years as the minimum legal age for alcoholic beverage consumption were enacted in all 50 states in response to the recognition that heightened risk-taking behavior by individuals in this age group was a public safety concern. These laws led to significant reductions in deaths from motor vehicle crashes involving drivers between the ages of 18 and 20 (O'Malley and Wagenaar 1991).

The few studies that have evaluated laws banning juvenile gun purchase or possession have found no effect on juvenile homicide *victimization* or suicide (Marvell 2001; Rosengart et al. 2005; Webster et al. 2004). However, there has yet to be a study on the effect of these types of laws on the *commission* of violent crimes or homicide. Violent crime and homicide perpetration may be particularly relevant outcomes. Access to firearms by juveniles increases their risk for violent offending and victimization into early adulthood (Ruback, Shaffer, and Clark 2011). In addition, a recent study of gun-using offenders incarcerated in state correctional facilities in the 13 states with the weakest standards for legal gun possession found that the largest segment of offenders who would have been prohibited in states with stricter standards were those between 18 and 20 years of age (Vittes et al. 2012).

Another type of age-based firearm restriction warrants mention. Recognizing that children and adolescents lack the requisite maturity and self-control to be trusted with firearms (Hardy 2003), child access prevention (CAP) laws hold adult gun owners criminally responsible if a child gains access to and uses a gun that is not securely stored. Eighteen states and the District of Columbia currently have some form of CAP laws (Legal Community Against Violence 2008). Studies have found that CAP laws—particularly those that carry felony rather than misdemeanor penalties—are effective in reducing accidental shootings of children (Cummings et al. 1997; Hepburn et al. 2006). Research also shows that enacting CAP laws is associated with lower rates of adolescent suicides (Webster et al. 2004).

Persons Convicted of Serious Juvenile Offenses

A sizeable body of research suggests that the commission of crimes at a young age is a robust predictor of subsequent criminal activity and violent offending (Berk et al. 2009; Brame, Bushway, and Paternoster 2003; Farrington 1987; Ou and Reynolds 2010). For example, a study analyzing data from a cohort of low-income minority youth in Chicago found that men who were arrested before age 18 had a 38% higher likelihood of a subsequent felony conviction by age 26 compared with those who had not been arrested (Ou and Reynolds 2010). A study of probationers and parolees in Philadelphia found that serious criminal offending at a young age strongly predicted the subsequent commission of homicide or attempted homicide (Berk et al. 2009).

There is also a sizable literature suggesting that criminal recidivism is inversely associated with time since criminal conviction and with age (Blumstein and Nakamura 2009; Kurlychek, Brame, and Bushway 2005, 2007; Kurlychek, Bushway, and Brame 2012; Soothill and Francis 2009). Many of the states that have laws that restrict firearm possession from these offenders take this into account by making the restriction effective for a specified period of time or until the offender reaches a certain age. For example, Massachusetts bans firearm possession for five years after conviction for a serious juvenile offense, and California and Pennsylvania prohibit firearm possession until age 30 for juveniles adjudicated of certain felonies and misdemeanors.

Policy Recommendations

Despite the contentious debate among policymakers and others in the United States about policies governing the ownership and use of firearms, there is wide agreement that access ought to be restricted for individuals deemed to be at high risk for using guns to inflict harm on themselves or others. There also is a growing research literature that supports prohibiting firearm access among such dangerous persons. Nonetheless, some may argue that expanding prohibitory criteria for firearm possession is unfairly discriminatory or too difficult to achieve.

Persons who are barred from firearm possession, however, do have some legal recourse under the relief from federal firearms disabilities program. Under the provisions of the Gun Control Act of 1968, felons and other persons who have been prohibited under federal law from possessing firearms can

apply to the attorney general to have this prohibition lifted. The U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) is responsible for reviewing and responding to requests for relief from firearms disability submitted by individual applicants. In recent years, however, appropriations have not been provided for this program (ATF 2013). Providing adequate appropriations for the relief from firearms disabilities program could make policies that broaden denial criteria for legal firearm possession more politically palatable.

Although many of the federal prohibitory criteria for firearm possession were established decades ago by the Gun Control Act of 1968, it is not the case that the categories of persons that are prohibited under federal law are unchangeable or even that they have not been changed recently. In fact, persons convicted of a domestic violence misdemeanor and those subject to certain types of domestic violence restraining orders were added to the list of prohibited firearm possessors as recently as 1996 and 1994, respectively (Vernick and Hepburn 2003).

The following recommendations are based on the evidence presented in the previous sections:

1. Prohibit firearm purchase for persons convicted of two or more crimes involving drugs or alcohol within any three-year period for a period of 10 years.
2. Raise the federal minimum age requirement for handgun purchase or possession to 21 years of age.
3. Prohibit firearm purchase for persons who have committed one or more serious juvenile offenses until age 30.

The research presented in this chapter indicates that alcohol abusers, young people, and persons who have been convicted of serious crimes as juveniles are at increased risk for violence. Access to firearms by individuals in these groups increases their own and the public's risk for injury and death. Firearm prohibitions for individuals in other high-risk groups such as domestic violence misdemeanants and respondents to domestic violence restraining orders are effective injury prevention policies. Evaluations of policies that can isolate the effect of firearm restrictions on high-risk groups are needed. Universal background checks, discussed elsewhere in this volume, would aid in the implementation and enforcement of these policies. Meanwhile, broadening these prohibitions has the potential to save additional lives.

Notes

1. The 13 U.S. states with the least stringent criteria for legal firearm possession are Arkansas, Georgia, Idaho, Louisiana, Maine, Michigan, Mississippi, Montana, New Hampshire, New Mexico, Vermont, Wisconsin, and Wyoming.

References

- 18 U.S.C. §922 (d) (2012).
- Affi, T. O., C. A. Henriksen, G. J. G. Asmundson, and J. Sareen. 2012. "Victimization and perpetration of intimate partner violence and substance use disorders in a nationally representative sample." *Journal of Nervous and Mental Disease* 200(8): 684–691. doi: 10.1097/NMD.0b013e3182613f64.
- ATF. 2013. *General Questions*. Bureau of Alcohol, Tobacco, Firearms, and Explosives. Available from <http://www.atf.gov/firearms/faq/general.html>.
- Berk, R., L. Sherman, G. Barnes, E. Kurtz, and L. Ahlman. 2009. "Forecasting murder within a population of probationers and parolees: A high stakes application of statistical learning." *Journal of the Royal Statistical Society* 172(1): 191–211.
- Blumstein, A., and K. Nakamura. 2009. "Redemption in the presence of widespread criminal background checks." *Criminology* 47(2): 327–359.
- Borges, G., E. E. Walters, and R. C. Kessler. 2000. "Associations of substance use, abuse, and dependence with subsequent suicidal behavior." *American Journal of Epidemiology* 151(8): 781–789.
- Borowsky, I. W., M. Ireland, and M. D. Resnick. 2001. "Adolescent suicide attempts: Risks and protectors." *Pediatrics* 107(3): 485–493.
- Brame, R., S. D. Bushway, and R. Paternoster. 2003. "Examining the prevalence of criminal desistance." *Criminology* 41(2): 23–448.
- Campbell, J. C., D. W. Webster, J. Koziol-McLain, et al. 2003. "Risk factors for femicide in abusive relationships: Results from a multisite case control study." *American Journal of Public Health* 93(7): 1089–1097.
- Carr, B. G., G. Porat, D. J. Wiebe, and C. C. Branas. 2010. "A review of legislation restricting the intersection of firearms and alcohol in the US." *Public Health Reports* 125(5): 674–679.
- Carr, B. G., D. J. Wiebe, T. S. Richmond, R. Cheney, and C. C. Branas. 2009. "A randomised controlled feasibility trial of alcohol consumption and the ability to appropriately use a firearm." *Injury Prevention* 15(6): 409–412.
- Cook, P. J., J. Ludwig, and A. A. Braga. 2005. "Criminal records of homicide offenders." *Journal of the American Medical Association* 294(5): 598–601.
- Cummings, P., D. C. Grossman, F. P. Rivara, and T. D. Koepsell. 1997. "State gun safe storage laws and child mortality due to firearms." *Journal of the American Medical Association* 278(13): 1084–1086.
- Diener, E., and K. W. Kerber. 1979. "Personality characteristics of American gun-owners." *Journal of Social Psychology* 107(2): 227–238.

- Etter, G. W., and M. L. Birzer. 2007. "Domestic violence abusers: A descriptive study of the characteristics of defenders in protection from abuse orders in Sedgwick County, Kansas." *Journal of Family Violence* 22(3): 113–119.
- Fabio, A., R. Loeber, G. K. Balasubramani, J. Roth, W. Fu, and D. P. Farrington. 2006. "Why some generations are more violent than others: Assessment of age, period, and cohort effects." *American Journal of Epidemiology* 164(2): 151–160.
- Fagan, J. A., D. K. Stewart, and K. V. Hansen. 1983. "Violent men or violent husbands? Background factors and situational correlates." In *The Dark Side of Families: Current Family Violence Research*, edited by D. Finkelhor, R. Gelles, G. Hotaling, and M. A. Straus, 49–68. Beverly Hills, CA: Sage Publications.
- Farrington, D. P. 1987. "Predicting individual crime rates." *Crime and Justice: A Review of Research* 9: 53–101. doi: 10.1086/449132.
- Fox, J. A., and M. W. Zawitz. 2010. *Homicide trends in the US: Age, gender, and race trends*. Washington, DC: Bureau of Justice Statistics, U.S. Department of Justice.
- Freeman, J., J. C. Maxwell, and J. Davey. 2011. "Unraveling the complexity of driving while intoxicated: A study into the prevalence of psychiatric and substance abuse comorbidity." *Accident Analysis and Prevention* 43(1): 34–39. doi: 10.1016/j.aap.2010.06.004.
- Friedman, A. S. 1998. "Substance use/abuse as a predictor to illegal and violent behavior: A review of the relevant literature." *Aggression and Violent Behavior* 3(4): 339–355. doi: 10.1016/s1359-1789(97)00012-8.
- Gayford, J. J. 1975. "Wife battering: A preliminary study of 100 cases." *British Medical Journal* 1(5951): 194–197.
- Hahn, R. A., O. Bilukha, A. Crosby, et al. 2005. "Firearms laws and the reduction of violence: A systematic review." *American Journal of Preventive Medicine* 28(2, Supp 1): 40–71.
- Hardy, M. S. 2003. "Effects of gun admonitions on the behaviors and attitudes of school-aged boys." *Journal of Developmental & Behavioral Pediatrics* 24(5): 352–358.
- Hepburn, L., D. Azrael, M. Miller, and D. Hemenway. 2006. "The effects of child access prevention laws on unintentional child firearm fatalities, 1979–2000." *Journal of Trauma* 61(2): 423–428.
- Homicide Trends in the U.S.* Bureau of Justice Statistics, March 20, 2012 2012. Available from <http://bjs.ojp.usdoj.gov/content/homicide/teens.cfm>.
- Hotaling, G. T., M. A. Straus, and A. J. Lincoln. 1989. "Intrafamily violence, and crime and violence outside the family." In *Family Violence*, edited by L. Ohlin and M. Tonry, 315–375. Chicago: University of Chicago Press.
- Johnson, S. B., R. W. Blum, and J. N. Giedd. 2009. "Adolescent maturity and the brain: The promise and pitfalls of neuroscience research in adolescent health policy." *Journal of Adolescent Health* 45(3): 216–221.
- Keane, C., P. S. Maxim, and J. J. Teevan. 1993. "Drinking and driving, self-control, and gender: Testing a general-theory of crime." *Journal of Research in Crime and Delinquency* 30(1): 30–46.
- Kelleher, K., Chaffin M., J. Hollenberg, and E. Fischer. 1994. "Alcohol and drug disorders among physically abusive and neglectful parents in a community-based sample." *American Journal of Public Health* 84(10): 1586–1590.

- Kurlychek, M. C., R. Brame, and S. D. Bushway. 2005. "Scarlet letters and recidivism: Does an old criminal record predict future offending?" *Criminology & Public Policy* 5(3): 483–504.
- . 2007. "Enduring risk? Old criminal records and predictions of future criminal involvement." *Crime & Delinquency* 53(1): 64–83.
- Kurlychek, M. C., S. D. Bushway, and R. Brame. 2012. "Long-term crime desistance and recidivism patterns: Evidence from the Essex County convicted felon study." *Criminology* 50(1): 71–103. doi: 10.1111/j.1745-9125.2011.00259.x.
- Lapham, S. C., J. C. Baca, G. P. McMillan, and J. Lapidus. 2006. "Psychiatric disorders in a sample of repeat impaired-driving offenders." *Journal of Studies on Alcohol* 67: 707–713.
- Lapham, S. C., E. Smith, J. C. Baca, I. Y. Chang, B. J. Skipper, G. Baum, and W. C. Hunt. 2001. "Prevalence of psychiatric disorders among persons convicted of driving while impaired." *Archives of General Psychiatry* 58: 943–949.
- Laplante, D. A., S. E. Nelson, S. S. Odegaard, R. A. Labrie, and H. J. Shaffer. 2008. "Substance and psychiatric disorders among men and women repeat driving under the influence offenders who accept a treatment-sentencing option." *Journal of Studies on Alcohol and Drugs* 69(2): 209–217.
- Legal Community Against Violence. 2008. *Regulating guns in America: An evaluation and comparative analysis of federal, state, and selected local gun laws*. San Francisco, CA.
- Lucker, G. W., V. L. Holt, D. J. Kruzich, and J. D. Gold. 1991. "The prevalence of anti-social behavior among U.S. Army DWI offenders." *Journal of Studies on Alcohol* 52(4): 318–320.
- Marvell, T. B. 2001. "The impact of banning juvenile gun possession." *Journal of Law & Economics* 44(2): 691–713.
- Miller, M., D. Hemenway, and H. Wechsler. 1999. "Guns at College." *Journal of American College Health* 48 (1): 7–12.
- . 2002. "Guns and gun threats at college." *Journal of American College Health* 51(2): 57–65.
- Nelson, D. E., J. A. Grant-Worley, K. Powell, J. Mercy, and D. Holtzman. 1996. "Population estimates of household firearm storage practices and firearm carrying in Oregon." *Journal of the American Medical Association* 275(22): 1744–1748. doi: 10.1001/jama.275.22.1744.
- O'Malley, P. M., and A. C. Wagenaar. 1991. "Effects of minimum drinking age laws on alcohol use, related behaviors and traffic crash involvement among American youth: 1976–1987." *Journal of Studies on Alcohol* 52(5): 478–491.
- Ou, S. R., and A. J. Reynolds. 2010. "Childhood predictors of male adult crime." *Children and Youth Services Review* 32(8): SI 1097–1107.
- Parker, R. N., and K. Auerhahn. 1998. "Drugs, alcohol, and homicide: Issues in research and theory." In *Homicide: A Sourcebook of Social Research*, edited by M. D. Smith and M. A. Zahn. Thousand Oaks, CA: Sage.
- Rivara, F. P., B. A. Mueller, G. Somes, C. T. Mendoza, N. B. Rushforth, and A. L. Kellermann. 1997. "Alcohol and illicit drug abuse and the risk of violent death in the home." *Journal of the American Medical Association* 278(7): 569–575.

- Rosengart, M., P. Cummings, A. Nathens, P. Heagerty, R. Maier, and F. Rivara. 2005. "An evaluation of state firearm regulations and homicide and suicide death rates." *Injury Prevention* 11(2): 77–83.
- Ruback, R. B., J. N. Shaffer, and V. A. Clark. 2011. "Easy access to firearms: Juveniles' risks for violent offending and violent victimization." *Journal of Interpersonal Violence* 26(10): 2111–2138. doi: 10.1177/0886260510372948.
- Sharps, P.W., J. Campbell, D. Campbell, F. Gary, and D. Webster. 2001. "The role of alcohol in intimate partner femicide." *American Journal of Addictions* 10(2): 122–135.
- Soothill, K., and B. Francis. 2009. "When do ex-offenders become like non-offenders?" *The Howard Journal* 48(4): 373–387.
- Steinberg, L. 2004. "Risk taking in adolescence: what changes, and why?" *Annals of the New York Academy of Science* 1021: 51–58.
- Vernick, J. S., and L. M. Hepburn. 2003. "Examining state and federal gun laws: Trends for 1970–1999." In *Evaluating Gun Policy*, edited by Jens Ludwig and Philip J. Cook, 345–411. Washington, DC: Brookings Institution Press.
- Vigdor, E. R., and J. A. Mercy. 2003. "Disarming batterers: The impact of domestic violence firearm laws." In *Evaluating Gun Policy*, edited by Jens Ludwig and Philip J. Cook, 157–201. Washington, DC: Brookings Institution Press.
- . 2006. "Do laws restricting access to firearms by domestic violence offenders prevent intimate partner homicide?" *Evaluation Review* 30(3): 313–346.
- Vittes, K. A., J. S. Vernick, and D. W. Webster. 2012. "Legal status and source of offenders' firearms in states with the least stringent criteria for gun ownership." *Injury Prevention* epub. doi: 10.1136/injuryprev-2011-040290.
- Walton-Moss, B.J., J. Manganello, V. Frye, and J. C. Campbell. 2005. "Risk factors for intimate partner violence and associated injury among urban women." *Journal of Community Health* 30(5): 377–389.
- Webster, D. W., and J. S. Vernick. 2009. "Keeping firearms from drug and alcohol abusers." *Injury Prevention* 15(6): 425–427.
- Webster, D. W., J. S. Vernick, A. M. Zeoli, and J. A. Manganello. 2004. "Association between youth-focused firearm laws and youth suicides." *Journal of the American Medical Association* 292(5): 594–601.
- Welford, C. F., J. V. Pepper, and C. V. Petrie. 2004. *Firearms and Violence: A Critical Review*. Edited by Division of Behavioral and Social Science and Education Committee on Law and Justice, National Research Council of the National Academies. Washington, DC: The National Academies Press.
- Wintemute, G. J. 2011. "Association between firearm ownership, firearm-related risk and risk reduction behaviours and alcohol-related risk behaviours." *Injury Prevention* 17(6): 422–427.
- Wintemute, G. J., M. A. Wright, C. M. Drake, and J. J. Beaumont. 2001. "Subsequent criminal activity among violent misdemeanants who seek to purchase handguns: Risk factors and effectiveness of denying handgun purchase." *Journal of the American Medical Association* 285(8): 1019–1026.
- Zeoli, A. M., and D. W. Webster. 2010. "Effects of domestic violence policies, alcohol taxes and police staffing levels on intimate partner homicide in large US cities." *Injury Prevention* 16(2): 90–95.

Broadening Denial Criteria for the Purchase and Possession of Firearms

Need, Feasibility, and Effectiveness

Garen J. Wintemute

This essay presents the findings of research relating to criminal activity among legal purchasers of firearms—those who have passed their background checks—and the evidence that extending the denial criteria to additional high risk populations is feasible and effective. Its primary subject is persons convicted of violent misdemeanor crimes, a group sometimes referred to as not-so-law-abiding gun owners. It will briefly consider persons who abuse alcohol, which is discussed more fully in the essay by Katherine A. Vittes (in this volume).

Background

Federal statute prohibits the purchase and possession of firearms by persons convicted of any felony or a misdemeanor domestic violence offense, anyone

Garen J. Wintemute, MD, MPH, is the Susan P. Baker–Stephen P. Teret Chair in Violence Prevention and a professor of emergency medicine in the University of California, Davis, School of Medicine.

who is “an unlawful user of or addicted to any controlled substance,” and others (U.S. Code). From the inception of the Brady Act in 1994 through 2009, the most recent year for which data are available, 107,845,000 background checks were performed; 1,925,000 (1.8%) firearm purchases were denied (Bowling et al. 2010). In 2009 alone, 10,764,000 background checks were performed, and 150,000 (1.4%) denials resulted. Well over 90% of denials result from the would-be purchaser’s prior criminal activity.

While recent Supreme Court decisions have affirmed that any individual right to possess firearms is subject to restriction (*District of Columbia v. Heller* 2008, *McDonald v. City of Chicago* 2010), there is no agreement on what those restrictions should be.

The existing federal denial criteria do not extend to all persons who are at increased risk for committing crimes. This problem of incomplete coverage has been noted at least since 1981, when Cook and Blose noted that a “considerable fraction of people who commit violent crimes are legally entitled to own guns” (Cook and Blose 1981). One notable gap concerns prior convictions for violent misdemeanors. While persons convicted of misdemeanor assault on their intimate partners are prohibited persons, those convicted of misdemeanor assault on anyone else, or of misdemeanor violence of other kinds, are not. Another important omission concerns persons who abuse alcohol. Alcohol is specifically excluded from the list of controlled substances referred to in statutes regulating firearm purchase and possession.

Two recent studies highlight the importance of such gaps in coverage. Among individuals arrested for homicide in Illinois in 2001, 42.6% had prior felony convictions. Many of the remaining 57.4% were likely not prohibited from purchasing firearms at the time of their arrests (Cook, Ludwig, and Braga 2005). The second study concerned inmates incarcerated for firearm-related felonies in 13 states where denial criteria reflected those in federal statutes. This study considered all denial criteria related to criminal activity. Of 253 inmates, 102 (40.3%) were prohibited persons at the time of their arrests (Vittes, Vernick, and Webster 2012).

This evidence suggests that most of those who commit firearm-related violent crimes are eligible to purchase firearms, under federal standards at least, at the time the crimes are committed. In fact, the narrow scope of the current federal denial criteria has been proposed as one of the reasons that the Brady Handgun Violence Prevention Act did not measurably reduce homicide rates (Ludwig and Cook 2000, Wintemute 2000).

Given the important gaps in federal regulation, many states have enacted additional prohibitions on firearm purchase and possession. Twenty-six states include at least some misdemeanor crimes, and 20 include persons with a history of alcohol abuse (Bureau of Justice Statistics 2006). The specifics vary from state to state.

Since 1991, California has denied firearm purchases to persons convicted of essentially all violent misdemeanors, including crimes such as assault and battery and brandishing a firearm, since 1991. The prohibition lasts for 10 years. Criminal convictions account for 80% to 90% of denials in California, and convictions for violent crimes account for 40% to 55% (Wintemute et al. 1999, Wright, Wintemute, and Claire 2005). Denials for felony convictions and violent misdemeanor convictions are about equal in number. Approximately 25% of denials for misdemeanor assault are for domestic violence offenses (Wright, Wintemute, and Claire 2005).

Such extensions can substantially expand the size of the population that is denied purchase and possession of firearms. Of the 253 felons in the 13-state study discussed, an additional 28.9% would have been prohibited persons under stricter criteria that are now in effect in other states (Vittes, Vernick, and Webster 2012).

Evidence

Two important empirical questions should be addressed when considering expansions of the denial criteria. First, are there subgroups of persons who purchase firearms legally, at least under federal statute, who are demonstrably at increased risk for committing violent crimes? Second, does denial *work*—does it decrease risk for firearm-related and violent crimes among the individuals who are directly affected? There is good evidence on both questions for persons convicted of violent misdemeanors, and on the first for alcohol abusers.

Misdemeanor Violence

The research on misdemeanor violence comes from California. The first study concerned 5,923 authorized purchasers of handguns ages 21 to 49 in 1977 (Wintemute et al. 1998). Of these handgun purchasers, 3,128 had at least one prior misdemeanor conviction (not necessarily for a violent offense), and 2,795 had no prior criminal history. Over 15 years of follow-up, 50.4% of purchasers with prior convictions, but only 9.8% of those with no prior criminal

history, were arrested for a new offense (Table 6.1). Approximately one in six purchasers with a prior misdemeanor conviction (15.4%) was arrested for a violent Crime Index offense: murder, rape, robbery, or aggravated assault.

There was a strong dose-response relationship among men; risk of arrest increased with the number of prior convictions (Table 6.1). There also appeared to be some specificity of association, in that prior convictions for offenses involv-

Table 6.1 Incidence of and relative risk for new criminal activity, by type of offense, among authorized purchasers of handguns in California

Type and number of prior conviction(s)	Nature of new offense			
Study group	Any offense n (%)	Nonviolent firearm offense n (%)	Violent offense n (%)	Violent Crime Index offense n (%)
Prior misdemeanor conviction (n=2,735)	1379 (50.4)	361 (13.2)	682 (24.9)	421 (15.4)
No prior criminal history (n=2,442)	239 (9.8)	50 (2.0)	108 (4.4)	60 (2.5)
Males ^a	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
Any conviction(s)				
1	5.9 (5.1–6.9)	5.0 (3.6–7.0)	5.0 (4.0–6.2)	5.1 (3.8–6.9)
≥2	8.4 (7.2–9.8)	7.7 (5.6–10.5)	7.3 (5.9–9.1)	7.6 (5.7–10.2)
Conviction(s), none involving firearms or violence				
1	5.9 (5.0–6.9)	4.8 (3.4–6.7)	4.8 (3.8–6.0)	5.0 (3.7–6.8)
≥2	7.8 (6.7–9.2)	6.5 (4.7–9.1)	6.8 (5.4–8.6)	6.4 (4.7–8.7)
Conviction(s) involving firearms, but none involving violence				
1	6.4 (4.9–8.2)	7.7 (4.8–12.3)	4.4 (3.0–6.6)	5.2 (3.1–8.5)
≥2	10.9 (6.0–20.0)	14.7 (5.8–36.9)	13.0 (6.3–26.7)	12.4 (5.0–31.0)
Conviction(s) involving violence				
1	9.3 (7.7–11.3)	8.7 (6.0–12.6)	8.9 (6.8–11.6)	9.4 (6.6–13.3)
≥2	11.3 (8.3–15.3)	11.7 (6.8–20.0)	10.4 (6.9–15.8)	15.1 (9.4–24.3)

Source: Wintemute GJ, Drake CM, Beaumont JJ, Wright MA, Parham CA. Prior Misdemeanor Convictions as a Risk Factor for Later Violent and Firearm-Related Criminal Activity among Authorized Purchasers of Handguns. *JAMA* 1998;280:2083–2087.

RR=relative risk; CI=confidence interval

^aComparison is to subjects with no prior criminal history. Results are adjusted for age and time elapsed since handgun purchase.

ing firearms or violence were associated with the greatest risk of subsequent arrests for violent or firearm-related offenses. Handgun purchasers with two or more prior convictions for violent crimes were at substantially increased risk of arrest for violent crimes generally (relative risk 10.4), and the violent Crime Index offenses (relative risk 15.1). But even purchasers with only a single prior misdemeanor conviction, and that for an offense involving neither firearms nor violence, were still approximately five times as likely as those with no prior criminal history to be arrested subsequently for firearm-related or violent crimes.

At the time these handgun purchases were made, California still relied on the criminal history criteria in federal statute, as many states do today. On that parameter, this study population is generally comparable to persons who purchase handguns now from licensed retailers across the United States.

More recent research measured the incidence of criminal activity serious enough to prohibit firearm ownership among people who had previously, and legally, purchased handguns (Wright and Wintemute 2010). This study was conducted after California began prohibiting violent misdemeanants from purchasing firearms, and such persons are not part of the study population. A cohort of 7,256 handgun purchasers in 1991, 2,761 with a non-prohibiting criminal history and 4,495 with no criminal record at the time of purchase, were followed for up to five years. During that time, 21.0% of purchasers with convictions for non-violent misdemeanors were arrested, and 4.5% were convicted of a crime that prohibited firearm ownership under federal law. The incidence of criminal activity among those with no criminal history was much lower; 3.7% were arrested for any reason, and 0.9% became prohibited persons. Prior conviction for a non-violent misdemeanor was associated with a five-fold increase in risk of conviction for a prohibiting offense (hazard ratio 5.1), as in the prior study.

Risk was related inversely to age and, as before, was related directly to the extent of the prior criminal history (Table 6.2). Compared to handgun purchasers with no criminal history, and after adjustment for age and sex, those with three or more prior convictions for nonviolent misdemeanors had a hazard ratio of 13.6 for conviction for any prohibiting offense and a hazard ratio of 11.0 for a conviction for a violent Crime Index offense (Table 6.2).

Age and prior criminal history acted synergistically as risk factors. As compared to purchasers aged 35 to 49 with no prior criminal history, those aged 21 to 24 with three or more prior misdemeanor convictions had arrest rates for all types of offenses that were increased by a factor of approximately 200.

Table 6.2 Risk of arrest and new prohibition among legal purchasers of handguns in California^a

Characteristic	Arrest for any crime	Conviction for prohibiting offense	Conviction for violent Crime Index crime ^b
Misdemeanor conviction(s)	HR (95% CI)	HR (95% CI)	HR (95% CI)
No criminal history	Referent	Referent	Referent
1	5.6 (4.5–6.9)	4.2 (2.5–6.8)	4.9 (2.2–11.1)
2	9.0 (6.7–12.2)	10.4 (5.7–18.8)	9.2 (3.1–26.8)
≥3	11.4 (8.3–15.7)	13.6 (7.2–25.6)	11.0 (3.4–35.6)
Sex			
Male	1.0 (0.7–1.3)	0.6 (0.3–1.1)	0.9 (0.3–3.1)
Female	Referent	Referent	Referent
Age, yr			
21–24	4.9 (3.7–6.4)	6.1 (3.5–10.8)	7.7 (2.8–20.9)
25–34	2.4 (1.9–3.1)	2.4 (1.4–4.1)	2.6 (1.0–6.9)
35–49	Referent	Referent	Referent

Adapted from Wright MA, Wintemute GJ. Felonious or Violent Criminal Activity That Prohibits Gun Ownership among Prior Purchasers of Handguns: Incidence and Risk Factors. *J Trauma* 2010;69:948–955.

HR=hazard ratio; CI=confidence interval.

^aAdjusted for all variables in the table.

^bMurder, forcible rape, robbery, aggravated assault.

Alcohol Abuse

Alcohol abuse is a major risk factor for firearm-related violence of all types (Kellermann et al. 1992, Kellermann et al. 1993, Rivara et al. 1997, Conner et al. 2001, Karch, Dahlberg, and Patel 2010). Moreover, several studies have identified an association between personal firearm ownership and heavy or abusive alcohol consumption (Diener and Kerber 1979, Schwaner et al. 1999, Miller, Hemenway, and Wechsler 1999, 2002, Nelson et al. 1996, Smith 2001, Casiano et al. 2008).

A recent study of data from the 1996 and 1997 Behavioral Risk Factor Surveillance System surveys examined this association more closely (Wintemute 2011). After adjustment for demographics and state of residence, firearm owners were more likely than persons who had no firearms at home to have five or

more drinks on one occasion (odds ratio 1.3), to drink and drive (odds ratio 1.8), and to have 60 or more drinks per month (odds ratio 1.5) (Table 6.3).

Of particular interest—and perhaps not surprisingly—firearm owners who engaged in risk behaviors with firearms were also more likely than other firearm owners to drink excessively. For example, as compared with persons who had no firearms at home, firearm owners who also drove or rode in a vehicle with a loaded firearm were at greatest risk for drinking and driving (odds ratio 4.3). Firearm owners who did not travel in a vehicle with a loaded firearm available, were still at increased risk for drinking and driving (odds ratio 2.1), but less so.

Table 6.3 Alcohol use and alcohol-related risk behaviors among firearm owners by presence or absence of specific firearms-related behavior^a

Characteristic or behavior	Any alcohol OR (95% CI)	≥5 Drinks/ occasion OR (95% CI)	Drink and drive OR (95% CI)	≥60 Drinks/ month OR (95% CI)
Exposure to firearms				
Firearm owner	1.3 (1.2–1.5)	1.3 (1.2–1.5)	1.8 (1.3–2.4)	1.5 (1.1–1.8)
Household	1.2 (1.1–1.3)	1.0 (0.9–1.3)	1.3 (0.8–1.9)	1.3 (0.8–2.0)
No firearms	Referent	Referent	Referent	Referent
Loaded unlocked firearm at home				
Firearm owner, ‘yes’	1.4 (1.2–1.7)	1.8 (1.5–2.3)	3.5 (2.3–5.4)	2.3 (1.6–3.3)
Firearm owner, ‘no’	1.3 (1.2–1.4)	1.2 (1.1–1.4)	1.5 (1.9–2.0)	1.3 (1.0–1.7)
No firearms	Referent	Referent	Referent	Referent
Drive/ride in vehicle with loaded firearm				
Firearm owner, ‘yes’	1.5 (1.3–1.9)	1.7 (1.4–2.2)	3.0 (1.9–4.7)	2.2 (1.4–3.3)
Firearm owner, ‘no’	1.3 (1.2–1.4)	1.2 (1.1–1.4)	1.6 (1.2–2.2)	1.3 (1.0–1.7)
No firearms	Referent	Referent	Referent	Referent
Carry firearm for protection against people				
Firearm owner, ‘yes’	1.3 (0.9–1.8)	1.5 (1.0–2.1)	2.1 (1.0–4.6)	1.6 (0.8–3.1)
Firearm owner, ‘no’	1.3 (1.2–1.5)	1.3 (1.1–1.5)	1.7 (1.3–2.3)	1.4 (1.1–1.8)
No firearms	Referent	Referent	Referent	Referent

Source: Wintemute GJ. Association between firearm ownership, firearm-related risk and risk reduction behaviors and alcohol-related risk behaviors. *Injury Prevention* 2011;17(6):422–427.

OR=odds ratio; CI=confidence interval

^aAdjusted for state of residence, age, sex, and race.

The limited data available suggest that firearm ownership itself is associated with an increased risk of arrest (Cook and Ludwig 1996, Diener and Kerber 1979) or, among college students, “trouble with the police” (Miller, Hemenway, and Wechsler 2002). Carrying a firearm in public has also been linked to arrest for a non-traffic offense (Cook and Ludwig 1996, Smith 2001) and aggressive or hostile driving behavior (Miller et al. 2002, Hemenway, Vrinotis, and Miller 2006). Given the findings just presented, it is plausible that alcohol abuse among firearm owners is partly responsible for the association between firearm ownership and involvement with the criminal justice system.

Does Denial Work?

If denying firearm purchases reduces risk for future criminal activity, it most likely does so through incapacitation. To the extent that denial deprives high-risk persons of access to firearms, it reduces their capacity for committing firearm-related and violent crimes.

Some argue that denial simply prevents ineligible persons from acquiring firearms from licensed retailers and note that firearms can easily be obtained from private parties. Jacobs and Potter, partly on this basis, have labeled background checks and denial as nothing more than “a sop to the widespread fear of crime” (Jacobs and Potter 1995). The evidence is, however, that criminal firearm markets do not function smoothly; firearms are not always easily obtained through them (Cook et al. 2005). We have no data on how frequently firearm acquisitions are merely redirected by purchase denials and not prevented.

Background check and recordkeeping requirements do divert prohibited persons away from licensed retailers. Observational research at gun shows, where licensed retailers and private party sellers operate side by side, has documented cases in which individuals who are unable to purchase firearms from licensees do so from private parties instead (Wintemute 2009). In the 1991 Survey of State Prison Inmates, half of those who purchased their most recent firearm from an illegal source said that they had not bought their weapon from a licensee because of concerns about the background check (Bureau of Justice Statistics 1994). Vittes and colleagues reported that just 3.9% of the prohibited persons in their inmate sample had gotten those weapons from a licensed retailer (Vittes, Vernick, and Webster 2012).

Comprehensive background check requirements, which subject private party sales to the same safeguards that are applied to sales by licensed retailers, interfere with the operations of criminal firearms markets (Webster,

Vernick, and Bulzacchelli 2009, Pierce et al. 2012, Mayors Against Illegal Guns 2010). These studies are reviewed in the essay by Webster (in this volume).

Most importantly, denial appears to reduce risk for new criminal activity among those persons who are denied. The strongest evidence for this comes from a quasi-experimental evaluation of California's decision to extend its prohibitions to persons convicted of violent misdemeanors (Wintemute et al. 2001). The prohibition lasts for 10 years following their convictions. Study subjects were aged 21 to 34; all had prior convictions for violent misdemeanors. The intervention group comprised 927 persons who sought to purchase handguns in 1991 and were denied under the terms of the new policy. The control group included 727 persons who sought to purchase handguns in 1989 or 1990, just before the policy changed, and whose purchases were approved. Subjects were followed for up to three years.

Overall, 33.0% of subjects were arrested during follow-up: 21.8% for a firearm-related or violent offense and 22.1% for offenses of other types (Table 6.4). Persons whose purchases were approved were more likely than those who were denied to be arrested for a firearm-related or violent offense (relative hazard 1.2) but not for other offenses (relative hazard 0.9). In both groups, as always, risk of arrest was strongly related to age and the number of prior misdemeanor convictions (Table 6.4).

Denial was associated with a significant decrease in risk of arrest, both overall and for subjects stratified by age or number of prior convictions. These findings persisted in multivariate analysis (Table 6.5). Purchasers were more likely than denied persons to be arrested for new firearm-related or violent crimes (relative hazard 1.3), but not for other crimes (relative hazard 1.0). Similar results were seen in subgroups stratified by age, number of prior convictions for any crime, and number of prior convictions for a firearm-related or violent crime. The only exception was for subjects with three or more prior convictions for firearm-related or violent crimes. In this group with an established pattern of such activity, denial of handgun purchase may have no effect.

The authors called attention to the fact that there was a decrease in arrest rates only for the types of crimes the new policy might be thought to affect. They interpreted this specificity of effect as consistent with the hypothesis that the observed effect was related to the new policy.

A second study with a similar design estimated the effectiveness of denial of purchase based on a prior felony conviction (Wright, Wintemute, and Rivara 1999). As this policy has been enforced for decades in California, no

Table 6.4 Incidence and relative hazard of first arrest for new crimes among violent misdemeanants who applied to purchase handguns

Characteristic	Subjects, <i>n</i>	Firearm-related and/or violent crime		Non-firearm, nonviolent crime	
		Persons arrested <i>n</i> (%)	RH (95% CI)	Persons arrested <i>n</i> (%)	RH (95% CI)
All subjects	1654	360 (21.8)		366 (22.1)	
Purchase status					
Denied	927	186 (20.1)	Referent	211 (22.8)	Referent
Approved	727	174 (23.9)	1.2 (1.0–1.5)	155 (21.3)	0.9 (0.8–1.1)
Sex					
Female	65	11 (16.9)	Referent	15 (23.1)	Referent
Male	1589	349 (22.0)	1.3 (0.7–2.5)	351 (22.1)	0.9 (0.6–1.6)
Age, yr					
21–24	377	108 (28.6)	Referent	117 (31.0)	Referent
25–29	719	152 (21.1)	0.7 (0.6–0.9)	152 (21.1)	0.7 (0.5–0.8)
30–34	558	100 (17.9)	0.6 (0.4–0.8)	97 (17.4)	0.5 (0.4–0.7)
Prior convictions					
Any crime					
1	815	144 (17.7)	Referent	126 (15.5)	Referent
2	429	90 (21.0)	1.2 (0.9–1.6)	104 (24.2)	1.7 (1.3–2.1)
3	200	57 (28.5)	1.7 (1.3–2.3)	58 (29.0)	2.0 (1.5–2.8)
≥4	198	63 (31.8)	2.0 (1.5–2.7)	73 (36.9)	2.8 (2.1–3.7)
Firearm-related and/or violent crime					
1	1217	230 (18.9)	Referent	241 (19.8)	Referent
2	302	86 (28.5)	1.6 (1.3–2.1)	81 (26.8)	1.4 (1.1–1.8)
≥3	115	37 (32.2)	1.8 (1.3–2.6)	36 (31.3)	1.7 (1.2–2.5)

Source: Wintemute GJ, Wright MA, Drake CM, Beaumont JJ. Subsequent Criminal Activity among Violent Misdemeanants Who Seek to Purchase Handguns. *JAMA* 2001;285(8):1019–1026.

RH=relative hazard; CI=confidence interval

non-intervention group was available. Instead, 177 individuals who sought to purchase handguns in 1977 but were denied as a result of a prior felony conviction were compared to 2,470 persons who purchased handguns in 1977 and at that time had records of felony arrests. (Members of this group might have been convicted of those offenses, but at the misdemeanor level.) Subjects

Table 6.5 Risk of arrest for new crimes for handgun purchasers compared with denied persons among violent misdemeanants who applied to purchase handguns^a

Characteristic	Firearm-related and/or violent crime	Non-firearm, nonviolent crime
	RH (95% CI)	RH (95% CI)
Age, yr		
21–24	1.4 (0.9–2.0)	1.0 (0.7–1.5)
25–29	1.1 (0.8–1.5)	0.9 (0.7–1.3)
30–34	1.6 (1.1–2.5)	1.0 (0.6–1.5)
Prior convictions		
Any crime		
1	1.3 (0.9–1.8)	1.0 (0.7–1.4)
2	1.2 (0.8–1.8)	0.9 (0.6–1.3)
3	1.1 (0.7–1.9)	1.3 (0.8–2.3)
≥4	1.8 (1.1–3.1)	0.9 (0.6–1.5)
Firearm-related and/or violent crime		
1	1.4 (1.1–1.8)	1.0 (0.7–1.3)
2	1.3 (0.8–2.0)	1.1 (0.7–1.8)
≥3	0.9 (0.5–1.8)	0.8 (0.4–1.7)

Source: Wintemute GJ, Wright MA, Drake CM, Beaumont JJ. Subsequent Criminal Activity among Violent Misdemeanants Who Seek to Purchase Handguns, Risk Factors and Effectiveness of Denying Handgun Purchase. *JAMA* 2001;285:1019–1026.

RH=relative hazard; CI=confidence interval

^aThe comparison is to persons whose handgun purchases were denied. Adjusted for sex and all variables in the table.

were followed for up to three years following their attempted or completed purchases. The small size of the study population precluded multivariate adjustment. In separate analyses adjusting for age and for the nature and extent of the prior criminal history, the felony arrestees whose purchases were approved had statistically significant increases in risk of arrest for offenses involving firearms or violence (relative risk of 1.1 to 1.3) as compared to the felons whose purchases were denied.

Studies evaluating prohibitions on firearm ownership at the population level have yielded mixed findings. State-level firearm prohibitions for persons subject to domestic violence restraining orders were associated with 7% to 20% declines in the female intimate partner homicide rate (Vigdor

and Mercy 2003, 2006, Zeoli and Webster 2010). The Brady Handgun Violence Prevention Act, however, was found to have no effect on rates of firearm homicide (Ludwig and Cook 2000). Specific reasons for this other than a lack of effect of denial on the persons directly affected have been proposed, including effects on interstate trafficking and the fact that private party transfers are not regulated by the Brady Act. These studies are discussed elsewhere.

Recommendations

Federal and state governments should broaden their criteria for denial of firearm purchase and possession to include persons convicted of violent misdemeanors. An unknown, but possibly substantial, proportion of such persons were arrested on felony charges but convicted at the misdemeanor level in plea bargain arrangements. Among those who purchase firearms, persons convicted of violent misdemeanors are at substantially increased risk for violent crime in the future. Denial of firearm purchase can reduce that risk by an amount that is of real-world importance. The list of offenses now in use in California provides a reasonable model. At the federal level, this could perhaps be accomplished by deleting the word “domestic” from the phrase “misdemeanor crime of domestic violence” in 18 USC §922(d) and reworking the definition of the phrase as appropriate.

Federal and state governments should also deny the purchase and possession of firearms to persons who abuse alcohol. Multiple definitions of alcohol abuse are in use, and it might be reasonable to consider the second instance of any alcohol-related offense (DUI, drunk and disorderly, etc.) as the criterion for denial. This can be explored further and refined as needed. We do not have specific evidence that denial is effective in such cases, but there is good evidence that alcohol abuse is a risk factor for crime, that its prevalence is increased among firearm owners, and that it and other behaviors that increase risk for violence co-occur among firearm owners.

The question of how long these prohibitions should last has not been definitively answered. Risk of recidivism following an index arrest declines over time. Among 18-year-olds arrested for violent or property crimes, risk of arrest returned to the level seen for the never-arrested after approximately 20 years (Blumstein and Nakamura 2009). Other studies, again of juveniles and young adults, have seen risk return to baseline after less than 10 years (Kurlychek,

Brame, and Bushway 2007, 2006). In the United Kingdom, the time required is between 10 and 15 years (Soothill and Francis 2009). There appears to be no parallel research on older offenders or firearm owners. California’s 10-year policy is consistent with the available evidence.

Background checks that extend to misdemeanor convictions and alcohol-related offenses will be more complex and take longer to complete. ATF encountered 3,166 cases in 2011 in which a firearm was acquired by a prohibited person because the three-day waiting period ended before the background check could be completed (Federal Bureau of Investigation 2012). In such cases, ATF agents must contact the purchasers and recover or arrange other dispositions for the firearms (Frandsen 2010). To avoid a massive increase in delayed denials, as such cases are known, the waiting period should be extended in individual cases until the background check is completed.

Support for Broadened Denial Criteria

Survey research in the late 1990s found high levels of support among the general population and firearm owners for denial criteria that included violent and firearm-related misdemeanors and alcohol abuse (Table 6.6) (Teret et al. 1998). Results for the general population were confirmed in the 2001 General Social Survey (Smith 2007).

In a 2012 survey of firearm owners, 75% of members of the National Rifle Association (NRA) felt that persons with a history of misdemeanor violence

Table 6.6 Support overall and among firearm owners for denial of firearm purchases by persons convicted of specific misdemeanor offenses

Offense	Overall %	Firearm owners %
Public display of a firearm in a threatening manner	95	91
Possession of equipment for illegal drug use	92	89
Domestic violence	89	80
Assault and battery without a lethal weapon or serious injury	85	75
Drunk and disorderly conduct	74	73
Carrying a concealed weapon without a permit	83	70
Driving under the influence of alcohol	71	59

Source: Teret SP, Webster DW, Vernick JS, et al. Support for new policies to regulate firearms. *N Engl J Med.* 1998;339:813–818.

should not receive concealed weapon permits. Many states provide such permits to anyone who is legally eligible to possess firearms. Therefore, a judgment that a class of persons should not receive concealed weapon permits suggests a judgment that they should not possess firearms (Luntz Global 2012).

Drawbacks and Costs

Background checks are useful only to the extent that the databases on which they are performed are accurate and complete. There will be costs, which may be substantial, to compile the data for background checks that include these offenses. There will also be costs associated with the increasing number of denials and, presumably, appeals of those denials. Personnel, facility, and other resource requirements will all increase. No estimates of cost, or of offsetting financial benefit in crimes and injuries prevented, have been developed.

Compiling additional data on violent misdemeanors and alcohol-related offenses will take some time. Estimates of how long, and exploration of ways to shorten the time to implementation, will be needed.

These hurdles notwithstanding, California's experience with misdemeanor denials shows that such policies can be implemented and sustained over time and that a robust firearms market can operate with such regulation in place. More than 601,000 firearms were sold in California in 2011 (California Department of Justice), and the industry describes the state's market as "lucrative" (Anonymous 2007).

References

- Anonymous. "California Market Still Lucrative." 2007. *The New Firearms Business*, 15 March, 5.
- Blumstein, Alfred, and Kiminori Nakamura. 2009. "Redemption in the Presence of Widespread Criminal Background Checks." *Criminology*, no. 47: 327–359.
- Bowling, Michael, et al. 2010. *Background Checks for Firearms Transfers, 2009—Statistical Tables*. Washington, DC: Bureau of Justice Statistics.
- Bureau of Justice Statistics. 1994. *Firearms and Crimes of Violence*. Washington, DC: Department of Justice.
- Bureau of Justice Statistics. 2006. *Survey of State Procedures Related to Firearm Sales, 2005*. Washington, DC: Bureau of Justice Statistics.
- California Department of Justice. 2012. *Dealers Record of Sale Transactions*.
- Casiano, Hygiea, et al. 2008. "Mental Disorder and Threats Made by Noninstitutionalized People with Weapons in the National Comorbidity Survey Replication." *Journal of Nervous and Mental Disease*, no. 196: 437–445.

- Conner, Kenneth R, et al. 2001. "Violence, Alcohol, and Completed Suicide: A Case-Control Study." *American Journal of Psychiatry*, no. 158: 1701-1705.
- Cook, Philip J, et al. 2005. *Underground Gun Markets*. Cambridge, MA: National Bureau of Economic Research.
- Cook, Philip J, and J Blose. 1981. "State Programs for Screening Handgun Buyers." *The Annals of the American Academy of Political and Social Science*, no. 445: 80-91.
- Cook, Philip J, and Jens Ludwig. 1996. *Guns in America: Results of a Comprehensive National Survey on Firearms Ownership and Use*. Washington, DC: The Police Foundation.
- Cook, Philip J, Jens Ludwig, and Anthony A Braga. 2005. "Criminal Records of Homicide Offenders." *Journal of the American Medical Association*, no. 294: 598-601.
- Diener, Edward, and Kenneth W Kerber. 1979. "Personality Characteristics of American Gun-Owners." *Journal of Social Psychology*, no. 107: 227-238.
- District of Columbia v. Heller, 128 S.Ct. 2783 (2008).
- Federal Bureau of Investigation. 2012. National Instant Criminal Background Check System (NICS) Operation 2011. Washington, DC: Federal Bureau of Investigation.
- Frandsen, Ronald J. 2010. Enforcement of the Brady Act, 2008: Federal and State Investigations and Prosecutions of Firearm Applicants Denied by a NICS Check in 2008. Final Report to the U.S. Department of Justice. Document Number: 231052.
- Hemenway, David, M Vriniotis, and Matthew Miller. 2006. "Is an Armed Society a Polite Society?" *Accident Analysis and Prevention*, no. 38: 687-695.
- Jacobs, James B, and Kimberly A Potter. 1995. "Keeping Guns out of the 'Wrong' Hands: The Brady Law and the Limits of Regulation." *Journal of Criminal Law and Criminology*, no. 86: 93-120.
- Karch, Debra L, Linda L Dahlberg, and Nimesh Patel. 2010. "Surveillance for Violent Deaths - National Violent Death Reporting System, 16 States, 2007." *Morbidity and Mortality Weekly Report (MMWR)*, no. 59: 1-50.
- Kellermann, Arthur L, et al. 1992. "Suicide in the Home in Relation to Gun Ownership." *New England Journal of Medicine*, no. 327: 467-472.
- Kellermann, Arthur L, et al. 1993. "Gun Ownership as a Risk Factor for Homicide in the Home." *New England Journal of Medicine*, no. 329: 1084-1091.
- Kurlychek, Megan C, Robert Brame, and Shawn D Bushway. 2006. "Scarlet Letters and Recidivism: Does an Old Criminal Record Predict Future Offending?" *Criminology & Public Policy*, no. 5: 483-504.
- Kurlychek, Megan C, Robert Brame, and Shawn D Bushway. 2007. "Enduring Risk? Old Criminal Records and Predictions of Future Criminal Involvement." *Crime & Delinquency*, no. 53: 64-83.
- Ludwig, Jens A, and Philip J Cook. 2000. "Homicide and Suicide Rates Associated with Implementation of the Brady Handgun Violence Prevention Act." *Journal of the American Medical Association*, no. 284: 585-591.
- Luntz Global. 2012. Gun Owners Poll. New York, NY: Mayors Against Illegal Guns.
- Mayors Against Illegal Guns. 2010. "Trace the Guns: The Link between Gun Laws and Interstate Gun Trafficking," www.MayorsAgainstIllegalGuns.org, www.TraceTheGuns.org.
- McDonald v. City of Chicago, 130 S.Ct. 3020 (2010).
- Miller, Matthew, et al. 2002. "'Road Rage' in Arizona: Armed and Dangerous." *Accident Analysis and Prevention*, no. 34: 807-814.

- Miller, Matthew, David Hemenway, and Henry Wechsler. 1999. "Guns at College." *Journal of American College Health*, no. 48: 7–12.
- Miller, Matthew, David Hemenway, and Henry Wechsler. 2002. "Guns and Gun Threats at College." *Journal of American College Health*, no. 51: 57–65.
- Nelson, David E, et al. 1996. "Population Estimates of Household Firearm Storage Practices and Firearm Carrying in Oregon." *Journal of the American Medical Association*, no. 275: 1744–1748.
- Pierce, Glenn L, et al. 2012. *New Approaches to Understanding and Regulating Primary and Secondary Illegal Firearms*. Washington, DC: National Institute of Justice.
- Rivara, Frederick P, et al. 1997. "Alcohol and Illicit Drug Abuse and the Risk of Violent Death in the Home." *Journal of the American Medical Association*, no. 278: 569–575.
- Schwamer, Shawn L, et al. 1999. "Who Wants a Gun License?" *Journal of Criminal Justice*, no. 27: 1–10.
- Smith, Tom W. 2001. *National Gun Policy Survey of the National Opinion Research Center: Research Findings*. Chicago, IL: National Opinion Research Center, University of Chicago.
- Smith, Tom W. 2007. *Public Attitudes Towards the Regulation of Firearms*. Chicago, IL: National Opinion Research Center, University of Chicago.
- Soothill, Keith, and Brian Francis. 2009. "When Do Ex-Offenders Become Like Non-Offenders?" *The Howard Journal*, no. 48: 373–387.
- Teret, Stephen P, et al. 1998. "Support for New Policies to Regulate Firearms: Results of Two National Surveys." *New England Journal of Medicine*, no. 339: 813–818
- Title 18, U.S. Code, Part 1, Chapter 44, Section 922(d).
- Vigdor, Elizabeth Richardson, and James A Mercy. 2003. "Disarming Batterers: The Impact of Domestic Violence Firearm Laws" In *Evaluating Gun Policy: Effects on Crime and Violence*, ed. Jens A Ludwig and Philip J Cook. Washington, DC: Brookings Institution Press, 157–213.
- Vigdor, Elizabeth Richardson, and James A Mercy. 2006. "Do Laws Restricting Access to Firearms by Domestic Violence Offenders Prevent Intimate Partner Homicide?" *Evaluation Review*, no. 30: 313–346.
- Vittes, Katherine A, Jon S Vernick, and Daniel W Webster. 2012. "Legal Status and Source of Offenders' Firearms in States with the Least Stringent Criteria for Gun Ownership." [Published Online Ahead of Print June 23, 2012] *Injury Prevention*, DOI: 10.1136/injuryprev-2011-040290.
- Webster, Daniel W, Jon S Vernick, and Maria T Bulzacchelli. 2009. "Effects of State-Level Firearm Seller Accountability Policies on Firearm Trafficking." *Journal of Urban Health*, no. 86: 525–537.
- Wintemute, Garen J. 2000. "Impact of the Brady Act on Homicide and Suicide Rates." (Letter) *Journal of the American Medical Association*, no. 284: 2719–2720.
- Wintemute, Garen J. 2009. *Inside Gun Shows: What Goes on When Everybody Thinks Nobody's Watching*. Sacramento, CA: Violence Prevention Research Program.
- Wintemute, Garen J. 2011. "Association between Firearm Ownership, Firearm-Related Risk and Risk Reduction Behaviours and Alcohol-Related Risk Behaviours." *Injury Prevention*, no. 17: 422–427.
- Wintemute, Garen J, et al. 1998. "Prior Misdemeanor Convictions as a Risk Factor for Later Violent and Firearm-Related Criminal Activity among Authorized

- Purchasers of Handguns.” *Journal of the American Medical Association*, no. 280: 2083–2087.
- Wintemute, Garen J, et al. 1999. “Denial of Handgun Purchase: A Description of the Affected Population and a Controlled Study of Their Handgun Preferences.” *Journal of Criminal Justice*, no. 27: 21–31.
- Wintemute, Garen J, et al. 2001. “Subsequent Criminal Activity among Violent Misdemeanants Who Seek to Purchase Handguns: Risk Factors and Effectiveness of Denying Handgun Purchase.” *Journal of the American Medical Association*, no. 285: 1019–1026.
- Wright, Mona A, and Garen J Wintemute. 2010. “Felonious or Violent Criminal Activity That Prohibits Gun Ownership among Prior Purchasers of Handguns: Incidence and Risk Factors.” *Journal of Trauma*, no. 69: 948–955.
- Wright, Mona A, Garen J Wintemute, and Barbara E Claire. 2005. “People and Guns Involved in Denied and Completed Handgun Sales.” *Injury Prevention*, no. 11: 247–250.
- Wright, Mona A, Garen J Wintemute, and Frederick A Rivara. 1999. “Effectiveness of Denial of Handgun Purchase to Persons Believed to Be at High Risk for Firearm Violence.” *American Journal of Public Health*, no. 89: 88–90.
- Zeoli, April M, and Daniel W Webster. 2010. “Effects of Domestic Violence Policies, Alcohol Taxes and Police Staffing Levels on Intimate Partner Homicide in Large Us Cities.” *Injury Prevention*, no. 16: 90–95.

This page intentionally left blank

Comprehensive Background Checks for Firearm Sales

Evidence from Gun Shows

Garen J. Wintemute

Many lines of evidence bear on whether to institute a comprehensive background check policy that would extend the current background check and recordkeeping requirements for sales by licensed retailers to sales by private parties. This essay presents evidence from observational and other research related to gun shows and makes recommendations based on that evidence. For simplicity's sake, "sales" will be used to refer to transfers of all types.

Background

In 1995, Philip Cook and colleagues defined buying and selling by licensed retailers as the primary market for firearms; both new and used firearms are involved (Cook, Molliconi, and Cole 1995). The secondary market consists of

Garen J. Wintemute, MD, MPH, is the Susan P. Baker–Stephen P. Teret Chair in Violence Prevention and a professor of emergency medicine in the University of California, Davis, School of Medicine.

Portions of this chapter are based on prior work by the author.

transfers by unlicensed private parties such as the individual attendees at gun shows (Cook, Molliconi, and Cole 1995, Braga et al. 2002).

The secondary market is quite large. According to the National Survey of Private Ownership of Firearms, approximately 40% of all firearms transactions occur directly between private parties (Cook and Ludwig 1996). Other estimates concur. In the 2004 National Firearms Survey, for example, 55% of 566 firearm owners reported that their most recent acquisition had been from a store (Hepburn et al. 2007). Another 8% reported purchasing their firearm from a licensed retailer at a gun show (unpublished data, National Firearms Survey).

The Federal Double Standard

In order to sell a firearm, a federally licensed retailer must see the buyer's identification. The buyer must complete a lengthy Firearms Transaction Record and certify, under penalty of perjury, that he is buying the firearm for himself and is not a member of any prohibited class. The National Instant Criminal Background Check System (NICS), administered by the Federal Bureau of Investigation (FBI), must perform a background check. In over 90% of cases this background check is completed within minutes, but if important information is missing the buyer may have to wait up to three business days to acquire the firearm (Federal Bureau of Investigation 2012b).

The retailer must keep a permanent record of each purchase that includes specific identifying information for both the buyer and the firearm. If the same person buys more than one handgun from him within five business days, the retailer must file a special report with the U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF).

These procedural safeguards are intended to ensure that the buyer is who he says he is, that he and not someone else will be the actual owner of the firearm, and that he is not prohibited from owning it. They help prevent the large-volume purchasing that otherwise might fuel trafficking operations. They establish a chain of ownership that will help law enforcement authorities link the firearm to its buyer if it is used in a future crime.

But a private party can sell that same firearm—or many firearms—and none of these federal safeguards will be in place. Private-party sellers are not required to ask for identification. They *cannot* initiate a background check, except in Delaware, Nevada, and Oregon, where they may do so voluntarily. There are no forms to fill out, and no records need be kept.

Even if the purchaser is a prohibited person, let alone a non-prohibited person with criminal intent, a private party may sell him a firearm without committing a crime. The key is that while it is always illegal for a prohibited person to buy a firearm, it is only illegal to sell a firearm to a prohibited person if the seller knows or has “reasonable cause to believe” that he is doing so (U.S. Code).

How did this come to pass? The provisions of the federal Gun Control Act apply only to those who are “engaged in the business” of selling firearms. Any clear understanding of what “engaged in the business” might mean was abolished by the 1986 Firearm Owners’ per style sheet Protection Act (U.S. Code). FOPA specifically excluded from the scope of engagement in the business a person who makes “occasional sales, exchanges, or purchases of firearms for the enhancement of a personal collection or for a hobby, or who sells all or part of his personal collection of firearms” (U.S. Code).

The practical result was to make it much more difficult to set an upper limit to the number of firearm sales that an individual could make without being required to have a license and comply with the safeguards described above (Braga and Kennedy 2000, Wintemute 2007, 2009b). ATF summarized the situation this way in a 1999 study of gun shows: “Unfortunately, the effect of the 1986 amendments has often been to frustrate the prosecution of unlicensed dealers masquerading as collectors or hobbyists but who are really trafficking firearms to felons or other prohibited persons” (Bureau of Alcohol, Tobacco and Firearms 1999b).

State Regulation of Firearm Sales

In 33 states, statutes regulating firearm sales do not go beyond those enacted by Congress. But 17 states regulate at least some private-party sales, usually by requiring that the seller have the transaction processed by a licensed retailer (Table 7.1) (Bureau of Justice Statistics 2006). Such transactions are then subject to the same procedural safeguards that apply to the retailer’s own sales that identity is confirmed, a background check is performed, and a record is kept. Six states require background checks for all firearm sales, regardless of firearm type or place of sale, and another nine do so for all handgun sales.

In at least 17 states, the background check can be waived for holders of permits to carry concealed weapons and similar permits, whether at gun shows or elsewhere (Bowling et al. 2010). This has adverse consequences that will be discussed later in this essay.

Table 7.1 State regulation of private-party firearm sales

State	Handgun sales		Long gun sales	
	All sales	Gun shows only	All sales	Gun shows only
California	•		•	
Colorado		•		•
Connecticut	•			•
Hawaii	•		•	
Illinois	•		•	
Iowa	•			
Maryland	•			
Massachusetts	•		•	
Michigan	•			
Missouri	•			
Nebraska	•			
New Jersey	•		•	
New York	•			•
North Carolina	•			
Oregon		•		•
Pennsylvania	•			
Rhode Island	•		•	

Source: From *Survey of state procedures related to firearm sales, 2005*. Washington, DC: Bureau of Justice Statistics, 2006. NCJ 214645.

Note: In the remaining 33 states, private-party firearm sales are not regulated.

In California, a comprehensive background check and recordkeeping policy has been in place since 1991. In essence, private-party sales must be routed through a licensed retailer. At gun shows, designated retailers serve as transfer agents to facilitate sales between individual attendees.

All firearm types are covered, but there are exceptions for certain transactions. These include a transfer between spouses or vertically between other immediate family members, such as from a parent to a child or a grandparent to a grandchild. Temporary transfers, such as infrequent and short-term loans between persons who are personally known to each other, are also exempted.

There are no exemptions for holders of concealed weapon or other permits. Private parties are still allowed to sell firearms in small numbers, involving a licensed retailer to satisfy the background check and recordkeeping requirements.

There is no requirement that the seller and buyer be present at the licensed retailer simultaneously. Many sales are done on consignment; the seller deposits firearms with the retailer for sale, and the seller and buyer never meet. Some retailers maintain separate a display space for consignment firearms.

The retailer is allowed to charge a fee of up to \$10 per firearm for serving as a transfer agent (the fee is less per firearm for transfers involving multiple firearms). Whether the sale occurs at a gun show or elsewhere, the purchaser may take delivery of his firearm from the retailer only after the state's 10-day waiting period has expired. The increased foot traffic at participating retailers provides opportunities to develop new customers. As one retailer explained, "when they come in to do the paper, everybody needs bullets and cleaning supplies" (Matthews 2009).

The system does not appear to impair the operations of California's legal firearms market. More than 601,000 firearms were sold in the state in 2011 (California Department of Justice). Trends in the California market reflect those occurring nationwide. Firearm sales increased 15.6% per year, on average, over the last five years for which we have data (California Department of Justice 2012). A leading industry newsletter has described California's market as "lucrative" (Anonymous 2007).

Criminal Acquisition of Firearms from Private Parties

Private-party firearm sales are quick—they can be completed in less than a minute—and convenient. Even a law-abiding purchaser might appreciate the absence of paperwork that characterizes private-party sales. Their anonymity attracts those who put privacy at a premium.

But these same attributes make private-party sales the only viable option for prohibited persons and the principal option for purchasers with criminal intent, for whom a record of the sale would be hazardous. Again, it is only illegal to sell a firearm to a prohibited person if the seller knows or has "reasonable cause to believe" that he is doing so (U.S. Code). The matter is easily finessed. As one private-party seller said while contemplating a possibly illegal handgun sale at a gun show, "Of course, if I don't ask, nobody knows" (Wintemute 2009 b).

Private-party sales are critical to illegal commerce in firearms. As discussed earlier, perhaps 40% of all firearm sales nationwide are private-party transactions. For those who commit crimes with firearms, that percentage at least doubles. Four large-scale surveys of persons incarcerated for firearm-related felonies in the 1990s asked inmates where they acquired the firearm they used in the crime for which they were incarcerated. Between 12% and 21% of these inmates acquired their weapons from licensed retailers (Harlow 2001, Scalia 2000, Wright and Rossi 1986). An analysis of more recent data also considered whether the inmates were prohibited from possessing firearms at the time of acquisition (Vittes, Vernick, and Webster). Overall, 13.4% of respondents obtained their firearms from licensed retailers. For prohibited persons, purchases from licensed retailers fell to just 3.9%.

For juveniles, direct purchase of any type of firearm from a licensed retailer is illegal, as are handgun purchases for people aged 18 to 20. Private-party sales are essentially their only source of firearms (Ash et al. 1996, Webster et al. 2002).

Private-party sales are also an important component of firearm trafficking operations. Of 1,530 trafficking investigations conducted by ATF during 1996 to 1998, 314 (20.5%) involved unlicensed sellers (Bureau of Alcohol, Tobacco and Firearms 2000 b). A related study evaluated data for trafficking operations involving juveniles and youth (Braga and Kennedy 2001). Of 648 such operations, 92 (14.2%) involved private-party sellers.

There is no current estimate of the proportion of private-party sales that involve prohibited persons. But when background checks for licensed retailer sales were first required in some states by the Brady Act, as many as 9.4% of prospective purchasers were prohibited persons (Manson and Gilliard 1997). It is reasonable to estimate that the proportion is similar or higher for private-party sales that do not involve background checks.

At gun shows, some private-party handgun sellers make a point of checking the buyer's driver's license to be sure that they are not making an illegal sale to an out-of-state resident (Wintemute 2009b). But asking questions about the buyer's eligibility to purchase firearms, theoretically something that private-party sellers could do, guarantees unpleasantness (or worse) and risks the loss of the sale. In observational research at nearly 80 gun shows, such questioning was never observed (Wintemute 2009b). Other private party vendors serve as "hotspots," making repeated sales that serve criminal purposes

(Bureau of Alcohol, Tobacco and Firearms 2000 b, Braga and Kennedy 2000, Wintemute 2009 b).

Criminal Acquisition of Firearms at Gun Shows

Gun shows present a special case, in that large numbers of licensed retailers and private-party sellers are active in the same setting and competing for customers (Bureau of Alcohol, Tobacco and Firearms 1999b, Wintemute 2007, 2009 b). Between 25% and 50% of firearm sellers who rent table space at gun shows are private parties (Bureau of Alcohol, Tobacco and Firearms 1999b, Wintemute 2007). Such tables frequently carry “Private Sale” signs implying that purchases require no paperwork, no background check, no waiting period, and no recordkeeping. Individual attendees who do not rent table space but bring firearms to sell are common. In a study by the author, as many as 316% of gun show attendees were armed, and many of these attendees were unambiguously offering their firearms for sale (Wintemute 2007).

While there are no data on the frequency of illegal private-party sales at gun shows, it is clear that some sellers are willing to make them. Private investigators recently conducted “integrity tests” of 30 private-party sellers at seven gun shows in Nevada, Ohio, and Tennessee (City of New York 2009). The subjects were selected after observation suggested they were effectively in the business of selling firearms. An investigator then negotiated the purchase of a firearm with each seller, but during the negotiation said that he “probably could not pass a background check.” Of the 30 sellers, 19 completed the sales despite the clear indication that the buyer was a prohibited person.

As a highly visible marketplace for private-party sales, gun shows have received a great deal of attention. As detailed elsewhere, however, three points suggest a more nuanced understanding of the role gun shows play in legal and illegal commerce in firearms (Wintemute 2009 b).

Gun shows account for a small proportion of firearm sales. According to the National Survey of Private Ownership of Firearms, discussed earlier, 3.9% of firearms are acquired at gun shows (Cook and Ludwig 1996). Unpublished data from the National Firearms Survey (Hepburn et al. 2007) yield a similar result; 9% of firearm owners acquired their most recent firearms at a gun show.

Most sales at gun shows probably involve licensed retailers. Most vendors at gun shows are licensed retailers, as are nearly all of the largest and most active vendors (Wintemute 2009 b). Again, unpublished data from the National

Firearms Survey agree (Hepburn et al. 2007). Of respondents who purchased firearms at gun shows, more than 75% bought them from licensed retailers.

Licensed retailers are the primary source of firearms acquired at gun shows that are later used in crime. A study of 314 ATF trafficking investigations involving gun shows reported that while an unlicensed seller was the main subject in most of the investigations (54.1%), two thirds of the trafficked firearms were linked to investigations involving a licensed retailer (Braga and Kennedy 2000).

Effectiveness of Background Checks

The evidence suggests that background checks and denials of purchases by prohibited persons reduce risk of arrest among the individuals who are directly affected and interfere with the operations of criminal firearm markets, particularly with firearm trafficking. This essay considers observational evidence on the latter point from gun shows, where large numbers of firearm sales can be observed directly in a short period of time (Wintemute 2009b, 2007).

The best such evidence comes from a study comparing gun shows in California, with its comprehensive background check policy and separate regulations for gun shows, to shows in four states without such policies (Arizona, Nevada, Texas, and Florida) that are leading sources of firearms used in crime in California (Wintemute 2007). Altogether, 28 shows were included. Events in all states were well attended, and commerce was brisk. Shows in California were smaller than those in the comparison states, whether measured by number of firearm vendors or number of attendees, but the number of attendees per vendor was larger.

No direct private-party sales between attendees were observed in California. Instead, private-party sales were completed with the assistance of a licensed retailer serving as transfer agent (Wintemute 2007). In the comparison states, such transactions occurred frequently; an appropriately-stationed observer could see several occurring at any one time.

One unintended effect of California's policies may have been to displace illegal sales to nearby and more permissive states. At some shows in Reno, Nevada, which is a short distance across the border, more than 30% of the vehicles in the parking lot were from California (Wintemute 2007). Such undermining of more rigorous regulation in some states by lack of regulation in others has long been an argument for more rigorous regulation at the federal level. However, an unexpected finding suggests diffusion of benefit. Though

surrogate, or “straw man,” purchases are illegal nationwide under federal law, they were more than six times as common in the comparison states as in California (Wintemute 2007).

Commenting on this study, *Shooting Sports Retailer*, a firearm industry trade magazine, agreed that “there is some evidence that gun shows with restrictive regulations mandating background checks have less illegal activity than shows in states or jurisdictions without this requirement” (Matthews 2009).

Recommendations

Anonymous, undocumented private-party sales are an important contributor to firearm violence in the United States. Comprehensive background check requirements restore a simple, single, equitable structure to retail commerce in firearms. They have been shown to be feasible, and the evidence is that they provide concrete benefits. The United States should adopt a comprehensive background check requirement for firearm sales.

The primary direct effect of such a requirement will be to prevent, or make substantially more difficult, the criminal acquisition of firearms. Many prohibited persons attempting to purchase firearms from private parties will be detected by the background checks, and their purchases will be denied. Background checks and denials reduce risk of violent and firearm-related crime among prohibited persons (Wintemute et al. 2001, Wright, Wintemute, and Rivara 1999). Non-prohibited buyers with criminal intent will be deterred by the new requirements for purchaser identification and record keeping. Recall that 80% of felons incarcerated for firearm-related crimes who were *not* prohibited persons nonetheless acquired their firearms from private parties (Vittes, Vernick, and Webster 2012).

Some prohibited persons and others with criminal intent will continue to seek firearms from private-party sellers. There will still be individuals willing to sell firearms to prohibited persons. There are likely to be fewer, however, because a comprehensive background check policy changes the rules for sellers as well. Private parties will no longer be able to sell firearms legally, at least, without determining whether buyers can legally purchase them. Direct sales will now be crimes and could be made prohibiting offenses.

These effects at the individual level, taken together, will interfere with the operation of criminal firearm markets and disrupt firearm trafficking operations (Webster, Vernick, and Bulzacchelli 2009, Pierce et al. 2012). Mapping

trafficking networks and investigating individual crimes will be aided by more complete records of firearm transfers. Increasingly, it will be possible for law enforcement agencies to identify the most recent purchaser of a crime-involved firearm, not the first (Wintemute et al. 2004, Pierce et al. 2012).

California's policies provide a suitable model. Reasonable exemptions from the background check are allowed, and private-party sales may be made in small numbers if a licensed retailer is involved.

In order to avoid a massive increase in delayed denials, the current three-day limit to the waiting period for firearm purchases should be lifted. Firearm acquisition should be allowed once the buyer has passed the background check.

Pitfalls to Avoid

Closing the "Gun Show Loophole"

Requiring background checks for private-party sales only at gun shows is known as closing the "gun show loophole." There is no such loophole in federal law, in the limited sense that the law does not exempt private-party sales at gun shows from regulation that is required elsewhere. The fundamental flaw in the gun show loophole proposal is its failure to address the great majority of private-party sales, which occur at other locations and increasingly over the Internet at sites where any non-prohibited person can list firearms for sale and buyers can search for private-party sellers.

Creating an Exemption for Permit Holders

The Fix Gun Checks Act, introduced in the 112th Congress and expected to be reintroduced in 2013, is described as requiring a background check for all firearm purchases. It does not. A prospective purchaser in at least 17 states may avoid a background check by presenting an unexpired permit to carry a concealed weapon, or similar permit, for which a background check was required at the time of issuance. Such permits remain valid for as long as five years. An important fraction of permit holders become prohibited persons during that time (Wright and Wintemute 2010). Nationwide, there would be many thousands each year. Their new prohibitions will most often result from new convictions for serious crimes.

No state routinely recovers permits that have not reached their nominal expiration dates from people who are no longer eligible to have them. Thus,

under the Fix Gun Checks Act, those permits will allow newly prohibited individuals who are at high risk for committing further crimes to avoid background checks and acquire firearms. Moreover, a permit exemption is unnecessary; several states operate comprehensive background check systems without it.

Drawbacks, Costs, and Uncertainties

A comprehensive background check policy would make private-party sales less convenient. Airport security screening provides a useful analogy. All of us, regardless of our individual risk of committing violence in the air, are subjected to this inconvenience in one form or another. We tolerate it because it is one of the ways terrorists do get caught.

There would be a financial cost to firearm purchasers. In California, retailers may charge \$10 per firearm, in addition to other fees required by the state. This is a small fraction of the purchase price of all but the least expensive firearms, however.

Some private-party sellers will object, finding the new requirements burdensome. The great majority of individuals who sell firearms have no interest in providing weapons for use by criminals. They will see the value of background checks and recordkeeping as means to prevent violent crime. It is unreasonable to expect private parties to question potential buyers about their eligibility, initiate background checks, and retain records. Private parties who sell firearms infrequently, who are hobbyists or collectors, will encounter the new requirements infrequently. Those who sell more often are in the business and should obtain licenses.

Retailers will object if the fee they are allowed to charge is too low to cover their costs. In California, \$10 per firearm has proved satisfactory. Retailers will see an offsetting benefit in increased opportunities to develop new customers.

There will be costs to governments as they conduct background checks for nearly all firearm sales and issue more denials. The checks will only be as good as the data on which they rely. Efforts to improve the quality and completeness of these data must continue.

Implementing a comprehensive background check policy will be more a matter of substantial scaling up than of developing qualitatively new programs, which would be more expensive. In 11 states, including populous California, New York, and Pennsylvania, such policies are in effect now. Feasibility is proven.

References

- Anonymous. 2007. "California Market Still Lucrative." *The New Firearms Business*, 15 March, 5.
- Ash, Peter, et al. 1996. "Gun Acquisition and Use by Juvenile Offenders." *Journal of the American Medical Association*, no. 275: 1754–1758.
- Bowling, Michael, et al. 2010. Background Checks for Firearms Transfers, 2009—Statistical Tables. Washington, DC: Bureau of Justice Statistics.
- Braga, Anthony A., et al. 2002. "The Illegal Supply of Firearms." In *Crime and Justice: A Review of Research*, ed. Michael Tonry. Chicago, IL: University of Chicago Press, 319–352.
- Braga, Anthony A., and David M. Kennedy. 2000. "Gun Shows and the Illegal Diversion of Firearms." *Georgetown Public Policy Review*, no. 6: 7–24.
- Braga, Anthony A., and David M. Kennedy. 2001. "The Illicit Acquisition of Firearms by Youth and Juveniles." *Journal of Criminal Justice*, no. 29: 379–388.
- Bureau of Alcohol, Tobacco and Firearms. 1999b. Gun Shows: Brady Checks and Crime Gun Traces. Washington, DC: Bureau of Alcohol, Tobacco and Firearms.
- Bureau of Alcohol, Tobacco and Firearms. 2000b. Following the Gun: Enforcing Federal Laws against Firearms Traffickers. Washington, DC: Bureau of Alcohol, Tobacco and Firearms.
- Bureau of Justice Statistics. 2006. Survey of State Procedures Related to Firearm Sales, 2005. Washington, DC: Bureau of Justice Statistics.
- California Department of Justice. 2012. Dealers Record of Sale Transactions.
- City of New York. 2009. Gun Show Undercover: Report on Illegal Sales at Gun Shows. New York, NY: City of New York.
- Cook, Philip J., and Jens Ludwig. 1996. *Guns in America: Results of a Comprehensive National Survey on Firearms Ownership and Use*. Washington, DC: The Police Foundation.
- Cook, Philip J., Jens Ludwig, and Anthony A. Braga. "Criminal Records of Homicide Offenders." *Journal of the American Medical Association*, no. 294 (2005): 598–601.
- Cook, Philip J., Stephanie Molliconi, and Thomas B. Cole. 1995. "Regulating Gun Markets." *Journal of Criminal Law and Criminology*, no. 86: 59–92.
- Federal Bureau of Investigation. 2012b. National Instant Criminal Background Check System (NICS) Operation 2011. Washington, DC: Federal Bureau of Investigation.
- Harlow, Caroline Wolf. 2001. *Firearm Use by Offenders*. Washington, DC: Bureau of Justice Statistics.
- Hepburn, Lisa M., et al. 2007. "The U.S. Gun Stock: Results from the 2004 National Firearms Survey." *Injury Prevention*, no. 13: 15–19.
- Manson, D., and D.K. Gilliard. 1997. *Presale Handgun Checks, 1996: A National Estimate*. Washington, DC: Bureau of Justice Statistics.
- Matthews, Jim. 2009. "In Defense of the Neighborhood Gun Show." *Shooting Sports Retailer*, January, 58–62.
- Pierce, Glenn L., et al. 2012. *New Approaches to Understanding and Regulating Primary and Secondary Illegal Firearms*. Washington, DC: National Institute of Justice.

- Scalia, John. 2000. *Federal Firearm Offenders, 1992–98*. Washington, DC: Bureau of Justice Statistics.
- Title 18, *U.S. Code*, Part 1, Chapter 44, Section 921(a)(21)(C).
- Title 18, *U.S. Code*, Part 1, Chapter 44, Section 922(d).
- Vittes, Katherine A., Jon S. Vernick, and Daniel W. Webster. 2012. “Legal Status and Source of Offenders’ Firearms in States with the Least Stringent Criteria for Gun Ownership [Published Online Ahead of Print June 23, 2012].” *Injury Prevention*. DOI: 10.1136/injuryprev-2011-040290.
- Webster, Daniel W., et al. 2002. “How Delinquent Youths Acquire Guns: Initial versus Most Recent Gun Acquisitions.” *Journal of Urban Health*, no. 79: 60–69.
- Webster, Daniel W., Jon S. Vernick, and Maria T. Bulzacchelli. 2009. “Effects of State-Level Firearm Seller Accountability Policies on Firearm Trafficking.” *Journal of Urban Health*, no. 86: 525–537.
- Wintemute, Garen J. 2007. “Gun Shows across a Multistate American Gun Market: Observational Evidence of the Effects of Regulatory Policies.” *Injury Prevention*, no. 13: 150–156.
- Wintemute, Garen J. 2009b. *Inside Gun Shows: What Goes on When Everybody Thinks Nobody’s Watching*. Sacramento, CA: Violence Prevention Research Program.
- Wintemute, Garen J., et al. 2004. “The Life Cycle of Crime Guns: A Description Based on Guns Recovered from Young People in California.” *Annals of Emergency Medicine*, no. 43: 733–742.
- Wintemute, Garen J., et al. 2001. “Subsequent Criminal Activity among Violent Misdemeanants Who Seek to Purchase Handguns: Risk Factors and Effectiveness of Denying Handgun Purchase.” *Journal of the American Medical Association*, no. 285: 1019–1026.
- Wright, James D., and Peter H. Rossi. 1986. *Armed and Considered Dangerous: A Survey of Felons and Their Firearms*. New York, NY: Aldine de Gruyter.
- Wright, Mona A., and Garen J. Wintemute. 2010. “Felony or Violent Criminal Activity That Prohibits Gun Ownership among Prior Purchasers of Handguns: Incidence and Risk Factors.” *Journal of Trauma*, no. 69: 948–955.
- Wright, Mona A., Garen J. Wintemute, and Frederick A. Rivara. 1999. “Effectiveness of Denial of Handgun Purchase to Persons Believed to Be at High Risk for Firearm Violence.” *American Journal of Public Health*, no. 89: 88–90.

This page intentionally left blank

Preventing the Diversion of Guns to Criminals through Effective Firearm Sales Laws

Daniel W. Webster, Jon S. Vernick, Emma E. McGinty,
and Ted Alcorn

Weaknesses in Federal Gun Laws Which Enable Criminals to Get Guns

Preventing individuals who are deemed too risky or dangerous from obtaining firearms is arguably the most important objective of gun control policies. Many perpetrators of gun violence are prohibited by federal law from purchasing firearms from a licensed dealer due to prior felony convictions or young age. Other contributions to this book provide compelling evidence that existing conditions for disqualifying someone from legally possessing firearms are justifiable and should be expanded (Vittes, Webster, and Vernick, in this volume). Wintemute (chap. 7 in this volume) and Zeoli and Frattaroli

Daniel W. Webster, ScD, MPH, is a professor in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Jon S. Vernick, JD, MPH, is an associate professor and associate chair in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Emma E. McGinty, MS, is a research assistant and fourth-year PhD candidate in Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Ted Alcorn, MA, MHS, is a senior policy analyst in the Office of the Mayor of New York City.

(in this volume) provide evidence that laws which prohibit firearm possession by persons convicted of violent misdemeanors and those who are subject to restraining orders for domestic violence can reduce violence.

Some prohibited persons will voluntarily refrain from having a firearm in order to avoid criminal sanctions. But policies that enhance firearm seller and purchaser accountability are likely to determine how effectively gun control laws prevent prohibited individuals from acquiring guns. The federal Brady Law serves as a foundation, albeit incomplete, for preventing prohibited persons from acquiring firearms by making firearm purchases from federally licensed firearm dealers contingent upon the prospective purchaser passing a background check (Cook and Ludwig, in this volume). Licensed dealers must check purchasers' IDs, submit purchase applications to the FBI's National Instant Check System (NICS), and maintain records of all firearms acquisitions and sales so that ATF auditors can assess the dealers' compliance with gun sales laws.

Data on guns recovered by police and traced by the U.S. Bureau of Alcohol, Tobacco and Firearms (ATF) have indicated that about 85% of criminal possessors were not the retail purchaser (Bureau of Alcohol, Tobacco and Firearms 2002). This is consistent with our analysis of data from the most recent (2004) Survey of Inmates in State Correctional Facilities (SISCF) to determine the source for the handguns acquired by the 1,402 inmates incarcerated for an offense committed with a handgun. The largest proportions of offenders got their handguns from friends or family members (39.5%) or from street or black market suppliers (37.5%), sales for which there are no federal background check requirements. Licensed gun dealers were the direct source for 11.4% of the gun offenders. One in 10 offenders in our sample reported that they had stolen the handgun that they used in their most recent crime. Handgun acquisitions by offenders at gun shows and flea markets were rare (1.7%).

It is easy to understand why offenders would prefer private sellers over licensed firearms dealers. Under federal law and laws in most states, firearm purchases from unlicensed private sellers require no background check or record keeping. The lack of record keeping requirements helps to shield an offender from law enforcement scrutiny if the gun were used in a crime and recovered by police. Indeed, of the offenders in the SISCF who were not prohibited from possessing a handgun prior to the crime leading to their incarceration, two-thirds had obtained their handguns in a transaction with a private seller.

That only 11% of handgun offenders reported acquiring their handguns from a licensed gun dealer does not mean that licensed dealers play a negligible role in the diversion of guns to criminals. Federal gun trafficking investigations indicate that corrupt licensed dealers represent one of the largest channels for the illegal gun market (Bureau of Alcohol, Tobacco and Firearms 2000), and a national phone survey of gun dealers found a willingness to make gun sales likely to be illegal relatively common (Sorenson and Vittes 2003). As articulated by Vernick and Webster (in this volume) and Braga and Gagliardi (in this volume), current federal laws provide many protections to licensed firearm sellers, and the Bureau of Alcohol, Tobacco, Firearms and Explosives lacks the resources and political power to serve as a robust deterrent to illegal gun sales.

Prior Evidence That Better Regulation of Gun Sellers Reduces Diversions of Guns to Criminals

Weaknesses in federal gun sales laws may cause skepticism about whether gun control can work in the United States. However, states vary greatly in the nature of their gun sales laws. For example, many states extend conditions for firearm prohibitions beyond those covered in federal law to include additional high-risk groups and place additional regulations on firearm sales to prevent illegal transfers. Twelve states require retail firearm sellers to be licensed by state or local governments and allow law enforcement to conduct audit inspections of gun dealers (Vernick, Webster, and Bulzachelli 2006). Fifteen states extend firearms sales regulations to sales by private, unlicensed sellers, and two additional states require background checks for firearms sold at gun shows. Nine states have some form of licensing system for handgun purchasers, five require applicants to apply directly with a law enforcement agency and be photographed and fingerprinted, and three allow agencies to use their discretion to deny an application if they deem it to be in the interest of public safety. Additional laws enacted by states to keep guns from prohibited persons include mandatory reporting of loss or theft of private firearms, limiting handgun sales to one per person per month, and banning the sale of low-quality “junk guns” that are overrepresented in crime (Wintemute 1994; Wright, Wintemute, and Webster 2010).

A study which used crime gun trace data from 53 U.S. cities for the years 2000–2002 examined the association between state gun sales regulations and

12 *Daniel W. Webster, Jon S. Vernick, Emma E. McGinty, and Ted Alcorn*

the diversion of guns to criminals (Webster, Vernick, and Bulzacchelli 2009). Diversion of guns to criminals was measured by the number of guns recovered by police within one year of retail sale unless the criminal possessor was the legal retail purchaser. In addition to examining state laws, this study also surveyed state and local law enforcement officials to ascertain their policies for conducting compliance inspections or undercover stings of licensed dealers. Strong regulation and oversight of licensed gun dealers—defined as having a state law that required state or local licensing of retail firearm sellers, mandatory record keeping by those sellers, law enforcement access to records for inspection, regular inspections of gun dealers, and mandated reporting of theft or loss of firearms—was associated with 64% less diversion of guns to criminals by in-state gun dealers. Regulation of private handgun sales and discretionary permit-to-purchase (PTP) licensing were each independently associated with lower levels of diversion of guns sold by in-state dealers. The finding on private sales regulations is consistent with the results of a systematic observational study of gun sales at gun shows that found anonymous undocumented firearms sales to be ubiquitous and illegal “straw man” sales more than six times as common in states that do not regulate private sales compared with California that does regulate such sales (Wintemute 2007; Wintemute, chap. 7 in this volume).

Diversions of Guns to Criminals Following Missouri’s Repeal of Permit to Purchase Licensing

The associations between state gun sales laws and diversions of guns to criminals cited above are cross-sectional and therefore do not capture changes in gun diversions following changes in state gun sales laws. The strong association between at least some forms of PTP licensing and lower rates of gun diversions to criminals could potentially be confounded by some variable omitted from the analyses that distinguishes states that enact the most comprehensive firearm sales regulations from those that do not. There have been few noteworthy changes in gun sales laws during a period when crime gun tracing practices were more common and the data were available to track changes over time. An exception is the repeal of Missouri’s PTP law effective August 28, 2007. This law had required handgun purchasers to apply for a PTP through their local county sheriff’s office and required a PTP for all handgun sales, whether by licensed or unlicensed sellers. Following the repeal, handgun

purchasers could purchase handguns without a background check or record keeping if the seller was not a licensed dealer, and licensed gun dealers rather than sheriff's deputies processed applications to purchase handguns.

Using annual state-level data on crime guns recovered by police in Missouri and traced by the ATF for the period 2002–2011, we examined changes in commonly used indicators of illegal gun diversion—the number and proportion of guns with short sale-to-crime intervals—before and after the state repealed its PTP law. If Missouri's PTP law had been curtailing the diversion of guns to criminals, the repeal of the law should result in more short sale-to-crime guns recovered by police, and the shift in increasing crime guns should coincide with the length of time between the repeal of the law and a crime gun's recovery by police.

Such a pattern is clearly evident in the data presented in Table 8.1. The percentage of traced crime with a sale-to-crime interval of less than three months begins to increase from a pre-repeal stable mean of 2.8% to 5.0% in 2007 when the repeal was in effect for four months, and then jumps up to a mean of 8.5% for 2008 through 2011. The percentage of crime guns with sale-to-crime intervals of three to twelve months increased sharply beginning in 2008 from a pre-repeal mean of 6.2% to 14.0% for 2008–2011 when all such guns were purchased after the law's repeal. If the PTP repeal increased the diversion of guns to criminals, the percentage of crime guns recovered at a

Table 8.1 Percentage of Missouri Crime Guns with Short Time Intervals between Retail Sale and Recovery by Police for Years 2002–2011

Year	Up to 3 months (%)	3–12 months (%)	1–2 years (%)
2002	2.9	5.2	5.2
2003	3.2	5.3	6.1
2004	2.1	5.6	5.7
2005	3.3	5.1	6.6
2006	3.2	7.5	7.2
2007	4.5	7.9	7.1
2008	9.4	12.6	6.7
2009	8.1	15.0	12.7
2010	7.6	13.7	13.0
2011	8.5	14.3	12.7

one to two years sale-to-crime interval should increase beginning in 2009. Indeed, that is what happened. These guns increased sharply from a mean of 6.4% to 13.0%. The sharp increase in very short sale-to-crime intervals for guns in Missouri was not part of a national trend; in fact, the average sale-to-crime interval increased nationally from 10.2 years in 2006 to 11.2 years in 2011.

Because states with stronger gun sales laws tend to attract guns originating in states with weaker gun laws (Cook and Braga 2001; Webster, Vernick, and Hepburn 2001), we also compared trends in the proportion of Missouri's crime guns that were initially purchased in Missouri versus those that had been purchased outside of the state. Consistent with our hypotheses that Missouri's PTP had been preventing guns from being diverted to criminals, the share of crime guns originating from Missouri increased from a mean of 55.6% when the PTP law was in place to 70.8% by 2011, while the proportion that had originated from out of state gun dealers decreased from 44.4% before the repeal, began dropping in 2008, and was 29.2% in 2011. This is a remarkable change for an indicator that tends to change very little over time.

Effects of State Gun Sales Laws on the Export of Guns to Criminals across State Borders

In 2009, 30% of crime guns traced by the ATF were recovered in states other than the state where they were originally sold; however, there is great variation across states with respect to the proportion of crime guns which were originally sold by gun dealers in other states. Mayors Against Illegal Guns (2010) published a report showing great disparities across states in the number of crime guns exported per capita. Bivariate analyses indicated that each of ten selected gun control laws were associated with exporting fewer guns per capita that were used by criminals in other states. In a National Bureau of Economic Research (NBER) working paper, Knight used an index of eleven laws developed by MAIG to examine the flow of guns to and from states with strong versus weak gun laws and found that states with weak gun laws tended to export guns to states with strong gun laws (Knight 2011).

The present study adds to this literature by using crime gun trace data from the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) to examine the cross-sectional association between state gun laws and the per capita rate of exporting crime guns across the 48 contiguous U.S. states. The following state gun sales laws were considered: strong regulations of retail

gun dealers¹; permit-to-purchase (PTP) licensing; private sales regulations (mandatory background checks of sellers or valid PTP); handgun registration; mandatory reporting to law enforcement of theft and loss of firearms by private owners; whether the state has criminal penalties for dealers who fail to conduct background checks or has penalties for illegal straw purchasers; one-gun-per-month restrictions; assault weapon bans; and junk gun bans. Three variations of PTP laws were examined: (1) discretionary PTP laws which give law enforcement the discretion to refuse to issue permits; (2) PTP with fingerprinting which requires applicants to appear at the law enforcement agency that issues the permits to be photographed and fingerprinted; and (3) nondiscretionary PTP laws which require a permit to purchase a firearm but do not require applicants to go to agencies to be fingerprinted.

We used negative binomial regression models with robust standard errors to estimate the association between state gun laws and the per capita rate of crime guns exported to criminals in other states after controlling for potential confounders. Key confounders controlled for in the analyses were the prevalence of gun ownership, out-of-state population migration, and the number of people living near the border of states with strong gun laws. State population served as an offset variable so that transformed regression coefficients could be interpreted as incident rate ratios (IRR) and percentage reductions in risk.

Data on crime gun exports were obtained from the 2009 state-level crime gun trace data posted on the ATF's website. ATF defines crime guns as recovered firearms that were "illegally possessed, used in a crime, or suspected to have been used in a crime." In 2009, 61% of the guns that police submitted to ATF were successfully traced to the first retail sale.

Data on state gun laws were obtained through legal research and from ATF and U.S. Department of Justice Publications. Oak Ridge National Laboratory's LandScan global population distribution data was used with arcGIS Version 10 to calculate state border population variables used as control variables in statistical models. These control variables included population within 50 miles of a bordering states with the strongest gun control laws² and states with medium level of gun control.³ Household prevalence of firearm ownership was obtained from the Behavioral Risk Factor Surveillance System 2001 survey (Centers for Disease Control and Prevention 2001), and measures of state migration⁴ were obtained from the American Community Survey (ACS) 2005–2009 five-year estimates. Finally, we measured two variables indicating that a state borders Canada or Mexico, respectively.

States that exported the most crime guns per 100,000 population were Mississippi (50.4), West Virginia (47.6), Kentucky (35.0), and Alabama (33.4). Of these four states, three (Mississippi, West Virginia, and Kentucky) had none of the state gun laws we examined. Alabama penalized gun dealers who failed to conduct background checks but had no other laws of interest in place. States that exported the fewest crime guns per capita—New York (2.7), New Jersey (2.8), Massachusetts (3.7), and California (5.4)—each had strong gun dealer oversight, regulated private sales, and handgun registries. New York, New Jersey, and Massachusetts also had discretionary PTP and required reporting of firearm theft/loss.

Data from the regression analysis are presented in Table 8.2. Due to high collinearity (Variance Inflation Factor > 10), assault weapons bans and handgun registration laws were dropped from the final models. Statistically significant lower per capita export of crime guns across state borders was found for

Table 8.2 Estimates of association between state gun laws and crime gun exports

	IRR	Robust SE	<i>p</i> value
State gun laws			
Discretionary purchase permits	0.24	0.10	.001
Purchase permits with fingerprinting	0.55	0.15	.02
Nondiscretionary permits	0.75	0.15	.15
Strong dealer regulation ^a	1.45	0.30	.07
Penalty for failure to conduct background checks	0.76	0.12	.07
Penalty for straw purchasers	1.46	0.30	.07
Junk guns banned	0.68	0.13	.04
Private sales regulated	0.71	0.11	.03
Firearm theft/loss reported	0.70	0.10	.02
One gun per month	0.81	0.26	.51
Covariates			
Household gun ownership	6.05	4.20	.009
Border population in states with strong gun laws ^b	1.00	1.82E-08	.50
Border population in states with medium gun laws ^c	1.00	2.57E-08	.14
Migration out of state	0.99	5.04E-07	.50
Borders Canada	0.68	0.065	<.001
Borders Mexico	0.84	0.19	.43

Note: IRR = incidence rate ratio. Model also includes state population offset term.

^aStates were considered to have strong dealer regulation if they require licensing of gun dealers, allow inspection of dealer records, and penalize dealers who falsify records.

^bStates were considered to have strong gun laws if they have a discretionary permit-to-purchase law.

^cStates were considered to have medium gun laws if they regulate private sales, require licensing of gun dealers, and allow inspections of dealer records.

discretionary PTP laws (IRR=0.24, lowered risk 76%), nondiscretionary PTP laws requiring fingerprinting at a law enforcement agency (IRR=0.55, -45%), junk gun bans (IRR=0.68, -32%), regulation of private sales (IRR=0.71, -29%), and required reporting of firearm theft or loss by private gun owners (IRR=0.70, -30%) were each associated with statistically significantly lower rates of crime gun exports. Effects for penalties for gun dealers' failure to conduct background checks (IRR=0.76) and penalties for straw purchases (IRR=1.24) approached statistical significance at the .05 level but in opposite directions. Although billed as a deterrent to interstate gun trafficking, one-gun-per-month restrictions were unrelated to trafficking and neither were strong dealer regulations, penalties for failure to conduct background checks, or penalties for straw purchasing. Household gun ownership (IRR=6.05) was associated with higher crime gun export rates and bordering Canada was associated with lower crime gun exports (IRR=0.84). States bordering other states where gun laws are relatively strict was unrelated to the rate of exporting crime guns after controlling for gun sales laws and other factors.

Conclusions and Policy Implications

Data presented here provide compelling evidence that the repeal of Missouri's permit-to-purchase (PTP) law increased the diversion of guns to criminals. The timing of the effects on our indicator of diversion, short intervals between sales, and recovery in crime was in exact correspondence with the timing of the law's repeal. The changes observed in gun diversions in Missouri are likely related to the substantial change in how guns were sold following the law's repeal. Prospective purchasers of handguns being sold by private individuals no longer had to pass a background check and sellers were no longer required to document the sale. Prospective purchasers, including illegal straw purchasers, interested in buying handguns from licensed dealers applied to purchase the gun at the place that profited from the sale rather than at a law enforcement agency. Repealing the PTP law made it less risky for criminals, straw purchasers, and persons willing to sell guns to criminals and to their intermediaries, and these individuals appear to have taken advantage of the opportunities afforded to them by the repeal.

In our study of state gun sales laws in the 48 contiguous states, discretionary PTP laws were the most dramatic deterrent to interstate gun trafficking. This finding is consistent with prior research showing a negative association

between these laws and intrastate diversion of guns to criminals; however, the effects were either mediated by or explained by lower levels of gun ownership in states with these laws (Webster, Vernick, and Bulzachelli 2009). Discretionary permitting procedures such as in-depth and direct scrutiny by law enforcement, longer waiting times, higher fees, and stricter standards for legal ownership may depress gun ownership and reduce opportunities for criminals to find individuals who have guns that they would be willing to sell or who would be targets for gun theft. The strong negative association between nondiscretionary PTP laws and exporting guns to criminals in other states after statistically controlling for gun ownership levels, geography, and other gun laws suggests that PTP laws deter gun trafficking.

Perhaps most relevant to current debates about federal gun policy, we found that states which regulated all handgun sales by requiring background checks and record keeping, not just those made by licensed dealers, diverted significantly fewer guns to criminals in other states. This finding is consistent with the results of a prior study of intrastate diversions of guns to criminals (Webster, Vernick, and Bulzachelli 2009) and the findings of an observational study of sales practices gun shows (Wintemute 2007; chap. 7 in this volume). The importance of fixing this flaw in current gun law is highlighted by data first reported here which indicate that nearly 80% of handgun offenders incarcerated in state prisons reported purchasing or trading for their handgun from an unlicensed seller who, in most states, was not legally obligated to ensure that the purchaser passed a background check or to keep a record of the transaction.

Our examination of state firearms regulations and the interstate diversion of guns to criminals considered a larger array of laws than prior studies. Laws requiring private gun owners to promptly report theft or loss of firearms to police are intended to increase private gun seller accountability and provide law enforcement with a tool to combat illegal straw purchases when such purchasers accept no responsibility for the gun being in the hands of a prohibited person with dubious claims of unreported gun theft. Having this measure of accountability significantly reduced interstate gun trafficking, as did bans of junk guns. Junk guns are the least expensive guns, and their low price enables traffickers to invest relatively little money in guns that can sell for nearly five times more than retail prices on the streets in states with the most restrictive gun laws. Prior research on the effects of Maryland's ban of junk guns found the banned guns used much less in Baltimore, Maryland, than in cities with-

out such bans, seven years after Maryland's law was enacted (Vernick, Webster, and Hepburn 1999), and gun homicides were 9% lower than projected had the law not been enacted (Webster, Vernick, and Hepburn 2002).

Interestingly, a policy designed specifically to deter interstate gun trafficking—one-gun-per-month limits for gun buyers—was not associated with the export of guns to criminals in other states. Strong gun dealer regulations were also unrelated to exporting of crime guns across state lines. A prior study of intra-state trafficking found that strong dealer regulations by themselves were not effective unless law enforcement reported that they had a policy of regular compliance inspections. Unfortunately, we had no measure of enforcement for the current study.

Our assessment of the effects of state gun control laws on the export of guns to criminals in other states had several limitations. First, the cross-sectional study design precludes an assessment of whether changes in gun control laws prompt subsequent changes in crime gun exports. Longitudinal crime gun trace data could not be obtained, as many of the state laws of interest were in place before crime gun tracing become common practice. The sharp increase in diversions of guns to criminals following the repeal of Missouri's law, however, lessens this concern. Second, our outcome data does not include all crime gun exports. Not all crime guns are submitted to the ATF for tracing. In 2009, gun traces could not be completed for nearly 40% of crime guns due to insufficient or incorrect data. Third, although reducing the diversion of guns to criminals is a key objective of some gun control laws, there is currently insufficient research to discern the degree to which reductions in diverted guns affects gun violence, and it appears as though some have had no impact.

In spite of these limitations, our study is the first to estimate independent associations between a number of state gun control laws and crime gun export rates while controlling for confounders, and it is the first longitudinal assessment of the impact of permit-to-purchase licensing that regulates all handgun sales. Our findings on cross-state diversions of crime guns underscores the importance of having more comprehensive federal regulation of firearm sales because lax laws in many states facilitate the arming of criminals beyond state borders. At a minimum, federal law should require background checks and record keeping for all firearms sales. Regulating many private sellers is a challenge, yet the data suggest that it is necessary to deter the diversion of guns to criminals, and requiring gun owners to report theft or loss of firearms provides additional accountability to prevent illegal sales.

120 Daniel W. Webster, Jon S. Vernick, Emma E. McGinty, and Ted Alcorn

Acknowledgments

Funding for this research was provided by grants from the Joyce Foundation and Bloomberg Philanthropies.

Notes

1. Licensing of gun dealers, inspection of dealer records allowed, and criminal penalties for dealers who falsified records.
2. PTP laws or in the District of Columbia with what could be considered a ban on firearm ownership until 2008.
3. Regulate private sales, require licensing of gun dealers, and allow inspections of dealer records.
4. The number of people who moved out of each state between 2005 and 2009.

References

- Bureau of Alcohol, Tobacco and Firearms (ATF). 2000. *Following the Gun*. Washington, DC: U.S. Department of the Treasury.
- Bureau of Alcohol, Tobacco and Firearms (ATF). 2002. *Crime Gun Trace Reports (2000): The Youth Crime Gun Interdiction Initiative*. Washington, DC: U.S. Department of the Treasury.
- Bureau of Justice Statistics. 2004. *Survey of Inmates in State Correctional Facilities (SISCF)*. Washington, DC: U.S. Department of Justice.
- Centers for Disease Control and Prevention (CDC). 2001. *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, GA: U.S. Department of Health and Human Services.
- Cook, Philip J., and Anthony A. Braga. 2001. "Comprehensive Firearms Tracing: Strategic and Investigative Uses of New Data on Firearms Markets." *Arizona Law Review* 43 (2): 277–309.
- Cook, Philip J., Jens Ludwig, and Anthony A. Braga. 2005. "Criminal Records of Homicide Offenders." *Journal of the American Medical Association* 294: 598–601.
- Environmental Systems Research Institute (ESRI). 2011. *ArcGIS Desktop: Release 10*. Redlands, CA.
- Knight, Brian G. 2011. "State Gun Policy and Cross-State Externalities: Evidence from Crime Gun Tracing." National Bureau of Economic Research Working Paper no. 17469. Cambridge, MA.
- Mayors Against Illegal Guns. 2010. *Trace the Guns: The Link Between Gun Laws and Interstate Gun Trafficking*. http://www.mayorsagainstillegalguns.org/downloads/pdf/trace_the_guns_report.pdf.
- Sorenson, Susan B., and Katherine A. Vittes. 2003. "Buying a Handgun for Someone Else: Firearm Dealer Willingness to Sell." *Injury Prevention* 9:147–150. doi:10.1136/ip.9.2.147.

- Vernick, Jon S., Daniel W. Webster, and Maria T. Bulzacchelli. 2006. "Regulating Firearms Dealers in the United States: An Analysis of State Law and Opportunities for Improvement." *Journal of Law, Medicine & Ethics* 34: 765–775.
- Vernick, Jon S., Daniel W. Webster, and Lisa M. Hepburn. 1999. "Effects of Maryland's Law Banning Saturday Night Special Handguns on Crime Guns." *Injury Prevention* 5: 259–263.
- Vittes, Katherine A., Jon S. Vernick, and Daniel W. Webster. 2012. "Legal Status and Source of Offenders' Firearms in States with the Least Stringent Criteria for Gun Ownership." *Injury Prevention*. Published Online First: 23 June. doi:10.1136/injuryprev-2011-040290.
- Webster, Daniel W., Jon S. Vernick, and Maria T. Bulzacchelli. 2009. "Effects of State-Level Firearm Seller Accountability Policies on Firearms Trafficking." *Journal of Urban Health* 86: 525–537.
- Webster, Daniel W., Jon S. Vernick, and Lisa M. Hepburn. 2001. "The Relationship between Licensing, Registration and Other State Gun Sales Laws and the Source State of Crime Guns." *Injury Prevention* 7: 184–189.
- Webster, Daniel W., Jon S. Vernick, and Lisa M. Hepburn. 2002. "Effects of Maryland's Law Banning Saturday Night Special Handguns on Homicides." *American Journal of Epidemiology* 155: 406–412.
- Wintemute, Garen J. 1994. *Ring of Fire: The Handgun Makers of Southern California*. Sacramento, CA: Violence Prevention Research Program.
- Wintemute, Garen J. 2007. "Guns Shows across a Multistate American Gun Market: Observational Evidence of the Effects of Regulatory Policies." *Injury Prevention* 13: 150–155. Erratum in: *Injury Prevention* 13 286.
- Wright, Mona A., Garen J. Wintemute, and Daniel W. Webster. 2010. "Factors Affecting a Recently Purchased Handgun's Risk for Use in Crime under Circumstances That Suggest Gun Trafficking." *Journal of Urban Health* 87: 352–364.

This page intentionally left blank

Spurring Responsible Firearms Sales Practices through Litigation

The Impact of New York City's Lawsuits against Gun Dealers on Interstate Gun Trafficking

Daniel W. Webster and Jon S. Vernick

Surveys of criminals indicate that “street or illegal sources,” family, and friends are the most common proximate sources for criminals to obtain guns (Webster et al., in this volume; Harlow 2004). However, there are little data on how guns are initially diverted into the illegal market and into the hands of direct suppliers for criminals. Data from gun trafficking investigations indicate that licensed gun dealers play an important role in the diversion of guns from the legal to the illegal market. Gun dealers facilitate blatantly illegal sales by straw purchasers (individuals who buy guns on behalf of prohibited purchasers), or sell guns to traffickers or directly to criminals (Bureau of Alcohol, Tobacco and Firearms 2000). Phone surveys of licensed gun dealers, in which callers asked whether the dealer would sell them a handgun intended for their boyfriend, found between 20% and 50% were willing to make what would have been an illegal sale (Sorenson & Vittes 2003; Wintemute 2010).

Daniel W. Webster, ScD, MPH, is a professor in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Jon S. Vernick, JD, MPH, is an associate professor and associate chair in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health.

Research has shown that gun dealers' sales practices can have a powerful effect on the illicit market. Although some licensed gun dealers rarely sell guns that are subsequently recovered from criminals, others have been identified as the origin of hundreds of crime guns in a given year (Americans for Gun Safety 2004; Wintemute, Cook, & Wright 2005). In Milwaukee, for example, a single gun dealer was linked to the majority of the city's crime guns which were recovered within a year of the first retail sale (Webster, Vernick, & Bulzacchelli 2006). In response to negative publicity about the gun shop's frequent connection to guns used in crime, that gun dealer voluntarily changed his shop's sales practices—including eliminating the sale of so-called "junk guns." This change was followed by an immediate 76% reduction in the flow of new guns from that gun shop to criminals in Milwaukee, and a 44% reduction in new crime guns citywide (Webster, Vernick, & Bulzacchelli 2006).

A recent study found that comprehensive state or local regulation of licensed gun dealers (e.g., state or local licensing, record-keeping requirements, mandating or allowing inspections) coupled with routine law enforcement compliance efforts was associated with less intrastate trafficking of guns (Webster, Vernick, & Bulzacchelli 2009). Litigation is another policy tool that has been used to deter gun sales practices which could enable criminals to obtain guns (Vernick, Rutkow, & Salmon 2007). Beginning in the late 1990s, several local governments began to sue gun manufacturers, wholesalers, and retail gun shops for engaging in sales practices that, according to the plaintiffs, facilitated the diversion of guns from the legal to the illegal gun market. In support of their claims that retail gun dealers were engaging in negligent sales practices which enabled criminals to obtain guns, the plaintiffs presented data from the United States Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) which indicated that a relatively small number of gun dealers had long histories of selling a large number of guns that police later recovered from criminals. Some cities, including Chicago and Detroit, initiated a series of undercover stings of gun shops in their area which were linked to the most crime guns. These stings involved undercover police officers posing as gang members and blatantly attempting to illegally purchase firearms using straw purchasers. The videotapes of these stings were presented as evidence in the lawsuits and, in the case of Chicago, were also used in criminal cases against individuals who broke state gun sales laws. A study which tracked illegal gun trafficking indicators over time found that the Chicago and

Detroit lawsuits were associated with significant reductions in the flow of new handguns to criminals. Guns recovered by police within a year of retail sale by an in-state gun dealer dropped 62% in Chicago and 36% in Detroit. There were no significant changes in gun trafficking indicators in three comparable Midwestern cities that had not sued local gun dealers (Webster et al. 2006).

As discussed in the essay by Jon Vernick et al. (in this volume), in 2005 a new federal law was enacted which made it much more difficult for individuals or municipalities to bring lawsuits against firearm makers and sellers. Under the Protection of Lawful Commerce in Arms Act (PLCAA), lawsuits against firearm manufactures or dealers “resulting from the criminal or unlawful misuse” of a firearm “by the person or a third party” may not be brought in state or federal court (15 U.S.C. §7903(A)(5) (2010)). Thus, if a city were to sue a gun dealer alleging harm caused by the criminal (i.e., “third party”) use of firearms in that city, the lawsuit would be dismissed unless one of the limited exceptions to the PLCAA applied. Even lawsuits pending at the time the PLCAA was enacted were to be “immediately dismissed.” As a result, nearly all lawsuits brought by cities against gun dealers and manufacturers were dismissed (Vernick, Rutkow, & Salmon 2007).

One exception to the PLCAA’s protection of the firearm industry involves lawsuits where the plaintiff can show that harm was caused by a firearm dealer or manufacturer who “knowingly violated a State or Federal statute applicable to the sale or marketing of the product . . .” (15 U.S.C. §7903(a)(5) (2010)). Under this exception, if the damages alleged in the lawsuit are associated with the knowing violation of a firearms sales law *by the defendant*—whether or not another criminal act, such as a homicide or assault by the gun buyer, was also involved—then the lawsuit may proceed.

This exception was used by New York City in its 2006 litigation against 27 gun dealers who were videotaped facilitating illegal straw gun purchases in undercover stings. This essay describes New York City’s use of litigation to compel these gun dealers to adopt new business practices designed to prevent the diversion of guns to criminals and other prohibited persons. It also presents data from 10 of the dealers who had maintained electronic sales records showing a dramatic reduction in the number of guns sold by these dealers that were subsequently recovered by the New York Police Department (NYPD).

New York City's Lawsuits against Selected Gun Dealers

Following shooting deaths of two NYPD officers and the fatal shooting of a young child caught in crossfire, in 2006 New York City Mayor Michael Bloomberg made fighting illegal guns a top priority of his administration. The success of the undercover stings and lawsuits in Chicago and Detroit in reducing the flow of new guns to criminals encouraged New York City officials to undertake a similar effort. The city hired private investigators to stage and secretly videotape undercover stings of 55 gun dealers located across seven states that were among the most common source states for guns recovered by police from criminals and crime scenes in New York City. The seven states were Alabama, Georgia, North Carolina, Ohio, Pennsylvania, South Carolina, and Virginia. Some of the targeted gun dealers had also sold guns to individuals prosecuted for crimes related to gun trafficking.

All of the stings were conducted in a similar manner. A male and a female investigator entered the gun stores together. The male investigator engaged sales staff with questions about different firearms and selected one or more to purchase. The female investigator, who had not been involved in the selection of the gun, would then attempt to complete the federal form for a background check of prospective firearm purchasers. The male investigator would attempt to pay for the firearm and receive it from the sales person after the instant background check was completed. Transactions of this type violate federal firearms laws; this was acknowledged by many of the gun dealers who were stung and refused to make the sale.

Of the 55 gun dealers, 27 were caught facilitating illegal sales in the undercover stings and were sued by New York City. Nearly all of the dealers came to an agreement with the city to change their business practices to prevent illegal gun sales. As part of the settlements, a special master was appointed to ensure that each gun dealer complied with all applicable firearm sales laws. Gun dealers were required to allow the special masters to use in-store observation (including use of videotape surveillance); records monitoring, including: all crime gun trace requests made by ATF since the date of the settlement; inventory inspections; random and repeated sales integrity testing; and instructional programs designed to provide best practices sales training to all employees involved in firearms sales. Gun dealers were also required to file a performance bond with the Court that was considered by the city to be satisfactory. The performance bond required the gun dealer, usually within

15 days of its signing, to forfeit a designated amount of money to New York City anytime the special master found that the dealer sold a gun to a straw purchaser or violated other applicable gun sales laws and regulations. Evidence of such a violation could have resulted from an indictment against a straw purchaser indicating circumstances under which a reasonable person would have recognized that a straw purchase was occurring, observation of a straw purchase from reviews of videotape monitors, or a sale made to an investigator conducting a simulated straw purchase. The performance bond lasted until the special master certified that three consecutive years of full compliance by the gun dealership had occurred.

Assessing Program Effects on the Diversion of Guns to Criminals

Electronic sales data for specific guns sold (i.e., make, model, caliber, serial number, date of sale) for the period from January 1, 2003 through June 30, 2007 were made available to the special master by 10 of the gun dealers sued by New York City. The special master shared the data with the New York City Law Department which then provided it to researchers. To ascertain whether any of the guns sold by these 10 dealers were subsequently recovered by NYPD, we obtained NYPD's database for firearms it recovered from criminals, crime scenes, and other settings from January 1, 2003 through June 30, 2008. The NYPD database contained data on manufacturer/make, model, caliber, and serial number for each gun as well as the date on which it was recovered. The gun sales and police recovery databases were subsequently merged. To identify guns that were sold by the 10 gun dealers of interest and later recovered by NYPD, we looked for matches based on make, caliber, and serial number.

The primary goal of the analysis was to compare the likelihood of NYPD recovery for guns sold before and after the lawsuits were announced. Guns sold during the pre-lawsuit period had much greater opportunity for NYPD recovery than guns sold after the lawsuits due to more follow-up time for the pre-lawsuit-sold guns compared with post-lawsuit sales. Guns sold prior to the lawsuit had from 25 to 66 months (mean = 43 months) of follow-up time, whereas guns sold after the lawsuits had 13 to 25 months (mean = 18 months) of follow-up time. Researchers were only provided sales data for 13.5 months following the announcement of the lawsuits and had between 12 and 25.5 months of follow-up time for police recovery data for post-lawsuit sales.

Therefore, we constrained the follow-up time for the pre-lawsuit-sold guns to make it roughly equivalent to that of the post-lawsuit cohort of guns. Specifically, we selected all guns sold during the 13.5 months immediately prior to the lawsuits for comparison with the post-lawsuit-sold guns. We then determined which of these guns had been subsequently recovered by NYPD, and if the recovery occurred within a follow-up time period that was within the bounds of the appropriate follow-up period for guns sold during the post-lawsuit period. For example, a gun sold on May 16, 2006—the first day following the announcement of the first lawsuits—had a follow-up time of 776 days during which recovery was determined. Similarly, a 776-day window of exposure was examined for guns sold on the first day of the pre-lawsuit cohort of gun sales (April 15, 2005). In contrast, post-lawsuit sales which took place on the last day for which gun sales data were available (June 30, 2007) had a maximum follow-up period of 365 days. We, therefore, constrained the follow-up period for guns sold on the last day prior to the lawsuits' announcement (May 14, 2006) to 365 days.

To test whether the odds of NYPD recovery for guns sold after the lawsuits were announced was different from the odds of NYPD recovery for guns sold before the lawsuits, we calculated the crude odds ratio, its 95% confidence interval, and Pearson's chi-square statistic. In addition, we performed a logistic regression to estimate the relationship between the time period in which a gun was sold (before lawsuits = 0; after lawsuits = 1) after controlling for the exposure or days of follow-up and a set of indicator variables for the specific dealer that sold the gun.

For the 10 gun dealers included in the study, we identified sales records for 12,267 guns—6,081 before the lawsuits and 6,186 after the lawsuits. The mean follow-up time for post-lawsuit-sold gun sales was slightly longer than that of pre-lawsuit-sold guns (565.7 versus 542.3, $p < .001$). The number of recorded sales varied greatly across the 10 dealers from a low of 91 to a high of 2,337.

Only 5 of the 6,186 (0.008%) guns sold after the lawsuit were subsequently recovered by NYPD compared with 31 of the 6,081 (0.005%) guns sold during the period immediately before the lawsuit ($\chi^2 = 19.28$, $df = 1$, $p < .001$). The odds of a NYPD recovery was 84.2% lower during the post-lawsuit sales period than the pre-lawsuit sales period (OR = 0.16, 95% CI: 0.02, 0.41). The adjusted odds ratio for NYPD recovery for post-lawsuits guns versus pre-lawsuits guns estimated from the logistic regression which controlled for follow-up time and dealer-specific effects (OR = 0.18, 95% CI: 0.07, 0.46) was similar to the crude

odds ratio indicating the odds a gun sold following the lawsuits was recovered by NYPD relative to the odds of a gun sold before the lawsuits was recovered by NYPD.

Discussion and Policy Implications

This study has several limitations which restrict our ability to ascertain the full effects of the lawsuits and any subsequent changes in business practices resulting from the settlement agreements. First, we only had access to police gun recovery data for New York City. Most gun dealers sued by the city were located in many states that were hundreds of miles from New York including Georgia, Alabama, South Carolina, North Carolina, Virginia and Ohio. Although illegal gun markets vary across states, it seems likely that the new policies and practices instituted by the gun dealers to reduce the illegal diversion of guns to criminals would reduce the flow of guns to criminals within their home states as well as that of other states. Access to crime gun trace data from ATF would have allowed us to examine broader effects of the lawsuits; however, congressionally imposed restrictions on access to these data make such research extremely difficult if not impossible (Webster et al. 2012).

Agreements with the special master for the settlements against the gun dealers prevented us from knowing the identity of any of the dealers being studied. Knowing which dealers were included and the dates of the settlements would have allowed us to more precisely measure pre- and post-lawsuit periods. We believe that our estimates of the association between the lawsuits and probability of gun sales leading to subsequent recovery of the gun by NYPD are somewhat conservative because we assumed that any protective effects would be realized immediately following the announcement of the lawsuits against the first 15 gun dealers sued. Among the five post-lawsuit-sold guns later recovered by NYPD, one had been sold the day after the first lawsuits were announced and another was sold 10 days after the first lawsuits. Certainly, the agreements to institute an array of business practices designed to reduce the diversion of guns to criminals had not been reached or implemented within 10 days of the first lawsuits.

With the available data, it is impossible to determine the degree to which the sharp reduction in the risk of NYPD recovery following gun sales is due to the active oversight of the gun dealers by the special masters for their settlements or to new sales policies and practices. Marketing researchers have theorized

about and studied the countermarketing of products—rejection of unwanted demand by getting rid of undesirable customers or the prevention of risky transactions—that pose a special risk to consumers or the public at large if there is great risk of the product causing consumer or public harm if misused. They have found evidence of countermarketing effects among retail firearm sellers (Gundlock, Bradford, & Wilkie 2010). Walmart, the largest seller of firearms in the United States, has adopted a 10-point, voluntary code for responsible sales practices to prevent guns they sell from getting into the hands of criminals (Mayors Against Illegal Guns 2013).

The findings from our study are consistent with a growing body of research evidence which indicates that gun dealers' sales practices affect the probability of guns getting to criminals (Webster, Vernick, & Bulzachelli 2006), and that policies designed to hold gun sellers accountable can curtail the diversion of guns to criminals (Webster et al. 2009; Webster et al., this volume). Conversely, there is evidence that the federal policy which curtailed the use of crime gun trace data in lawsuits or in decisions about firearm dealers' licensure, so that gun dealers are less accountable, can increase the diversion of guns to criminals by problem dealers (Webster et al. 2012). While the current study focused narrowly on the effects of lawsuits—and presumably the gun sales reforms agreed to by the gun dealers—on the dealers who were sued, a prior study demonstrated citywide reductions in the flow of new guns to criminals in Chicago and Detroit following undercover stings and lawsuits against area gun dealers (Webster et al. 2006). These findings suggest that, to prevent the flow of large numbers of guns to criminals, policymakers should eliminate special protections for gun dealers from lawsuits and law enforcement oversight.

References

- Americans for Gun Safety Foundation. 2004. *Selling Crime: High Crime Gun Stores Fuel Criminals*. Washington, DC, January.
- Bureau of Alcohol, Tobacco and Firearms. 2000. *Following the Gun: Enforcing Federal Firearms Laws Against Firearms Traffickers*. Washington, DC: U.S. Department of the Treasury, June.
- Bureau of Alcohol, Tobacco, Firearms and Explosives. 2008. *ATF New York City*. New York: U.S. Department of Justice, New York Division of the BATF, ATF Gun Center, February.
- Gundlach, G.T., K.D. Bradford, W.L. Wilkie. 2010. "Countermarketing and Demarketing Against Product Diversion: Forensic Research in the Firearms Industry." *Journal of Public Policy & Marketing* 29: 103–122.

- Harlow, Caroline W. 2004. *Survey of Inmates in State Correctional Facilities (SISCF)*. Washington, DC: Bureau of Justice Statistics, United States Department of Justice.
- Koper, C.S. 2006. "Federal Legislation and Gun Markets: How Much Have Recent Reforms of the Federal Firearms Licensing System Reduced Criminal Gun Suppliers?" *Criminology and Public Policy* 1: 151-178.
- Mayors Against Illegal Guns. 2013. Responsible Firearms Sellers Partnership: A 10-Point Voluntary Code. <http://www.mayorsagainstillegalguns.org/downloads/pdf/partnership.pdf>
- Sorenson, Susan B., and Katherine A. Vittes. 2003. "Buying a handgun for someone else: firearm dealer willingness to sell." *Injury Prevention* 9(2): 147-150.
- Vernick, J.S., L. Rutkow, D.A. Salmon. 2007. "Availability of Litigation as a Public Health Tool for Firearm Injury Prevention: Comparison of Guns, Vaccines, and Motor Vehicles." *American Journal of Public Health* 97: 1991-1997.
- Webster, D.W., J.S. Vernick, and M.T. Bulzacchelli. 2006. "Effects of a Gun Dealer's Change in Sales Practices on the Supply of Guns to Criminals." *Journal of Urban Health* 83: 778-787.
- Webster, D.W., J.S. Vernick, and M.T. Bulzacchelli. 2009. "Effects of State-Level Firearm Seller Accountability Policies on Firearms Trafficking." *Journal of Urban Health* 86: 525-537.
- Webster, DW, Vernick JS, Bulzacchelli MT, Vittes KA. 2012. "Recent federal gun laws, gun dealer accountability and the diversion of guns to criminals in Milwaukee." *Journal of Urban Health* 89: 87-97.
- Webster, D.W., A.M. Zeoli, M.T. Bulzacchelli, and J.S. Vernick. 2006. "Effects of Police Stings of Gun Dealers on the Supply of New Guns to Criminals." *Injury Prevention* 12: 225-230.
- Wintemute, Garen. 2010. "Firearm retailers' willingness to participate in an illegal gun purchase." *Journal of Urban Health* 87(5): 865-78.
- Wintemute, G.J., P.J. Cook, M.A. Wright. 2005. "Risk Factors Among Handgun Retailers for Frequent and Disproportionate Sales of Guns Used in Violent and Firearms Crimes." *Injury Prevention* 11:357:363.

This page intentionally left blank

Curtailing Dangerous Sales Practices by Licensed Firearm Dealers

Legal Opportunities and Obstacles

Jon S. Vernick and Daniel W. Webster

It is an enlightening truism of gun policy that, in the United States, the vast majority of guns used in crime were originally sold by federally licensed firearm dealers. The primary exceptions are the modest number of guns stolen from manufactures or dealers or illegally imported from abroad. This does not mean that most gun dealers flout the law or knowingly sell guns to criminals. But it does suggest that one potentially fruitful approach to make it harder for firearms to flow from the legal to the illegal market is through enhanced regulation and oversight of firearm dealers.

There are approximately 55,000 federally licensed gun dealers in the United States (ATF 2013). Yet data from a 2000 analysis indicate that just over 1% of these dealers sold more than half (57%) of the guns later traced to crime (BATF 2000 a). This disproportionate supply of crime guns is not explained solely by the dealers' sales volume, local crime rates, or buyer demographics

Jon S. Vernick, JD, MPH, is an associate professor and associate chair in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Daniel W. Webster, ScD, MPH, is a professor in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health.

(Wintemute, Cook, and Wright 2005). In addition, analyses of gun trafficking investigations have found that licensed gun dealers accounted for the largest single source of guns diverted to the illegal market (BATF 2000 b; Braga et al. 2012). From a policy perspective, this concentration of crime gun suppliers among a relatively small group of licensed dealers bolsters the case for increased oversight. It suggests that focusing enforcement resources on this set of dealers has the potential for substantial payoff in reducing the diversion of guns to criminals.

Interventions more widely focused on a larger set of dealers are also needed. For example, there is evidence that a substantial proportion of gun dealers are willing to make a sale under conditions of questionable legality. In one national study, more than half (52.5%) of dealers surveyed were willing to make a “straw sale,” where one person unlawfully buys a gun intended for another (Sorenson and Vittes 2003). In another study of California firearm dealers, 20% were willing to participate in a straw sale (Wintemute 2010).

This essay examines some of the law and policy opportunities for improved regulation and oversight of firearm dealers. Existing law also creates certain obstacles for law enforcement efforts. Recommendations to address these legal obstacles are provided.

Dealer Licensing and Inspection

Under federal law, persons “engaged in the business” of selling firearms must obtain a dealer’s license from the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF). The initial license costs \$200 and is good for three years. Licensed dealers may purchase firearms directly from manufactures or distributors and may transfer a firearm to another licensed dealer, even across state lines, without a background check.

Seventeen U.S. states and the District of Columbia also require a state-level firearm dealer’s license. Criteria for obtaining the license vary widely. Some states impose conditions such as minimum age, criminal history standards, and fingerprinting. Others simply mandate the completion of a form and payment of a licensing fee (Vernick, Webster, et al. 2006).

Regular inspection of licensed gun dealers can serve to identify those who fail to account for their inventory, violate record keeping rules, or otherwise disobey the law. Frequent or serious violations can result in revocation of a

dealer's license. Even if no violation is found, regular inspection sends the message that law enforcement takes its dealer oversight mission seriously and that dealers are at greater risk if they break the law.

At the federal level, dealer oversight and inspection are the responsibility of ATF. Under the federal Firearm Owners' Protection Act (FOPA) of 1986, however, ATF is limited to one routine inspection of licensed gun dealers per year (18 U.S.C. 923(g)(1)(B)(ii)(I)). Resources for dealer oversight are also modest. As a result, most dealers are inspected much less frequently (Office of the Inspector General 2004). In 2007, ATF reported that it inspected each dealer on average only once every 17 years, though this figure may have improved more recently (Mayors Against Illegal Guns 2008). FOPA also raised the legal standard for revocation of a dealer's license to require a "willful" violation of the law—a much higher standard than the law usually imposes (18 U.S.C. § 923 (e)).

At the state level, just two states (Massachusetts and Rhode Island) mandate regular inspections of dealers. Overall, 23 states permit but do not require such inspections (Vernick, Webster, et al. 2006).

Research clearly demonstrates that enhanced dealer oversight reduces illegal gun trafficking. Webster et al. studied guns recovered by the police in 54 U.S. cities from 2000 to 2002 to identify factors associated with intrastate gun trafficking (defined as the share of guns with an interval between retail sale and recovery by the police, from someone other than the buyer, of less than one year). The authors defined strong gun dealer regulation and oversight as requiring under state law (1) a dealer's license; (2) record keeping of firearm sales; (3) dealers' premises to be open for inspections; and (4) prompt reporting of firearm thefts from dealers. After controlling for other factors, cities in states with strong dealer regulation had a much lower measure of intrastate gun trafficking (Webster, Vernick, and Bulzacchelli 2009).

Regarding *interstate* gun trafficking, research by Mayors Against Illegal Guns has demonstrated that states neither requiring nor permitting inspections of gun dealers are much more likely to export crime guns to other states than are jurisdictions with these laws. In fact, the average exporting rate for states without dealer inspection laws is 50% greater than for states with these laws (Mayors Against Illegal Guns 2008). Other research has also demonstrated that comprehensive enforcement of gun sales laws reduced gun trafficking in Boston (Braga and Pierce 2005).

Undercover Stings and Lawsuits against Gun Dealers

In some jurisdictions, police have used crime gun trace data to identify local firearm dealers selling disproportionate numbers of guns used in crime. Law enforcement has then conducted targeted enforcement efforts.

In 1998 and 1999, law enforcement in Chicago, Detroit, and Gary, Indiana, conducted undercover stings of retail gun stores suspecting of facilitating large numbers of illegal firearm sales. Police posed as gang members looking to “settle scores” or as straw buyers. After a number of the dealers were videotaped making illegal sales, the cities each separately sued those gun dealers. The lawsuits in Chicago and Detroit received substantial press coverage. An evaluation of the stings and lawsuits in Chicago, Detroit, and Gary compared gun trafficking indicators in these cities with three comparable midwestern cities (Cincinnati, Cleveland, and St. Louis) that did not conduct stings. The researchers found a 62% reduction in trafficked guns sold by in-state retailers in Chicago ($p < 0.001$); a 36% decline in Detroit ($p = 0.051$); and a nonsignificant increase in Gary, where the intervention and publicity were less robust (Webster, Bulzacchelli, et al. 2006).

The ability for litigation to serve as an important public health tool to address scofflaw gun dealers and the supply of crime guns was diminished in 2005 with the enactment of the federal Protection of Lawful Commerce in Arms Act (PLCAA). Under the PLCAA, gun makers and dealers received substantial protection against lawsuits “resulting from the criminal or unlawful misuse of a qualified product by the person or a third party.” Following the PLCAA, numerous lawsuits brought by municipalities and individuals arguing, in part, that firearm manufacturers failed to adequately supervise their dealers, were dismissed (Vernick, Rutkow, and Salmon).

One important exception to the PLCAA allows lawsuits against gun dealers to proceed if the dealer “knowingly” violated laws governing firearm sales. A series of undercover stings and lawsuits brought by New York City took advantage of this exception. In 2006, New York City identified 55 gun dealers in seven states who were supplying guns used in crime in the city. During an undercover sting operation, 27 of these dealers were caught facilitating illegal sales and were sued by the city. Nearly all agreed to settle their case by agreeing to a number of changes to their business practices to reduce illegal gun sales. These changes were overseen by a special master. Webster and Vernick studied the effects of the settlement on crime guns recovered from

lo dealers. The odds that a crime gun sold by one of these 10 dealers was later recovered in New York City were 84% lower after the change in business practices (Webster and Vernick, in this volume).

Access to Trace Data and the Tiahrt Amendment

Firearm trace data supplied by ATF have been critical to identifying problem dealers in need of enhanced oversight. The case of a prominent gun dealer in the Milwaukee area, Badger Guns and Ammo, provides a powerful example of the potential utility of trace data. In May 1999, ATF publicly released information that Badger led the nation in the number of guns sold that were later traced to crime. Just a few days later, Badger announced that it would no longer sell small, poorly made handguns, known as “junk guns” or “Saturday Night Specials,” which are favored by some criminals and disproportionately traced to crime (Vernick, Webster, and Hepburn 1999; Webster, Vernick, and Hepburn 2002). Following this change in sales practices, there was a 71% decline in the number of new Saturday Night Special crime guns recovered in Milwaukee and an overall 44% decline in the recovery of all guns with indicia of trafficking (i.e., recovery within one year from a user other than the initial buyer) (Webster et al. 2006).

However, beginning in 2003, an amendment to ATF’s annual appropriation by Congress has limited the release of trace data. Named after its sponsor, Representative Todd Tiahrt (R-KS), the Tiahrt Amendment began modestly, stating: “No funds appropriated under this Act . . . shall be available to take any action based upon . . . [the Freedom of Information Act] with respect to records . . . maintained pursuant to [the Gun Control Act] . . . or provided by . . . law enforcement agencies in connection with . . . the tracing of a firearm” (Pub. L. No. 108-7 § 644 (2003)). From 2003 to 2008, the Tiahrt Amendment was slowly expanded to prohibit any release of individual trace data by ATF to the public (including researchers); use of trace data in civil litigation; requiring dealers to conduct a physical inventory of their firearms as part of a compliance inspection; and maintaining records of background checks from firearm purchase applications for more than 24 hours (Tang 2009; Mayors Against Illegal Guns 2013).

In addition to impeding research on illegal gun trafficking, there is evidence that the Tiahrt Amendment may have emboldened some gun dealers who no longer needed to fear disclosure of trace data to the public. Researchers were

able to obtain trace information directly from the Milwaukee police department (though not for comparison cities) for the period from 2003 to 2006 to study the effects of the Tiahrt Amendment on Badger Guns and Ammo. The adoption of the Tiahrt Amendment was associated with a 203% increase in the number of guns diverted to criminals within one year of retail sale by Badger (Webster et al. 2012).

Recommendations

The law has an important opportunity to either hinder or facilitate greater oversight of licensed gun dealers. Importantly, such oversight need not interfere with law-abiding citizens' rights under the Constitution's Second Amendment (Vernick et al. 2011).

The following six recommendations are based on the research findings described in this essay.

1. *Portions of the Firearm Owners' Protection Act (FOPA) should be repealed.* These portions limit routine dealer inspections by ATF to one per year and raise the legal standard for revocation of a dealer's license. Honest firearm dealers do not need these protections and they impede identification and prosecution of the minority of dealers who violate the law.

2. *Funds should be allocated to permit ATF to conduct regular routine inspections of gun dealers.* These inspections can identify inventory or record keeping irregularities and generally send the message that gun dealers face an increased risk of being caught if they flout the law.

3. *ATF should be granted authority to impose a range of sanctions—including license suspension, fines, or other penalties—for dealers who violate gun sales or other laws.* ATF needs the authority to impose a range of administrative sanctions, short of criminal prosecution, to address problems with scofflaw dealers before they escalate.

4. *All states should mandate a state-level firearm dealer's license in addition to the federal license.* This would provide states with leverage to revoke a license if a dealer is caught making illegal sales, without needing to rely upon the often lengthy federal revocation process. All 50 U.S. states require a license for persons engaged in practices as mundane as cosmetology. Businesses with the public safety implications of dealing in firearms merit at least as much state-level oversight.

5. *The Protection of Lawful Commerce in Arms Act (PLCAA) should be repealed.* The PLCAA interferes with litigation's ability to serve as a restraint on the dangerous practices of firearm dealers and manufacturers. There is no evidence that the firearm industry needs or merits this unprecedented liability protection.

6. *The Tiahrt Amendment should be repealed.* Researchers should have access to trace data to understand how illegal gun markets respond to changes in business practices, law enforcement efforts, or new legislation. Requiring dealers to conduct a physical inventory of their firearms as part of compliance inspections can help to identify those who sell guns off-the-books or who otherwise cannot account for their stock.

Acknowledgments

The authors wish to thank the Johns Hopkins University for supporting the development of this essay. Much of the research described, conducted by Johns Hopkins faculty, was supported by the Joyce Foundation of Chicago or by gifts from an anonymous donor.

References

- Braga, Anthony A., Pierce, Glen L. 2005. "Disrupting Illegal Firearms Markets in Boston: The Effects of Operation Ceasefire on the Supply of New Handguns to Criminals." *Criminology and Public Policy* 4:717-748.
- Braga, Anthony A., Wintemute, Garen J., Pierce, Glenn L., Cook, Philip J., Ridgeway, Greg. 2012. "Interpreting the Empirical Evidence on Illegal Gun Market Dynamics." *Journal of Urban Health* 89:779-793.
- Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF). 2000a. *Commerce in Firearms in the United States*. Washington, DC: US Department of the Treasury.
- Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF). 2000b. *Following the Gun: Enforcing Federal Gun Laws against Firearms Traffickers*. Washington, DC: US Department of the Treasury.
- Bureau of Alcohol, Tobacco, Firearms and Explosives. Listing of Federal Firearm Licensees. <http://www.atf.gov/about/foia/ffl-list.html>.
- Mayors Against Illegal Guns. 2008. *The Movement of Illegal Guns in America*. New York: Mayors Against Illegal Guns, December.
- Mayors Against Illegal Guns. 2013. *The Tiahrt Amendments*. <http://www.mayorsagainstillegalsguns.org/html/federal/tiahrt.shtml>.

- Office of the Inspector General, US Department of Justice. 2004. *Inspection of Firearm Dealers by the Bureau of Alcohol, Tobacco, Firearms, and Explosives*. Report Number I-2004-005 (July).
- Sorenson, Susan B., and Vittes, Katherine A. 2003. "Buying a Handgun for Someone Else: Firearm Dealer Willingness to Sell." *Injury Prevention* 9:147-150.
- Tang, Angela J. 2009. "Taking Aim at Tiahrt." *William and Mary Law Review* 50: 1787-1829.
- Vernick, Jon S., Rutkow, Lainie, Salmon, Daniel A. 2007. "Availability of Litigation as a Public Health Tool for Firearm Injury Prevention: Comparison of Guns, Vaccines, and Motor Vehicles." *American Journal of Public Health* 97:1991-1997.
- Vernick, Jon S., Rutkow, Lainie, Webster, Daniel W., Teret, Stephen P. 2011. "Changing the Constitutional Landscape for Firearms: The Supreme Court's Recent Second Amendment Decisions." *American Journal of Public Health* 101:2021-2026.
- Vernick, Jon S., Webster, Daniel W., Bulzacchelli, Maria T., Mair, Julie S. 2006. "Regulation of Firearm Dealers in the United States: An Analysis of State Law and Opportunities for Improvement." *Journal of Law, Medicine & Ethics* 765-775.
- Vernick, Jon S., Webster, Daniel W., Hepburn, Lisa M. 1999. "Effects of Maryland's Law Banning Saturday Night Special Handguns on Crime Guns." *Injury Prevention* 5:259-263.
- Webster, Daniel W., Bulzacchelli, Maria T., Zeoli, April M., Vernick, Jon S. 2006. "Effects of Undercover Police Stings of Gun Dealers on the Supply of New Guns to Criminals." *Injury Prevention* 12: 225-230.
- Webster, Daniel W., Vernick, Jon S., Bulzacchelli, Maria T. 2006. "Effects of a Gun Dealer's Change in Sales Practices on the Supply of Guns to Criminals." *Journal of Urban Health* 83:778-787.
- Webster, Daniel W., Vernick, Jon S., Bulzacchelli, Maria T. 2009. "Effects of Firearm Seller Accountability Policies on Firearm Trafficking." *Journal of Urban Health* 86:525-537.
- Webster, Daniel W., Vernick, Jon S., Bulzacchelli, Maria T., Vittes, Katherine A. 2012. "Temporal Association between Federal Gun Laws and the Diversion of Guns to Criminals in Milwaukee." *Journal of Urban Health* 89:87-97.
- Webster, Daniel W., Vernick, Jon S., Hepburn, Lisa M. 2002. "Effects of Maryland's Law Banning Saturday Night Special Handguns on Homicides." *American Journal of Epidemiology* 155: 406-412.
- Wintemute, Garen. 2010. "Firearm Retailers' Willingness to Participate in an Illegal Gun Purchase." *Journal of Urban Health* 87:865-878.
- Wintemute, Garen J., Cook, Phillip J., Wright, Mona A. 2005. "Risk Factors among Handgun Retailers for Frequent and Disproportionate Sales of Guns Used in Violent and Firearm Related Crimes." *Injury Prevention* 11:357-363.

Part II / Making Gun Laws Enforceable

This page intentionally left blank

Enforcing Federal Laws against Firearms Traffickers

Raising Operational Effectiveness
by Lowering Enforcement Obstacles

Anthony A. Braga and Peter L. Gagliardi

Research suggests that only about one of every six firearms used in a crime was obtained legally (Reiss and Roth 1993) and that most serious gun violence is committed by a relatively small number of very active criminals (Braga 2003; Cook, Ludwig, and Braga 2005). Clearly, the United States has a large problem with the illegal acquisition of guns by high-risk individuals who should not have access to them. Criminal demand for guns is influenced by a number of factors such as fear of victimization and status concerns, technological concerns (e.g., concealment, caliber), and economic concerns (e.g., affordability) (Sheley and Wright 1995; Wright and Rossi 1994). While semi-automatic assault rifles have been misused in some high-profile tragedies, such as the horrific school shooting in Newtown, Connecticut, handguns are most frequently recovered in crime by law enforcement agencies (Cook, Braga, and Moore 2011).

Anthony A. Braga, PhD, is the Don M. Gottfredson Professor of Evidence-Based Criminology in the School of Criminal Justice at Rutgers University and a Senior Research Fellow in the Program in Criminal Justice Policy and Management at Harvard University. Peter L. Gagliardi is the Senior Vice President, Forensic Technology Inc.

One broad class of gun control policy instruments are those designed to influence who has access to different kinds of firearms (Braga, Cook, et al. 2002; Cook, Braga, and Moore 2011). In essence, these “supply-side” interventions seek to reduce gun crimes by keeping guns out of the wrong hands without denying access to legitimate owners or infringing on legitimate uses of guns. In maintaining legal firearms commerce for law-abiding citizens, there is the serious problem of preventing illegal transfers. That prevention currently is being handled very poorly. Loopholes in existing gun laws weaken accountability of licensed gun dealers and private sellers; this facilitates illegal transfers by scofflaw licensed gun dealers, generates difficulty in screening out ineligible buyers, and, most important, results in a vigorous and largely unregulated secondary market—gun sales by private individuals—in which used guns change hands (Cook, Molloconi, and Cole 1995).

Unfortunately, no rigorous field experiments have tested whether supply-side strategies would reduce criminal gun acquisition and use. While guns used in crimes are stolen from legal owners, the available scientific evidence suggests that a noteworthy portion of crime guns are illegally diverted from legal commerce. Research also suggests that supply-side interventions have promise in limiting criminal access to firearms. A key element of supply-side interventions involves the investigation, apprehension, and prosecution of illegal gun traffickers and others who illegally divert guns to criminals. Unfortunately, the investigation of illegal gun traffickers is hampered by a variety of enforcement obstacles.

In this essay, we briefly review the available research on the workings of illegal gun markets and the potential efficacy of supply-side interventions designed to disrupt the flow of illegal guns to criminals. We then make policy and legislative recommendations to improve the enforcement of federal firearms laws against gun traffickers.

Evidence

Much of the evidence in support of supply-side interventions comes from analyses of U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) firearm trace data and firearms trafficking investigations that indicate some percentage of the guns used in crime were recently diverted from legal firearms commerce (ATF 1997, 2000, 2002; Braga, Wintemute et al. 2012; Cook and Braga 2001; Pierce et al. 2004). Firearm tracing makes it possible, at least in principle,

to determine the chain of commerce for a firearm from the point of import or manufacture to the first retail sale (and beyond, in states that maintain records of gun purchases). Unfortunately, not all firearms can be traced and firearm trace data have some widely recognized limits. The National Academies' Committee to Improve Research Information and Data on Firearms, however, suggests that the validity of conclusions drawn from firearm trace data research depends on the care taken in the application and analyses of these data (National Research Council 2005).

Among the main findings of these research studies are (1) new guns are recovered disproportionately in crime (Cook and Braga 2001; Pierce et al. 2004; Zimring 1976). (2) Some licensed firearm retailers are disproportionately frequent sources of crime guns; these retailers are linked to more guns traced by ATF than would be expected from their overall volume of gun sales (there could be many reasons for these patterns; see Wintemute 2005). (3) Under test conditions, significant proportions of licensed retailers and private party gun sellers will knowingly participate in illegal gun sales (Sorenson and Vittes 2003; Wintemute 2010). (4) On average, about one-third of guns used in crime in any community are acquired in that community, another third come from elsewhere in the same state, and a third are brought from other states (ATF 1997, 2002; Cook and Braga 2001). (5) There are long-standing interstate trafficking routes for crime guns, typically from states with weaker gun regulations to states with stronger ones. The best known of these is the "Iron Pipeline" from the Southeast to the Middle Atlantic and New England (Cook and Braga 2001; Pierce et al. 2004).

Analyses of ATF firearm trafficking investigation data reveal that illegal gun traffickers exploit an incredibly leaky legal firearms commerce system. For instance, a 2000 report examining 1,530 gun trafficking investigations made by ATF between July 1, 1996, and December 31, 1998, found that more than 84,000 firearms were diverted from legal to illegal commerce (ATF 2000). The report identified the primary gun trafficking pathways as scofflaw and negligent firearms dealers, "straw man" legal purchasers who provide guns to criminals, and illegal diversions through secondary market sources such as gun shows, flea markets, and want ads. The analysis also revealed the organized theft of firearms from licensed dealers, common carriers, and residences as illegal diversion pathways. Moreover, ATF (2000) found that 61 percent of the cases involved the diversion of twenty or fewer firearms, and it concluded that most but not all gun trafficking investigations involve a relatively

small number of firearms. The two largest gun trafficking cases involved the illegal diversion of some 11,000 and 10,000 firearms, respectively.

While survey research highlights the importance of theft and secondary market acquisitions in supplying adult criminals and juveniles with guns, these studies also complement analyses of firearm trace and investigation data in suggesting a fairly substantial role, either direct or indirect, for retail outlet sales in supplying criminals with guns. About 27 percent of state prisoners in a U.S. Bureau of Justice Statistics survey said they acquired their most recent handgun from a retail outlet (Beck and Gilliard 1993). Similarly, Wright and Rossi (1994) reported that 21 percent of male prisoners had acquired their most recent handgun from a licensed dealer. Sheley and Wright (1995) found that 32 percent of juvenile inmates had asked someone, typically a friend or family member, to straw purchase a gun for them in a gun shop, pawnshop, or other retail outlet. All three survey studies also found that “street” and “black market” sources are important, sources that may well include traffickers who are buying from retail outlets and selling on the street.

Despite multiple illegal sources of firearms for criminals, ethnographic research suggests that illegal gun markets may not work well in particular urban environments. Cook, Ludwig, and Braga (2005) found evidence of considerable frictions in the underground market for guns in Chicago. These frictions existed mainly because the underground gun market was both illegal and “thin”—the number of buyers, sellers, and total transactions was small, and relevant information on reliable sources of guns was scarce. The research further found that Chicago street gangs helped to overcome these market frictions, but the gangs’ economic interests caused gang leaders to limit their supply primarily to gang members, and even then transactions were usually loans or rentals with strings attached. Thin underground gun markets may be particularly vulnerable to focused gun market disruption strategies.

A growing body of evaluation evidence suggests that enforcement and regulatory interventions focused on retail sales practices can generate subsequent reductions in new guns recovered in crime. In Detroit and Chicago, the number of guns recovered within a year of first retail sale from someone other than the original purchaser was sharply reduced after undercover police stings and lawsuits targeted scofflaw retail dealers (Webster, Zeoli, et al. 2006). In Boston, a gun market disruption strategy that focused on the illegal diversion of new handguns from retail outlets in Massachusetts, southern states along Interstate 95, and elsewhere resulted in a significant reduction in

the percentage of new handguns recovered in crime by the Boston Police Department (Braga and Pierce 2005).

In Milwaukee, the number of guns recovered within a year of first retail sale from someone other than the original purchaser dramatically decreased after voluntary changes in the sales practices of a gun dealer that received negative publicity for leading the United States in selling the most guns recovered by police in crime (Webster, Vernick, and Bulzacchelli 2006). In Chicago, an analysis of recovered crime handguns found that the 1994 implementation of the Brady Handgun Violence Prevention Act was associated with a marked decrease in crime handguns imported from states that were required to institute the provisions of the Act (Cook and Braga 2001). The Brady Act mandated licensed dealers to conduct a criminal background check on all handgun buyers and required a one-week waiting period before transferring the gun to a criminal.

Policy Implications

Research suggests that supply-side interventions could be used to good effect in reducing the illegal supply of firearms to criminals. It is the responsibility of ATF, often working with state and local law enforcement, to investigate criminal firearms trafficking, arrest the perpetrators, and refer them to U.S. Attorneys for prosecution. Unfortunately, some major obstacles hinder federal law enforcement efforts to hold gun traffickers accountable for their crimes (Braga 2001). ATF is essentially working with one hand tied behind its back because of the way the federal firearms laws are written, cuts to its operating budgets, and persistent political interference. Here, we make six policy and legislative recommendations to improve the capacity of the U.S. Department of Justice to enforce federal laws against gun traffickers. This list should not be considered exhaustive as other opportunities certainly exist.

1. *Require the Execution of Private Sales through Federal Firearms Licensees.* The lack of background checks and transaction paperwork in the secondary market makes it easy for prohibited persons to acquire firearms and difficult for law enforcement agencies to prevent, detect, and prosecute illicit buyers and sellers who operate in the secondary market. Secondary market transactions are legal but not subjected to any federal requirement that the transaction be formally recorded or paperwork maintained. Most states do not have laws that require a record of secondary market transactions. The

main federal legal requirement is that the private seller may not knowingly transfer firearms to proscribed persons such as felons, fugitives, drug users, and illegal aliens. The provisions of the 1994 Brady Act do not apply to secondary firearms market transactions; therefore, criminal background checks of the prospective buyer are not conducted during these private transactions. Requiring private sales to be executed through federally licensed gun dealers would effectively close a major legal loophole exploited by gun traffickers and criminals. As part of these reforms, mandatory reporting of multiple purchases of handguns should be extended to include multiple purchases of certain long guns (e.g., semi-automatic rifles capable of accepting high-capacity magazines), similar to current practices in states along the southwest border of the United States with Mexico.

The enforcement of laws against gun trafficking is also hindered by the cumbersome procedure ATF uses to trace firearms. Most of the relevant firearms transaction records are not centralized but kept piecemeal, much in paper form, by the dealers, distributors, and manufacturers. This arrangement reflects the intention of Congress to ensure that there would be no national registry of firearms owners while maintaining some mechanism to allow crime investigators to trace a firearm. Modest changes to the system could make a big difference (Travis and Smarrito 1992). For example, a requirement for licensed dealers to report serial numbers for all gun transfers to ATF would greatly facilitate the tracing process without creating a central registry of gun owners. Electronic exchange of this information by means of a web portal would significantly expedite the process.

2. *Enact Effective Firearms Diversion/Trafficking Statutes.* There are no federal laws that specifically prohibit firearms trafficking and that adequately reflect the public safety risks of straw purchasing of weapons. For instance, there are no defined elements of gun trafficking in existing federal statutes such as the identification of a threshold number of illegally diverted guns and the establishment of a nexus to criminal activity. While there are nearly 40 federal statutes that touch on the various relevant areas of the illegal diversion of firearms (see ATF 2009), ATF agents commonly rely upon two statutes when investigating gun trafficking crimes: engaging in the business of dealing firearms without a license (Title 18, Section 922(a)(1)(A)) and falsifying the ATF Form 4473 (Title 18, Section 922(a)(6)).

The 1986 McClure-Volkmer Firearm Owners' Protection Act (FOPA) makes it very difficult to prosecute gun traffickers for dealing firearms without a

license. Individuals who make occasional gun sales, buy guns as a hobby, or sell firearms from their private collections are exempt from acquiring a federal firearms license. Gun traffickers exploit this gaping hole in licensing law to illegally divert guns to criminals and juveniles. Since the telltale paperwork is not available for these unregulated transactions, firearms traffickers operating in the secondary market can easily avoid prosecution by claiming that they were selling only a handful of firearms from their private collection. Although federal law penalizes individuals who make false statements on firearms transfer paperwork, it is difficult for ATF agents to prove that straw purchasers are falsifying paperwork, purchasing firearms for proscribed persons rather than buying firearms for their personal collections and subsequently selling them lawfully on the unregulated secondary market. The problem is compounded because document falsification violations are seldom viewed by prosecutors as appealing cases to bring before a jury.

A telling analysis of the disposition of 1,530 ATF firearms trafficking investigations suggests that prosecuting unlicensed dealers for engaging in the business of selling firearms and for straw purchasing presents a significant challenge in court (ATF 2000). Although ATF agents reported that dealing without a license and falsifying paperwork violations were occurring in cases accepted for prosecution, the prosecutor was able to charge at least one defendant with these violations in less than 38% of cases involving dealing without a license and less than 45% of the straw purchasing cases. In these cases, defendants were charged with being a convicted felon in possession of firearms, drug offenses, or other crimes revealed during the investigation.

3. *Revisit Sentencing Guidelines for Firearm Diversion/Trafficking Crimes.* Penalties for the illegal diversion of firearms should reflect the serious public safety consequences of these crimes. Since guns are durable goods, even one illegal gun can have repetitive and dire consequences. For instance, ballistic imaging analysis of a single handgun recovered by the Boston Police Department revealed that, in one year, it had been used in 14 violent crimes across four cities in two states (Gagliardi 2010). Prosecuting scofflaw dealers, who are associated with the illegal diversion of multiple guns, is often frustrating for U.S. Attorneys and ATF investigators. For instance, corrupt licensed dealers illegally divert firearms through record keeping violations such as making false entries in their records and failing to keep the required transfer information. Although a corrupt licensed dealer may illegally divert hundreds of guns to the street, these record keeping violations are primarily misdemeanors.

Gun traffickers are often prosecuted for associated criminal conduct because trafficking charges are difficult to prove and sometimes carry lesser penalties when compared to other crimes such as being a felon in possession of a firearm or drug trafficking (ATF 2000). One quarter of firearms traffickers in the ATF analyses were charged with being a convicted felon in possession of a firearm and another 6% were charged with other prohibited persons charges. More than 27% were charged with conspiracy charges and over 12% were charged with a narcotics violation. Gun trafficking investigations are sometimes prosecuted as drug trafficking cases because prosecutors prefer the mandatory minimum sentencing provisions. For instance, using a firearm during the commission of a drug trafficking or violent crime (Title 18, Section 924(c)) carries a mandatory five-year imprisonment sentence.

Most gun criminals, unfortunately, do not have prior felony convictions (Greenfeld and Zawitz 1995). Corrupt licensed dealers and individuals who execute straw purchases are legally entitled to engage in firearm transfers and, by definition, not felons or drug abusers. Therefore, although prosecutors and ATF agents are creatively using the existing federal laws to make cases against gun traffickers, this type of prosecution strategy clearly has its limits.

4. *Develop and Implement Regional Crime Gun-Processing Protocols.* Gun crime investigations are seriously undermined when local jurisdictions do not comprehensively process all recovered crime guns and related evidence (see IACP 2011). Without these comprehensive data, federal, state, and local agencies are not able to develop an accurate assessment of the sources of illegal guns and their use in violent crime. Law enforcement agencies at the local, state, and federal level should conduct a thorough review of their internal directives on the processing of the crime guns and related evidence. Policy procedures should include processing for ballistic evidence as well as DNA, latent fingerprints, and trace evidence from firearms; processing projectiles and casings through the ATF National Integrated Ballistics Information Network (NIBIN); conducting firearms traces; and reporting to the National Crime Information Center (NCIC) (see Gagliardi 2010). The various law enforcement agencies operating within a given region should collaborate on the design of mutually agreeable crime gun-processing protocols.

5. *Create a Strong and Effective ATF.* ATF is underfunded, often without stable leadership, and routinely whipsawed by special interests and Congress. Despite the number of gun dealers having reached nearly 130,000 federal licensees, ATF's budget has been largely stagnant, increasing from \$850 million in FY

2002 to only \$1.1 billion in FY 2012. ATF had to eliminate more than \$2 million in field contractor support and shut down 66% of its ballistic-imaging workstation sites across the United States for its NIBIN program in FY 2012. ATF has only some 2,500 special agents and roughly 800 inspectors. In terms of law enforcement personnel, the agency is roughly the same size as a city police department (the Boston Police Department has an authorized strength of some 2,250 officers). ATF has only enough inspectors to check every licensed firearms dealer once every ten years. Finally, ATF has been led by an acting director since the last confirmed director, Carl Truscott, resigned in August 2004.

In their roles as guardians of the Second Amendment, the National Rifle Association (NRA) and gun-rights politicians consistently meddle in ATF investigative initiatives. For instance, in February 2006, Congress convened two hearings on ATF's enforcement activities at eight gun shows in Richmond, Virginia, that resulted in an Inspector General's review of ATF's gun show investigation operations. Four witnesses testified that ATF agents used aggressive and harassing techniques. These individuals included the gun show promoter, a federal firearms licensee, a salesman working for a licensed gun dealer, and a private investigator hired by the NRA. The hearings did not reveal any illegal activities or other violations by ATF.

ATF needs to be properly funded to perform its mission now and in the future as newly mandated responsibilities are added. The agency clearly needs stable leadership now. Like the director of the Federal Bureau of Investigation, the ATF director's position should be a fixed ten-year term. This would ensure that the position is professional and nonpartisan and that it spans the political turnover of four-year presidential election cycles. ATF should also be able to more closely regulate the business practices of licensed dealers and set standards for secure storage and common carrier transportation of firearms and ammunition.

6. *Publish an Annual National Crime Gun-Tracing Report.* Rational debate on gun policy requires detailed information on crime guns. ATF currently produces only modest summaries of the characteristics of crime gun traces for the 50 states, the District of Columbia, U.S. territories, Canada, Mexico, and the Caribbean (www.atf.gov/statistics/index.html). Unlike the national and city-level trace reports generated by the now-defunct Youth Crime Gun Interdiction Initiative (e.g., ATF 1997, 2002), ATF's current state-level crime gun summaries do not involve external academics and do not provide more rigorous and detailed analyses of crime gun sources, trends, and patterns.

ATF should return to publishing these more detailed annual crime gun trace reports overseen by external academics.

To complement the routine reporting of detailed crime gun statistics, the U.S. government should also lift restrictions on the release of ATF trace data as mandated by the Tiahrt Amendment, remove ideological and politically motivated barriers to conducting basic gun research through grants from the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH), and increase funding for gun violence reduction research through the National Institute of Justice (NIJ). Indeed, much of the research evidence reviewed here was initiated prior to the passage of the Tiahrt Amendment.

Conclusion

The available evidence suggests that reducing the flow of guns to criminals may indeed disrupt their capacity to kill. Better record keeping and improved regulation of gun transactions can reduce access to guns by criminals and assist law enforcement agencies in launching investigations and prosecuting gun criminals. However, a measurable impact on firearms trafficking and related violence requires an adequate commitment of resources in terms of people, processes, and technology. For further gains, the firearms supply chain must be made more secure. The operational capacity of ATF must be strengthened. Success against firearms trafficking will be achieved only by separating firearms trafficking strategy from gun politics.

Reflecting upon the research and development experiences from the Clinton administration and early days of the George W. Bush administration, we suggest there should be a reinvigoration of the fusion of all-source information on crime gun sources along with comprehensive analysis and reporting, in which all sides of the gun control debate can be confident. Increased law enforcement-academic analysis and reporting of ATF firearms trace can begin the effort. Public safety and the public debate in the United States and other countries will surely benefit from the best possible information on the illegal sources of guns to criminals. Without credible data and rigorous analyses, the broader gun control policy debate will be based on ideology and conjecture. The case for a supply-side approach to gun violence is well supported by the empirical evidence on illegal gun market dynamics. To date, however, there is little empirical evidence that such an approach reduces rates of gun crime. We believe that

it is time to develop experimental evidence on whether interventions designed to limit illegal transfers of firearms can reduce gun violence.

References

- Beck, Allen, and Darrell Gilliard. 1993. *Survey of State Prison Inmates, 1991*. Washington, DC: U.S. Bureau of Justice Statistics.
- Braga, Anthony A. 2001. More Gun Laws or More Gun Law Enforcement? *Journal of Policy Analysis and Management* 20: 545–549.
- Braga, Anthony A. 2003. Serious Youth Gun Offenders and the Epidemic of Youth Violence in Boston. *Journal of Quantitative Criminology*, 19: 33–54.
- Braga, Anthony A., Philip J. Cook, David M. Kennedy, and Mark H. Moore. 2002. The Illegal Supply of Firearms. In *Crime and Justice: A Review of Research*, vol. 29, edited by Michael Tonry. Chicago: University of Chicago Press.
- Braga, Anthony A., and Glenn L. Pierce. 2005. Disrupting Illegal Firearms Markets in Boston: The Effects of Operation Ceasefire on the Supply of New Handguns to Criminals. *Criminology & Public Policy* 4: 717–748.
- Braga, Anthony A., Garen J. Wintemute, Glenn L. Pierce, Philip J. Cook, and Greg Ridgeway. 2012. Interpreting the Empirical Evidence on Illegal Gun Market Dynamics. *Journal of Urban Health* 89: 779–793.
- Cook, Philip J., and Anthony A. Braga. 2001. Comprehensive Firearms Tracing: Strategic and Investigative Uses of New Data on Firearms Markets. *Arizona Law Review* 43: 277–309.
- Cook, Philip J., Anthony A. Braga, and Mark H. Moore. 2011. Gun Control. In *Crime and Public Policy*, rev. ed., edited by James Q. Wilson and Joan Petersilia. New York: Oxford University Press.
- Cook, Philip J., Jens Ludwig, and Anthony A. Braga. 2005. Criminal Records of Homicide Offenders. *Journal of the American Medical Association* 294: 598–601.
- Cook, Philip J., Jens Ludwig, Sudhir Venkatesh, and Anthony A. Braga. 2007. Underground Gun Markets. *Economic Journal* 117: 558–588.
- Cook, Philip J., Stephanie Molloconi, and Thomas Cole. 1995. Regulating Gun Markets. *Journal of Criminal Law and Criminology* 86: 59–92.
- Gagliardi, Peter L. 2010. *The 13 Critical Tasks: An Inside-Out Approach to Solving More Gun Crime*. Montreal, Quebec: Forensic Technology Inc.
- Greenfeld, Lawrence, and Marianne Zawitz. 1995. *Weapons Offenses and Offenders*. Washington, DC: U.S. Bureau of Justice Statistics.
- International Association of Chiefs of Police (IACP). 2011. *Reducing Gun Violence in Our Communities*. Alexandria, VA: IACP.
- National Research Council. 2005. *Firearms and Violence: A Critical Review*. Committee to Improve Research and Information on Firearms. Washington, DC: National Academies Press.
- Pierce, Glenn L., Anthony A. Braga, Raymond R. Hyatt, and Christopher S. Koper. 2004. The Characteristics and Dynamics of Illegal Firearms Markets: Implications for a Supply-Side Enforcement Strategy. *Justice Quarterly* 21: 391–422.

- Reiss, Albert J., and Jeffrey Roth, eds. 1993. *Understanding and Preventing Violence*. Washington, DC: National Academies Press.
- Sheley, Joseph, and James D. Wright. 1995. *In the Line of Fire: Youth, Guns, and Violence in Urban America*. New York: Aldine de Gruyter.
- Sorenson, Susan and Katherine Vittes. 2003. Buying a Handgun for Someone Else: Firearm Retailer Willingness to Sell. *Injury Prevention* 9: 147–150.
- Travis, Jeremy, and William Smarrito. 1992. A Modest Proposal to End Gun Running in America. *Fordham Urban Law Journal* 19: 795–811.
- U.S. Bureau of Alcohol, Tobacco and Firearms (ATF). 1997. *Crime Gun Trace Analysis Reports (1997): The Illegal Firearms Market in 17 Communities*. Washington, DC: Bureau of Alcohol, Tobacco and Firearms.
- U.S. Bureau of Alcohol, Tobacco and Firearms (ATF). 2000. *Following the Gun: Enforcing Federal Laws against Firearms Traffickers*. Washington, DC: ATF.
- U.S. Bureau of Alcohol, Tobacco and Firearms (ATF). 2002. *Crime Gun Trace Analysis (2000): National Report*. Washington, DC: ATF.
- U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF). 2009. *Firearms Trafficking Investigation Guide*. Washington, DC: U.S. Department of Justice.
- Webster, Daniel W., Jon Vernick, and Maria Bulzacchelli. 2006. Effects of a Gun Dealer's Change in Sales Practices on the Supply of Guns to Criminals. *Journal of Urban Health* 83: 778–787.
- Webster, Daniel W., April Zeoli, Maria Bulzacchelli, and Jon Vernick. 2006. Effects of Police Stings of Gun Dealers on the Supply of New Guns to Criminals. *Injury Prevention* 12: 225–230.
- Wintemute, Garen J. 2005. Risk Factors among Handgun Retailers for Frequent and Disproportionate Sales of Guns Used in Violent and Firearm Related Crimes. *Injury Prevention* 11: 357–363.
- Wintemute, Garen J. 2010. Firearm Retailers' Willingness to Participate in an Illegal Gun Purchase. *Journal of Urban Health* 87: 865–878.
- Wright, James D., and Peter H. Rossi. 1994. *Armed and Considered Dangerous*. 2nd ed. New York: Aldine de Gruyter.
- Zimring, Franklin E. 1976. Street Crime and New Guns: Some Implications for Firearms Control. *Journal of Criminal Justice* 4: 95–107.

Part III / Gun Policy Lessons from the United States

High-Risk Guns

This page intentionally left blank

America's Experience with the Federal Assault Weapons Ban, 1994–2004

Key Findings and Implications

Christopher S. Koper

In 1994, the federal government imposed a ten-year ban on military-style semi-automatic firearms and ammunition-feeding devices holding more than ten rounds of ammunition. This legislation, commonly known as the federal assault weapons ban, was intended in the broadest sense to reduce gunshot victimizations by limiting the national stock of semi-automatic firearms with large ammunition capacities and other features conducive to criminal uses. Reflecting America's general political divisions over the issue of gun control, the debate over the law was highly contentious. Ten years later, Congress allowed the ban to expire.

More recently, there have been growing calls for a reexamination of the assault weapons issue. This debate has been fueled by a series of mass shooting incidents involving previously banned firearms or magazines. Since 2007, for example, there have been at least 11 incidents in which offenders using

Christopher S. Koper, PhD, is an associate professor in the Department of Criminology, Law and Society at George Mason University and a senior fellow and co-director of the Research Program on Evidence-Based Policing at George Mason's Center for Evidence-Based Crime Policy.

assault weapons or other semi-automatics with magazines larger than 10 rounds have wounded or killed eight or more people (Violence Policy Center 2012). Some of the most notorious of these incidents have been a 2007 shooting on the college campus of Virginia Tech that left 33 dead and 17 wounded; a 2011 shooting in an Arizona parking lot that killed 6 and wounded 13, including Congresswoman Gabrielle Giffords; a 2012 shooting in an Aurora, Colorado, movie theatre that left 12 dead and 58 wounded; and, most recently, a shooting in a Newtown, Connecticut, elementary school that left 26 victims dead, 20 of whom were children (an additional victim was killed elsewhere).

To help inform the new dialogue on this issue, this essay examines America's experience with the 1994 assault weapons law. During the course of the ban, the National Institute of Justice (NIJ) funded a series of studies on the law's impacts for the U.S. Department of Justice and the U.S. Congress (Koper 2004; Koper and Roth 2001, 2002; Roth and Koper 1997, 1999). I present highlights from those studies, with an emphasis on findings from the final evaluation reported in 2004 (Koper 2004). These studies sought to assess the law's impacts on (1) the availability of assault weapons (AWs) and large-capacity magazines (LCMs) as measured by price and production (or importation) indices in legal markets; (2) trends in criminal uses of AWs and LCMs; and (3) trends in the types of gun crimes that seemed most likely to be affected by changes in the use of AWs and LCMs. (The latter two issues are emphasized in this summary.) Finally, the research team examined studies of gun attacks more generally in order to estimate the ban's potential to produce longer-term reductions in shootings.

In summary, the ban had mixed effects in reducing crimes with the banned weaponry because of various exemptions and loopholes in the legislation. The ban did not appear to affect gun crime during the time it was in effect, but some evidence suggests it may have modestly reduced gunshot victimizations had it remained in place for a longer period. The ban's most important provision was arguably its prohibition on ammunition magazines holding more than 10 rounds. Policymakers considering a new version of the ban might particularly focus on this aspect of the previous legislation and reconsider the exemptions and loopholes that undermined the effectiveness of the original ban.

Provisions of the Assault Weapons Ban

Enacted on September 13, 1994, Title XI, Subtitle A of the Violent Crime Control and Law Enforcement Act of 1994 imposed a ten-year ban on the “manufacture, transfer, and possession” of certain semi-automatic firearms designated as assault weapons. The AW ban did not prohibit all semi-automatics; rather, it was directed at semi-automatics having features that appear to be useful in military and criminal applications but unnecessary in shooting sports or self-defense. Examples of such features include pistol grips on rifles, flash hiders, folding rifle stocks, threaded barrels for attaching silencers, and the ability to accept ammunition magazines holding large numbers of bullets. The law specifically prohibited 18 models and variations by name (e.g., the Intratec TEC-9 pistol and the Colt AR-15 rifle), as well as revolving cylinder shotguns (see Koper 2004, 5). This list included a number of foreign rifles that the federal government had banned from importation into the country beginning in 1989 (e.g., Avtomat Kalashnikov models). In addition, the ban contained a generic “features test” provision that generally prohibited other semi-automatic firearms having two or more military-style features, as described in Table 12.1. In total, the federal Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) identified 118 model and caliber variations that met the AW criteria established by the ban.

The law also banned “copies or duplicates” of the named gun makes and models, but federal authorities emphasized exact copies. Relatively cosmetic changes, such as removing a flash hider or bayonet mount, were thus sufficient to transform a banned weapon into a legal substitute. In this sense, the law is perhaps best understood not as a gun ban but as a law that restricted weapon accessories. A number of gun manufacturers began producing modified, legal versions of some of the banned guns, though not all of these substitute weapons proved as popular as the banned versions.¹ In other respects (e.g., type of firing mechanism, ammunition fired, and the ability to accept a detachable magazine), the banned AWs did not differ from other legal semi-automatic weapons.

The other major component of the assault weapons legislation was a ban on most ammunition-feeding devices holding more than 10 rounds of ammunition (referred to as large-capacity magazines).² The LCM ban was arguably the most important part of the assault weapons law for two reasons. First, an LCM is the most functionally important feature of an AW-type firearm. As noted by the U.S. House of Representatives, most prohibited AWs came equipped with magazines holding 30 rounds and could accept magazines holding as

Table 12.1 Features test of the federal assault weapons ban

Weapon category	Military-style features (2 or more qualified a firearm as an assault weapon)
Semi-automatic pistols accepting detachable magazines	<ol style="list-style-type: none"> 1) ammunition magazine that attaches outside the pistol grip 2) threaded barrel capable of accepting a barrel extender, flash hider, forward handgrip, or silencer 3) heat shroud attached to or encircling the barrel 4) weight of more than 50 ounces unloaded 5) semiautomatic version of a fully automatic weapon
Semi-automatic rifles accepting detachable magazines	<ol style="list-style-type: none"> 1) folding or telescoping stock 2) pistol grip that protrudes beneath the firing action 3) bayonet mount 4) flash hider or a threaded barrel designed to accommodate one 5) grenade launcher
Semi-automatic shotguns	<ol style="list-style-type: none"> 1) folding or telescoping stock 2) pistol grip that protrudes beneath the firing action 3) fixed magazine capacity over 5 rounds 4) ability to accept a detachable ammunition magazine

many as 50 or 100 rounds (United States Department of the Treasury 1998, 14). Removing LCMs from these weapons thus greatly limits their firepower.

Second, the reach of the LCM ban was much broader than that of the AW ban because many semi-automatics that were not banned by the AW provision could accept LCMs. Approximately 40 percent of the semi-automatic handgun models and a majority of the semi-automatic rifle models that were being manufactured and advertised prior to the ban were sold with LCMs or had a variation that was sold with an LCM (calculated from Murtz and the Editors of Gun Digest 1994). Still others could accept LCMs made for other firearms and/or by other manufacturers. A national survey of gun owners in 1994 found that 18% of all civilian-owned firearms and 21% of civilian-owned handguns were equipped with magazines having 10 or more rounds (Cook and Ludwig 1996, 17). The AW provision did not affect most LCM-compatible guns, but the LCM provision limited the capacities of their magazines to 10 rounds.

The AW ban also contained important exemptions. AWs and LCMs manufactured before the effective date of the ban were “grandfathered” and thus legal to own and transfer. Though not precise, estimates suggest there were

upward of 1.5 million privately owned AWs in the United States when the ban took effect (American Medical Association Council on Scientific Affairs 1992; Cox Newspapers 1989, 1; Koper 2004, 10). Gun owners in America possessed an estimated 25 million guns that were equipped with LCMs or 10-round magazines in 1994 (Cook and Ludwig 1996, 17), and gun industry sources estimated that, including aftermarket items for repairing and extending magazines, there were at least 25 million LCMs available in the United States as of 1995 (Gun Tests 1995, 30). Moreover, an additional 4.8 million pre-ban LCMs were imported into the country from 1994 through 2000 under the grandfathering exemption, with the largest number arriving in 1999. During this same period, importers were also authorized to import another 42 million pre-ban LCMs that may have arrived after 2000.

Criminal Use of Assault Weapons and Large-Capacity Magazines Prior to the Ban

During the 1980s and early 1990s, AWs and other semi-automatic firearms equipped with LCMs were involved in a number of highly publicized mass shootings that raised public concern about the accessibility of high-powered, military-style weaponry and other guns capable of rapidly discharging high numbers of bullets (Cox Newspapers 1989; Kleck 1997, 124–126, 144; Lenett 1995; Violence Policy Center 2012). Perhaps most notably, AWs or other semi-automatics with LCMs were used in 6, or 40%, of 15 particularly severe mass shooting incidents between 1984 and 1993 that resulted in at least 6 deaths or at least 12 killed or wounded (Kleck, 1997, 124–126, 144). Early studies of AWs, though sometimes based on limited and potentially unrepresentative data, also suggested that AWs recovered by police were often associated with drug trafficking and organized crime (Cox Newspapers 1989, 4; also see Roth and Koper 1997, chap. 5), fueling a perception that AWs were guns of choice among drug dealers and other particularly violent groups. These events intensified concern over AWs and other semi-automatics with LCMs and helped spur the 1989 federal import ban on selected semi-automatic rifles (implemented by executive order) and the passage of the 1994 federal AW ban (the states of California, New Jersey, Connecticut, Hawaii, and Maryland also passed AW legislation between 1989 and 1994).

Looking at the nation's gun crime problem more broadly, numerous studies of AW-type weapons conducted prior to the federal ban found that AWs

typically accounted for up to 8% of guns used in crime, depending on the specific AW definition and data source used (e.g., see Beck et al. 1993; Hargarten et al. 1996; Hutson, Anglin, and Pratts 1994; Hutson et al. 1995; McGonigal et al. 1993; New York State Division of Criminal Justice Services 1994; Roth and Koper 1997, chap. 2; Zawitz 1995). A compilation of 38 sources indicated that AWs accounted for about 2% of crime guns on average (Kleck 1997, 112, 141–143). Similarly, the most common AWs prohibited by the 1994 federal ban accounted for between 1% and 6% of guns used in crime according to most of several national and local data sources examined for the NIJ-funded studies summarized here (Koper 2004, 15).

As with crime guns in general, the majority of AWs used in crime were assault pistols rather than assault rifles. Among AWs reported by police to ATF during 1992 and 1993, for example, assault pistols outnumbered assault rifles by a ratio of three to one.

The relative rarity of AW use in crime can be attributed to a number of factors. Many of these models are long guns, which are used in crime much less often than handguns. Also, as noted, a number of the rifles named in the 1994 law were banned from importation into the United States in 1989. Further, AWs in general are more expensive and more difficult to conceal than the types of handguns that are used most frequently in crime.

Criminal use of guns equipped with LCMs had not been studied as extensively as criminal use of AWs at the time of the ban. However, the overall use of guns with LCMs, which is based on the combined use of AWs and non-banned guns with LCMs, is much greater than the use of AWs alone. Based on data examined for this and a few prior studies, guns with LCMs were used in roughly 13% to 26% of most gun crimes prior to the ban, though they appeared to be used in 31% to 41% of gun murders of police (see summary in Koper 2004, 18; also see Adler et al. 1995; Fallis 2011; New York Division of Criminal Justice Services 1994).

The Ban's Effects on Crimes with Assault Weapons and Large-Capacity Magazines

Although there was a surge in production of AW-type weapons as Congress debated the ban in 1994, the law's restriction of the new AW supply and the interest of collectors and speculators in these weapons helped to drive prices higher for many AWs (notably assault pistols) through the end of the 1990s

Table 12.2 Assault weapons as a percentage of guns recovered by police

City	Pre-ban	Post-ban	% change
Baltimore, MD	1.88% (1992–1993)	1.25% (1995–2000)	–34%
Boston, MA	2.16% (1991–1993)	0.6% (2000–2002)	–72%
Miami, FL	2.53% (1990–1993)	1.71% (1995–2000)	–32%
St. Louis, MO	1.33% (1992–1993)	0.91% (1995–2003)	–32%
Anchorage, AK	3.57% (1987–1993)	2.13% (1995–2000)	–40%
Milwaukee, WI	5.91% (1991–1993)	4.91% (1995–1998)	–17%

Note: Figures for Baltimore, Boston, Miami, and St. Louis are based on all recovered guns. Figures for Anchorage and Milwaukee are based on, respectively, guns tested for evidence and guns recovered in murder cases. Changes in Baltimore, Boston, Miami, and St. Louis were statistically significant at $p < .05$. See Koper (2004) for further details about the data and analyses.

and appeared to make them less accessible and/or affordable to criminal users.³ Analyses of several national and local databases on guns recovered by police indicated that crimes with AWs declined following the ban.

To illustrate, the share of gun crimes involving the most commonly used AWs declined by 17% to 72% across six major cities examined for this study (Baltimore, Miami, Milwaukee, Boston, St. Louis, and Anchorage), based on data covering all or portions of the 1995–2003 post-ban period (Table 12.2). (The number of AW recoveries also declined by 28% to 82% across these locations and time periods; the discussion here focuses on changes in AWs as a share of crime guns in order to control for general trends in gun crime and gun seizures.) Similar patterns were found in a national analysis of recovered guns reported by law enforcement agencies around the country to ATF for investigative gun tracing.⁴ The percentage of gun traces that were for AWs fell 70% between 1992–1993 and 2001–2002 (from 5.4% to 1.6%), though the interpretation of these data was complicated by changes that occurred during this time in gun tracing practices (see Koper 2004 for further discussion).

The decline in crimes with AWs was due primarily to a reduction in the use of assault pistols. Assessment of trends in the use of assault rifles was complicated by the rarity of crimes with such rifles and by the substitution in some cases of post-ban rifles that were very similar to the banned models. In general, however, the decline in AW use was only partially offset by substitution of post-ban AW-type models. Even counting the post-ban models as AWs, the share of crime guns that were AWs fell 24% to 60% across most of the local

jurisdictions studied. Patterns in the local data sources also suggested that crimes with AWs were becoming increasingly rare as the years passed.

The decline in crimes with AWs appeared to have been offset throughout at least the late 1990s by steady or rising use of other semi-automatics equipped with LCMs. Assessing trends in LCM use was difficult because there is no national data source on crimes with LCMs and few contacted jurisdictions maintained such information. It was possible, nonetheless, to examine trends in the use of guns with LCMs in four jurisdictions: Baltimore, Milwaukee, Anchorage, and Louisville (KY). Across the different samples analyzed from these cities (some databases included all recovered guns and some included only guns associated with particular crimes), the share of guns with an LCM generally varied from 14% to 26% prior to the ban. In all four jurisdictions, the share of crime guns equipped with LCMs rose or remained steady through the late 1990s (Table 12.3). These trends were driven primarily by handguns with LCMs, which were used in crime roughly three times as often as rifles with LCMs (though crimes with rifles having LCMs also showed no general decline). Generalizing from such a small number of jurisdictions must be done very cautiously, but the consistency of the findings across these geographically diverse locations strengthens the inference that they reflected a national pattern.

Failure to reduce LCM use for at least several years after the ban was likely because of the immense stock of exempted pre-ban magazines, which, as noted, was enhanced by post-ban imports. The trend in crimes with LCMs may have been changing by the early 2000s, but the available data were too limited and inconsistent to draw clear inferences (post-2000 data were available for only two of the four study sites).

Table 12.3 Guns with large-capacity magazines as a percentage of guns recovered by police (selected years)

City	Pre-ban	Late 1990s	Early 2000s
Baltimore, MD	14.0% (1993)	15.5% (1998)	15.7% (2003)
Anchorage, AK	26.2% (1992–1993)	30.0% (1999–2000)	19.2% (2001–2002)
Milwaukee, WI	22.4% (1993)	36.4% (1998)	N/A
Louisville, KY	N/A	20.9 (1996)	19.0% (2000)

Note: Figures for Baltimore and Milwaukee are based on, respectively, guns associated with violent crimes and with murders. Figures for Anchorage and Louisville are based on guns submitted for evidentiary testing. The Anchorage figures are based on handguns only. See Koper (2004) for further details about the data and analyses.

A later media investigation of LCM use in Richmond, Virginia, suggests that the ban may have had a more substantial impact on the supply of LCMs to criminal users by the time it expired in 2004. In that city, the share of recovered guns with LCMs generally varied between 18% and 20% from 1994 through 2000 but fell to 10% by 2004 (Fallis 2011). It is not clear whether the Richmond results represented a wider national or even regional trend. (The data from this study also show that after the ban was lifted, the share of Richmond crime guns with an LCM rose to 22% by 2008.)

The Ban's Impacts on Gun Violence

Because offenders could substitute non-banned guns and small magazines for banned AWs and LCMs, there was not a clear rationale for expecting the ban to reduce assaults and robberies with guns. But by forcing this weapon substitution, it was conceivable that the ban would reduce the number and severity of shooting deaths and injuries by reducing the number of shots fired in gun attacks (thus reducing the number of victims per gunfire incident and the share of gunshot victims sustaining multiple wounds). Based on this logic, the research team examined several indicators of trends in the lethality and injuriousness of gun violence for different portions of the 1995–2002 post-ban period. These included national-level analyses of gun murders, the percentage of violent gun crimes resulting in death, the share of gunfire cases resulting in wounded victims, the percentage of gunshot victimizations resulting in death, and the average number of victims per gun homicide incident. For selected localities, the team also examined trends in wounds per gunshot victim or the percentage of gunshot victims sustaining multiple wounds.

On balance, these analyses showed no discernible reduction in the lethality or injuriousness of gun violence during the post-ban years (see Koper 2004, Koper and Roth 2001, and Roth and Koper 1997). Nationally, for example, the percentage of violent gun crimes resulting in death (based on gun homicides, gun assaults, and gun robberies reported to the Uniform Crime Reports) was the same for the period 2001–2002 (2.9%) as it was for the immediate pre-ban period 1992–1993 (Koper 2004, 82, 92). Accordingly, it was difficult to credit the ban with contributing to the general decline in gun crime and gun homicide that occurred during the 1990s.

However, the ban's exemption of millions of pre-ban AWs and LCMs meant that the effects of the law would occur only gradually. Those effects were still

unfolding when the ban was lifted and may not have been fully realized until several years beyond that, particularly if importation of foreign, pre-ban LCMs had continued in large numbers. In light of this, it was impossible to make definitive assessments of the ban's impact on gun violence.

It was also difficult to judge the ban's effects on the more specific problem of mass shootings. The research team attempted to assess changes in mass shootings during the first few years of the ban, but this effort was hampered by the difficulty of counting these incidents (results can be sensitive to the definitions and data sources used) and identifying the specific types of guns and magazines used in them (Roth and Koper 1997, app. A). There is no national data source that provides detailed information on the types of guns and magazines used in shooting incidents or that provides full counts of victims killed and wounded in these attacks. Studying mass shootings in particular poses a number of challenges with regard to defining these events, establishing the validity and reliability of methods for measuring their frequency and characteristics (particularly if done through media searches, as is often necessary), and modeling their trends, as they are particularly rare events (e.g., see Duwe 2000; Roth and Koper 1997, app. A).

Nonetheless, the issue of mass shootings continues to be a catalyst to the debate surrounding AW legislation. A recent media compilation of 62 mass shooting incidents that involved the death of four or more people over the period 1982–2012, for instance, suggests that 25% of the guns used in these attacks were AW-type weapons (these were not precisely defined) and another 48% were other types of semi-automatic handguns (Follman, Aronsen, and Pan 2012). Continuing improvements in media search tools and greater attention to the types of guns and magazines used in multiple-victim attacks may improve prospects for examining this issue more rigorously in future studies.

Assessing the Potential Long-Term Effects of Banning Assault Weapons and Large-Capacity Magazines

Although available evidence is too limited to make firm projections, it suggests that the ban may have reduced shootings slightly had it remained in place long enough to substantially reduce crimes with both LCMs and AWs. A small number of studies suggest that gun attacks with semi-automatics—including AWs and other guns equipped with LCMs—tend to result in more shots fired, more persons wounded, and more wounds inflicted per victim

than do attacks with other firearms (see reviews in Koper 2004; Koper and Roth 2001; also see McGonigal et al. 1993; Richmond et al. 2003; Reedy and Koper 2003; Roth and Koper 1997). For example, in mass shooting incidents that resulted in at least 6 deaths or at least 12 total gunshot victims from 1984 through 1993, offenders who clearly possessed AWs or other semi-automatics with LCMs (sometimes in addition to other guns) wounded or killed an average of 29 victims in comparison to an average of 13 victims wounded or killed by other offenders (see Koper and Roth's [2001] analysis of data compiled by Kleck [1997, 144]).

Similarly, a study of handgun attacks in Jersey City, New Jersey, during the 1990s found that the average number of victims wounded in gunfire incidents involving semi-automatic pistols was in general 15% higher than in those involving revolvers (Reedy and Koper 2003). The study also found that attackers using semi-automatics to fire more than 10 shots were responsible for nearly 5% of the gunshot victims in the sample. Used as a tentative guide, this implies that the LCM ban could have eventually produced a small reduction in shootings overall, perhaps up to 5%, even if some gun attackers had the foresight to carry more than one small magazine (or more than one firearm) and the time and poise to reload during an attack.

Effects of this magnitude might be difficult to measure reliably, but they could nonetheless yield significant societal benefits. Consider that in 2010 there were 11,078 gun homicides in the United States and another 53,738 non-fatal assault-related shootings according to the federal Centers for Disease Control and Prevention (see the CDC's web-based injury statistics query and reporting system at <http://www.cdc.gov/injury/wisqars/index.html>). At these levels, reducing shootings by just 1% (arguably a reasonable ballpark estimate for the long-term impact of substantially reducing AW and LCM use) would amount to preventing about 650 shootings annually. The lifetime medical costs of assault-related gunshot injuries (fatal and nonfatal) were estimated to be about \$18,600 per injury in 1994 (Cook et al. 1999). Adjusting for inflation, this amounts to \$28,894 in today's dollars. Moreover, some estimates suggest that the full societal costs of gun violence—including medical, criminal justice, and other government and private costs (both tangible and intangible)—could be as high as \$1 million per shooting (Cook and Ludwig 2000). Hence, reducing shootings by even a very small margin could produce substantial long-term savings for society, especially as the shootings prevented accrue over many years.

Lessons and Implications from the 1994 Ban

Studies of America's previous assault weapons ban provide a number of lessons that can inform future policymaking. A new law similar to the old ban will have little impact on most gun crimes, but it may prevent some shootings, particularly those involving high numbers of shots and victims. It may thus help to reduce the number and severity of mass shooting incidents as well as produce a small reduction in shootings overall.

The most important feature of the previous ban was the prohibition on large-capacity ammunition magazines. A large magazine is arguably the most critical feature of an assault weapon, and restrictions on magazines have the potential to affect many more gun crimes than do those on military-style weapons. Restrictions focused on magazine capacity may also have a greater chance of gaining sufficient public and political support for passage than would new restrictions on assault weapons, though current polling suggests that both measures are supported by three-quarters of non-gun owners and nearly half of gun owners (Barry et al., in this volume). To enhance the potential impact of magazine restrictions, policymakers might also consider limiting magazine capacity to fewer than 10 rounds for all or selected weapons (for example, lower limits might be set for magazines made for semi-automatic rifles).⁵ It is unknown whether further restrictions on the outward features of semi-automatic weapons, such as banning weapons having any military-style features, will produce measurable benefits beyond those of restricting magazine capacity.

Policymakers must also consider the implications of any grandfathering provisions in new legislation. Assessing the political and practical difficulties of registering all assault weapons and large magazines or establishing turn-in or buyback programs for them is beyond the scope of this essay. Policymakers should note, however, that it may take many years to attain substantial reductions in crimes with banned weapons and/or magazines if a new law exempts the existing stock (which has likely grown considerably since the time of the original ban). Policies regarding exemptions must also explicitly address the status of imported guns and magazines.

Past experience further suggests that public debate on reinstating the ban or crafting a new one will raise prices and production of the guns and magazines likely to be affected. This could temporarily saturate the market for the guns and magazines in question (particularly if close substitutes emerge) and delay desired reductions in crimes with some categories of the banned weap-

only (this appeared to happen with assault rifles that were banned by the 1994 law and may have contributed as well to the observed trends in use of large magazines).

A new ban on assault weapons and/or large-capacity magazines will certainly not be a panacea for America's gun violence problem nor will it stop all mass shootings. However, it is one modest measure that, like federal restrictions on fully automatic weapons and armor-piercing ammunition, can help to prevent the further spread of particularly dangerous weaponry.

Notes

1. In general, the AW ban did not apply to semi-automatics possessing no more than one military-style feature listed under the ban's features test provision. Note, however, that firearms imported into the country still had to meet the "sporting purposes test" established under the federal Gun Control Act of 1968. In 1989, ATF determined that foreign semi-automatic rifles having any one of a number of named military features (including those listed in the features test of the 1994 AW ban) fail the sporting purposes test and cannot be imported into the country. In 1998, the ability to accept an LCM made for a military rifle was added to the list of disqualifying features. Consequently, it was possible for foreign rifles to pass the features test of the federal AW ban but not meet the sporting purposes test for imports (U.S. Department of the Treasury 1998).

2. Technically, the ban prohibited any magazine, belt, drum, feed strip, or similar device that has the capacity to accept more than 10 rounds of ammunition or which can be readily converted or restored to accept more than 10 rounds of ammunition. The ban exempted attached tubular devices capable of operating only with .22 caliber rimfire (i.e., low velocity) ammunition.

3. See Koper (2004), Koper and Roth (2002), and Roth and Koper (1997) for more extensive discussions of the ban's impacts on prices and production of AWs, non-banned firearms, and LCMs.

4. A gun trace is an investigation into the sales history of a firearm (e.g., see ATF 2000).

5. To support the formulation and evaluation of policy in this area, there are also a number of research needs worth noting. For one, it is important to develop better data on crimes with guns having LCMs. Policymakers should thus encourage police agencies to record information about magazines recovered with crime guns. Likewise, ATF should consider integrating ammunition magazine data into its national gun tracing system and encourage reporting of magazine data by police agencies that trace firearms. Second, there is a need for more studies that contrast the outcomes of attacks with different types of guns and magazines. Such studies would help to refine predictions of the change in gun deaths and injuries that would follow reductions in attacks with firearms having large-capacity magazines.

References

- Adler, Wendy, C., Frederick M. Bielke, David J. Doi, and John F. Kennedy. (1995). *Cops under Fire: Law Enforcement Officers Killed with Assault Weapons or Guns with High Capacity Magazines*. Washington, DC: Handgun Control, Inc.
- American Medical Association Council on Scientific Affairs. 1992. "Assault Weapons as a Public Health Hazard in the United States." *JAMA* 267:3067–3070.
- Beck, Allen, Darrell Gilliard, Lawrence Greenfeld, Caroline Harlow, Thomas Hester, Louis Jankowski, Tracy Snell, James Stephan, and Danielle Morton. 1993. *Survey of State Prison Inmates, 1991*. Washington, DC: Bureau of Justice Statistics, U.S. Department of Justice.
- Bureau of Alcohol, Tobacco, and Firearms (ATF). (2000). *Commerce in Firearms in the United States*. Washington, DC: United States Department of the Treasury.
- Cook, Philip J., Bruce A. Lawrence, Jens Ludwig, and Ted R. Miller. 1999. "The Medical Costs of Gunshot Injuries in the United States." *JAMA* 282:447–454.
- Cook, Philip J., and Jens Ludwig. 1996. *Guns in America: Results of a Comprehensive National Survey on Firearms Ownership and Use*. Washington, DC: Police Foundation.
- Cook, Philip J., and Jens Ludwig. 2000. *Gun Violence: The Real Costs*. New York: Oxford University Press.
- Cox Newspapers. 1989. *Firepower: Assault Weapons in America*. Washington, DC: Cox Enterprises.
- Duwe, Grant. 2000. "Body-Count Journalism: The Presentation of Mass Murder in the News Media." *Homicide Studies* 4:364–399.
- Fallis, David. 2011. "VA Data Show Drop in Criminal Firepower During Assault Gun Ban." *Washington Post*, January 23.
- Follman, Mark, Gavin Aronsen, and Deanna Pan. 2012. "A Guide to Mass Shootings in America." *Mother Jones*, Dec. 15. <http://www.motherjones.com/politics/2012/07/mass-shootings-map>.
- Gun Tests. 1995. "Magazine Rule Change Unlikely." March.
- Hargarten, Stephen W., Trudy A. Karlson, Mallory O'Brien, Jerry Hancock, and Edward Quebbeman. 1996. "Characteristics of Firearms Involved in Fatalities." *JAMA* 275:42–45.
- Hutson, H. Range, Deirdre Anglin, Demetrios N. Kyriacou, Joel Hart, and Kelvin Spears. 1995. "The Epidemic of Gang-Related Homicides in Los Angeles County from 1979 through 1994." *JAMA* 274:1031–1036.
- Hutson, H. Range, Deirdre Anglin, and Michael J. Pratts, Jr. 1994. "Adolescents and Children Injured or Killed in Drive-By Shootings in Los Angeles." *New England Journal of Medicine* 330:324–327.
- Kleck, Gary. (1997). *Targeting Guns: Firearms and Their Control*. New York: Aldine de Gruyter.
- Koper, Christopher S. 2004. *An Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence, 1994–2003*. Report to the National Institute of Justice, U.S. Department of Justice. Jerry Lee Center of Criminology, University of Pennsylvania, Philadelphia, PA.
- Koper, Christopher S., and Jeffrey A. Roth. 2001. "The Impact of the 1994 Federal Assault Weapon Ban on Gun Violence Outcomes: An Assessment of Multiple

- Outcome Measures and Some Lessons for Policy Evaluation.” *Journal of Quantitative Criminology* 17:33–74.
- Koper, Christopher S., and Jeffrey A. Roth. 2002. “The Impact of the 1994 Federal Assault Weapons Ban on Gun Markets: An Assessment of Short-Term Primary and Secondary Market Effects.” *Journal of Quantitative Criminology* 18:239–266.
- Lenett, Michael G. 1995. “Taking a Bite Out of Violent Crime.” *University of Daytona Law Review* 20:573–617.
- McGonigal, Michael D., John Cole, C. William Schwab, Donald R. Kauder, Michael F. Rotondo, and Peter B. Angood. 1993. “Urban Firearm Deaths: A Five-Year Perspective.” *Journal of Trauma*: 35:532–537
- Murtz, H.A., and the Editors of Gun Digest. 1994. *Guns Illustrated 1994*. Northbrook, IL: DBI Books.
- New York State Division of Criminal Justice Services. 1994. *Assault Weapons and Homicide in New York City*. Albany, NY.
- Reedy, Darin C., and Christopher S. Koper. 2003. “Impact of Handgun Types on Gun Assault Outcomes: A Comparison of Gun Assaults Involving Semiautomatic Pistols and Revolvers.” *Injury Prevention* 9:151–155.
- Richmond, Therese S., Charles C. Branas, Rose A. Cheney, and C. William Schwab. 2003. *The Case for Enhanced Data Collection of Handgun Type*. Firearm and Injury Center at Penn, University of Pennsylvania, Philadelphia, PA.
- Roth, Jeffrey A., and Christopher S. Koper. 1997. *Impact Evaluation of the Public Safety and Recreational Firearms Use Protection Act of 1994*. Washington, DC: The Urban Institute.
- Roth, Jeffrey A., and Christopher S. Koper. 1999. *Impacts of the 1994 Assault Weapons Ban: 1994–96*. Washington, DC: National Institute of Justice, U.S. Department of Justice.
- United States Department of the Treasury. (1998). *Department of the Treasury Study on the Sporting Suitability of Modified Semiautomatic Assault Rifles*. Washington, DC.
- Violence Policy Center (2012). *Mass Shootings in the United States Involving High-Capacity Ammunition Magazines*. Washington, DC.
- Zawitz, Marianne W. 1995. *Guns Used in Crime*. Washington, DC: Bureau of Justice Statistics, U.S. Department of Justice.

This page intentionally left blank

Personalized Guns

Using Technology to Save Lives

Stephen P. Teret and Adam D. Mernit

Gunfire took the lives of 31,672 Americans in 2010.¹ Death by gunfire occurs in homes, workplaces, shopping malls, churches, schools, and on the streets, and to Americans of all ages. Often, when possible solutions to this compelling public health problem are considered, conversations focus on troubled individuals who are at risk for becoming shooters, mental health interventions for these individuals, and securing the safety of vulnerable places such as schools. Little attention is paid to modifying the gun itself, which is the vehicle that causes the human damage, such as changing the design of guns so that they are inoperable by unauthorized users—that is, making all guns personalized. But product-oriented interventions have been highly effective with other public health problems, such as motor vehicle-related deaths.² In fact, the impressive reductions in highway fatalities are more attributable to

Stephen P. Teret, JD, MPH, is a professor in the Department of Health Policy and Management and director of the Center for Law and the Public's Health at the Johns Hopkins Bloomberg School of Public Health. Adam D. Mernit is an undergraduate senior in public health studies at Johns Hopkins University.

changes in the design of cars than to enhancing the driving skill of hundreds of millions of motorists.

This essay explores the topic of personalized guns, sometimes called smart guns or childproof guns. The definition we use for a personalized firearm is a gun that, by design integral to the gun itself as opposed to an external locking device, can be fired only by the authorized user or users. Our argument is that if all newly manufactured guns were personalized guns, there would be a meaningful reduction in gun deaths. This is not to imply that other efforts to regulate the sale, carrying, and use of guns should be ignored. Rather, changing the design of guns so that they are personalized would complement other policy interventions to reduce gun violence.

The Need for Personalized Guns

Of the 31,672 persons killed by firearms in 2010 in the United States, 61 percent were suicides, 35 percent were homicides, and most of the remaining deaths were unintentional or accidental deaths.³ How many of these gun deaths would be averted if guns were personalized is difficult to assess, but it is reasonable to assume that there would be substantial saving of lives.

Perhaps the most understandable saving of lives would occur in the unintentional or accidental category of gun deaths, which in 2010 accounted for 606 fatalities, 9 percent of which were of young people aged zero to 19 years.⁴ Although these unintended deaths are far fewer in number than gun suicides and homicides, when they occur to children, they are seen as particularly tragic. Children find guns in their homes, often handguns kept loaded for protection, and are able to fire them, shooting themselves, their siblings, and playmates. Wintemute et al.⁵ examined the circumstances of 88 deaths involving children shooting children and concluded that changes in gun design, particularly of handguns, would be useful in preventing such deaths.

The National Rifle Association (NRA) has long argued that the way to prevent accidental gun deaths of children is to educate them about gun safety. In pursuit of this goal, the NRA has developed its Eddie Eagle GunSafe Program, for children in pre-K through third grades. It states that since the inception of the program, 18 million children have been trained.⁶ The effectiveness of training young children in gun safety has been studied, and doubt has been cast as to whether such training is useful.⁷

Vernick et al.⁸ studied a series (N=117) of unintentional, undetermined intent, and negligent homicide gun deaths that occurred in Maryland and Milwaukee County, Wisconsin, from 1991 to 1998. The purpose of the study was to assess what portion of these deaths would likely have been prevented if the guns used were personalized and, separately, if the guns had other safety devices (loaded chamber indicators and magazine disconnect devices). Most (81%) of these deaths occurred with a handgun, roughly half being revolvers and half being pistols. Using specific criteria to address preventability, the researchers determined that 37 percent of the deaths would have been preventable if the guns involved were personalized.

Unintentional deaths are not the only type of gun death that could be affected by a change to personalized guns. Children and teenagers also use guns found in the home to commit suicide. In 2010, 748 youths between the ages of 10 and 19 committed suicide with a firearm.⁹ Such deaths, often stemming from depression, would be less likely if the gun in the home were inoperable by the young person. Some have argued that the depressed teenager would just find another means of committing suicide, but other forms of suicide attempts (e.g., poisoning) have lower case fatality rates. The lethality of self-inflicted gunshots leaves little opportunity for medical intervention.

Stolen guns are used in crime and therefore figure prominently in homicides and assaultive injuries involving firearms. Cook and colleagues,¹⁰ using data from the National Crime Victimization Survey (NCVS), noted that there are nearly 350,000 incidents of firearm theft from private citizens annually. Further, there are approximately 1.5 firearms taken during each of these burglaries, resulting in about half a million gun thefts each year. NCVS and FBI data show that the majority of the guns stolen are handguns.¹¹ These guns would be inoperable to criminals if they had been made as personalized guns.

A Brief History of Personalized Guns

Danger from the unauthorized use of guns has long been recognized. Roy G. Jinks's *History of Smith & Wesson*¹² tells the story of D. B. Wesson, one of the founding partners of the renowned gun-making firm, learning in the early 1880s of an incident in which a child was hurt while playing with a Smith & Wesson revolver that discharged. Wesson asked his son, Joe, to design a revolver that a young child could not operate, and in 1886, Smith & Wesson began to sell a gun it believed to be childproof. The revolver employed what is now

known as a grip safety—a metallic lever on the back of the gun that must be pressed inward in order for the gun to fire. In its marketing materials for this gun, Smith & Wesson stated that “no ordinary child under eight can possibly discharge it.” The concern that Smith & Wesson had for the safety of children more than 125 years ago has not carried through to present times. Smith & Wesson stopped using its childproofing technology many decades ago, and neither it nor other leading gun makers have developed and put into widespread operation newer technologies to protect the public from unauthorized gun use.

Ninety years later, however, a minor gun maker was still concerned with the danger of unauthorized use; he applied for and received a U.S. patent for a combination lock built into a carbine, a long gun. The U.S. patent was issued to Gerald Fox on May 29, 1973, Patent Number 3,735,519. The Fox Carbine featured a three-digit combination lock. The advertisement for this gun noted that “accidental and unauthorized firing is prevented by a patented, built-in combination lock safety.”¹³

During the 1980s and 1990s, there was increasing interest in personalizing guns. In 1984, a Massachusetts inventor was granted a patent for a device called a “personalized safety method and apparatus for a hand held weapon.” It was described as “responsive to the palm or fingerprint of one or more individuals. The safety device is activated by heat sensed when the device is hand held. The pattern of the palm or fingerprint is stored in the firearm and must match the user’s in order for the blocking safety mechanism to allow the weapon to fire.”¹⁴ The renewed attention to gun personalization coincided both with advancements in electronic technologies and highly publicized mass shootings.

In 1992, faculty at the Johns Hopkins Bloomberg School of Public Health, with a \$2,000 grant, commissioned a team of undergraduate students at the university’s School of Engineering to create a prototype of a personalized handgun. Using an existing revolver purchased for this purpose, the students employed touch memory technology, which worked through contact between a semiconductor memory chip and a reader embedded within the grip of the gun. The chip stored a serial number, which was placed on a ring worn by the authorized gun user. When the ring came in contact with the reader on the gun, an electronic current moved a blocking mechanism that kept the gun from being able to fire.

Other technologies, such as radio frequency identification and magnetic encoding, were used in experiments to develop a personalized gun.

On May 12, 2000, President Bill Clinton announced that the United States Justice Department, through its National Institute of Justice, would provide two grants of \$300,000 each to Smith & Wesson and FN Manufacturing, Inc., for research and development of personalized gun technology. The press release from the White House stated: “Smart gun technologies have the potential to limit a gun’s use to its proper adult owner—and could prevent accidental shooting deaths of children, deter gun theft, and stop criminals from seizing and using the guns of police officers against them.”¹⁵

Work by Colt’s on personalized, or smart gun, technology resulted in a prototype handgun that used radio frequency identification. Colt’s viewed its smart gun as a major growth prospect for the corporation. But Colt’s did not want the progress it was making on personalized guns to be widely known. Colt’s formed a new company, iColt, to pursue the technology, and it hoped for additional funding from the federal government. In June 1999, a memo was prepared by Colt’s, noting that remarkable progress was being made on personalization technology. The memo further stated that “Colt’s is working in Washington to help put \$20 million to \$40 million in the federal budget for research on ‘smart gun’ technology. Depending on how the press reports the current state of the ‘smart gun,’ it could be perceived by Congress that further research dollars are not needed.” This memo was uncovered during discovery in a lawsuit against Colt’s.¹⁶ Shortly after the memo was written, and during substantial litigation against Colt’s and other gun makers, Colt’s discontinued its work on personalized guns, and so did most of the major manufacturers in the gun industry.

Modern Personalized Gun Technology

Personalized firearms presently exist. Armatix GmbH, a German company, has produced the iP1 Pistol, which is a personalized .22 caliber handgun that works like a conventional pistol except that it is digital and battery operated, which allows for software flexibility depending on the needs of the consumer.¹⁷ The handgun is sold with an Active RFID Wrist Watch (designated by Armatix as iW1), which uses radio frequencies to activate the handgun, making it operable. The watch uses a personal identification number (PIN) that must be entered in order to unlock the electromechanical firing pin lock, making the gun operable by the owner.¹⁸ Microchips in both the iW1 watch and the iP1 pistol communicate with each other. If the watch is not within a specified distance

from the pistol, the gun is inoperable, rendering it useless. If the gun is first unlocked by its authorized user but then is taken beyond the distance where it can communicate with the watch, the gun will lock itself and be inoperable until the authorized user gets the watch and the gun back together.

A system of colored lights on the gun is used to convey the firearm's status to the user. A green light indicates that the firearm is in sync with the iW1 watch and is operable by the user. A red light indicates a "safe mode" in which the gun is locked and has not been made active by the authorized user. Additionally, a blue light indicates a "safe mode" in which the gun's magazine has been removed.¹⁹ This feature ensures that the user knows that the magazine containing the ammunition is removed, that the gun is inoperable, and that, even if there is a round in the chamber, it cannot be fired. The gun can be fired only if the light indicator is green.

The Armatix personalized handgun is now being sold on a limited edition basis throughout much of Western Europe, and Armatix has been granted permission from the United States Bureau of Alcohol, Tobacco, Firearms and Explosives to sell the firearm in the United States. The limited, collector's edition is selling in Europe for 7,000 Euro (about US\$10,000). Planned sales in the United States will be for a significantly lower cost, and once the pistol is selling in greater numbers, economies of scale will further reduce the cost, bringing it within the price range of many gun buyers.

TriggerSmart, a Limited Liability Irish company, is using radio frequency identification (RFID) technology in the development of its personalized pistol. TriggerSmart realized that a past issue with wireless personalization technology has been that both the firearm and the transmitter used to communicate with the firearm required batteries. This raised questions of reliability and functionality.²⁰ The TriggerSmart high-frequency RFID system incorporates technology that is commonly used in identification cards and in library books to establish communication between the firearm and a bracelet in order to authenticate a user.²¹ The firearm's battery, antenna, and electronic interface are built into the handgrip of the gun. Once the radio frequency tags in the bracelet fall within a distance where it can communicate with the antenna in the handgrip, the gun enters an "instant on" phase and can be fired.²²

The moment that the radio frequency tags comes out of contact, breaking communication, the firing pin locks and the gun cannot be fired. There is no battery in the bracelet component of the system, which addresses concerns over reliability and functionality. The company claims that this system is use-

ful because the closer the tags in the bracelet are to the antenna in the firearm, the less battery power is used, offering a dependable power source that will last for extended periods of time.

The New Jersey Institute of Technology, in the United States, has been working for years on a biometric version of a personalized gun. Their product employs “grip recognition.” The handgun, after some period of use by its owner, recognizes the palm configuration of the owner and will work only when held by that authorized user.

Achieving Personalized Guns

The federal government of the United States does not comprehensively regulate firearms with regard to their safe design. The U.S. Consumer Product Safety Commission, which is the federal agency that protects the public from unsafe consumer products, has expressly been forbidden by Congress to address the safety of guns.²³ Thus, gun makers are, under federal law, able to choose the design of their products without regard to safety and to ignore the lifesaving potential of personalized guns.

With other products, a manufacturer’s failure to design its product in a safe, feasible manner that could prevent foreseeable injuries would likely result in liability. The threat of litigation has provided a strong incentive to the makers of most products to utilize safety technology.²⁴ It was argued that the same exposure to liability would force gun makers to adopt personalization.²⁵ But, on October 26, 2005, President George W. Bush signed into law the Protection of Lawful Commerce in Arms Act (15 U.S.C. §§ 7901–7903), which provides to gun makers far-reaching immunity from product liability litigation.

As awareness of the need for personalized handguns increased, there was also more interest in state legislative efforts that would require personalized handguns. To aid in this process, a model law entitled “A Model Handgun Safety Standard Act” was developed by the Johns Hopkins Center for Gun Policy and Research. This model legislation could be used by states or municipalities to require that all handguns manufactured or sold within their jurisdiction after a certain date be personalized. Legislation patterned after the model law was passed in New Jersey in 2002 (New Jersey Statutes, Title: 2C; Chapter 58; Sections 2C:58-2.2 et seq.) The New Jersey law provides that once a personalized gun is introduced for sale in the state and is recognized by the New Jersey attorney general as complying with the statutory definition

of a personalized or childproof gun, then three years later all new handguns sold in New Jersey must be personalized.

In addition to state legislation, there are several actions that Congress could take to introduce personalized guns into the marketplace. These actions, stated in increasing order of effectiveness, in our opinion, are:

1. Provide funds, through the National Institute of Justice or another agency, for research and development of personalized gun technology. But, because of prior difficulties involving gun manufacturers' use of such funds, the work of the gun makers must be closely monitored.
2. Use the federal government's purchasing power to create a market for personalized guns.
3. Provide states with financial incentives to enact personalized or childproof gun laws, much as Congress has done with other areas of public safety, such as raising the drinking age.
4. Amend the Consumer Product Safety Act to give the Consumer Product Safety Commission (CPSC) jurisdiction over firearms as consumer products. Also, mandate the CPSC to promulgate a standard regarding childproof guns.
5. Enact technology-forcing legislation mandating that all newly manufactured or imported firearms be personalized, starting three years from the effective date of the legislation.
6. Amend the Protection of Lawful Commerce in Arms Act, permitting litigation against firearms manufacturers for injuries sustained by an unauthorized use of a recently manufactured firearm that was not personalized but also providing a safe haven of immunity if the firearm had been personalized.

Conclusion

Personalized guns are an idea whose time has come. The technology is now available to make guns a safer consumer product. To require all guns to be personalized does not interfere with Second Amendment rights—one can still keep and bear arms, but the arms would be designed in such a manner as to reduce the likelihood of being involved in mayhem.

Based on the longstanding behaviors of the gun industry, it would be naïve to expect them to voluntarily adopt even lifesaving technology. This means

that legislation, regulation, and perhaps litigation are needed to provide the public with safer guns.

Notes

1. CDC Web-based Injury Statistics Query and Reporting System (WISQARS): <http://www.cdc.gov/injury/wisqars/index.html>.
2. Lund AK, Ferguson SA. Driver Fatalities in 1985–1993 Cars with Airbags. *J Trauma*. 1995; 38:469–475.
3. CDC Web-based Injury Statistics Query and Reporting System (WISQARS): <http://www.cdc.gov/injury/wisqars/index.html>.
4. CDC Web-based Injury Statistics Query and Reporting System (WISQARS): <http://www.cdc.gov/injury/wisqars/index.html>.
5. Wintemute GJ, Teret SP, Kraus JF, Wright MA, Bradfield G. When Children Shoot Children: 88 Unintended Deaths in California. *JAMA*. 1987;257(22):3107–3109.
6. <http://www.nra.org/Article.aspx?id=1353>.
7. Hardy, M. Teaching Firearm Safety to Children: Failure of a Program. *J. Developmental & Behavioral Pediatrics*. 2002;23(2):71–76.
8. Vernick JS, O'Brien M, Hepburn LM, et al. Unintentional and Undetermined Firearm Related Deaths: A Preventable Death Analysis for Three Safety Devices. *Injury Prevention*. 2003; 9:307–311.
9. CDC Web-based Injury Statistics Query and Reporting System (WISQARS): <http://www.cdc.gov/injury/wisqars/index.html>.
10. Cook PJ, Molliconi S, Cole TB. Regulating Gun Markets. *J Crim L Criminology*. 1995;86:59–91.
11. Zawitz MW. *Guns Used in Crime: Firearms, Crime and Criminal Justice: Selected Findings*. Washington, DC: U.S. Dept. of Justice; Bureau of Justice Statistics, NCJ-160093. 1996.
12. Jinks RG. *History of Smith & Wesson*. North Hollywood, CA: Beinfeld Publishing. 1977.
13. <http://forums.vwvortex.com/showthread.php?5127428-the-DEMRO-Fox-Carbine-a-really-really-really-dumb-gun-design>.
14. Shaw FA. Personalized Safety Method and Apparatus for a Hand Held Weapon. U.S. Patent 4,467,545: Aug. 28, 1984.
15. http://clinton4.nara.gov/WH/New/html/20000531_4.html.
16. Ivey, C. Judge Orders Release of Colt's Smart Gun Research. *San Jose Mercury News*, Apr. 18, 2003; www.mercurynews.com.
17. Armatix iP1 product description at <http://www.armatix.de/iP1-Pistol.779.0.html?&L=1>.
18. Armatix iW1 product description at <http://www.armatix.de/iP1-Pistol779.0.html?&L=1>.
19. Armatix iP1 product description at <http://www.armatix.de/iP1-Pistol.779.0.html?&L=1>.
20. Pers. comm., Robert McNamara, Jan. 6, 2013.

182 *Stephen P. Teret and Adam D. Mernit*

21. Pers. comm., Robert McNamara, Jan. 6, 2013.
22. Pers. comm., Robert McNamara, Jan. 6, 2013.
23. Pub. L. 94-284, §3(e), May 11, 1976, 90 Stat. 504 (1976).
24. Teret SP. Litigating for the Public's Health. *Am J Public Health* 1986;76:1027-1029.
25. Teret SP, Culross P. Product-oriented Approaches to Reduce Youth Gun Violence. *The Future of Children*, 2002;12(2):119-131.

Part IV / International Case Studies of Responses to Gun Violence

This page intentionally left blank

Gun Control in Great Britain after the Dunblane Shootings

Michael J. North

Dunblane

On March 13, 1996, a man with a grudge against the local community walked into Dunblane Primary School in central Scotland. He was armed with two semi-automatic pistols and two revolvers and carrying hundreds of rounds of ammunition loaded into high-capacity magazines, all legally held. Within minutes Thomas Hamilton had shot and fatally wounded one teacher and sixteen 5- and 6-year-old children. Another ten children and three teachers were injured. All of his victims were shot with a 9-mm semi-automatic pistol. Hamilton then killed himself with one of his revolvers.

Gun homicide is rare in Great Britain. The deaths at Dunblane accounted for nearly a quarter of the country's gun victims in 1996. The public outrage at this scale of violence by a legally armed gunman translated into a campaign for tighter gun control, and within two years all handguns had been prohibited.

Michael J. North, PhD, was a biochemistry academic at the University of Stirling in Scotland when in March 1996 his only daughter was killed in a mass shooting at Dunblane Primary School. Following that event he became an advocate for gun control.

This essay outlines events which led to the landmark legislative changes and summarizes their impact. Only the key elements are included and more details can be found in North (2000). Inevitably, this is an insider's account and a more thorough analysis of the issues is provided by Squires (2000).

Firearms Legislation

Firearms legislation is determined by the UK parliament, though the laws applying in Northern Ireland differ in some respects from those for Great Britain (England, Wales and Scotland), the focus of this essay.

British law permits the private ownership of guns for which an appropriate reason can be demonstrated (e.g., target shooting, hunting, vermin control), but the reasons exclude self-protection (except rarely in Northern Ireland). Under the Firearms Act (1968) handgun and rifle owners were required to hold a firearm certificate (license) issued by the local police force. Justification for the ownership of each individual weapon was needed (a different system applies to shotguns). A person had to show suitability to be entrusted with a firearm with the application counter-signed by a responsible person who knew the applicant. Hamilton held firearms certificates for nearly 20 years and owned a number of handguns, all for target shooting at an approved gun club, the "good reason" for ownership of most of the legally held handguns in Great Britain.

Applications for firearm certificates were rarely unsuccessful, with only 1% being refused. Nor were many certificates revoked. Hamilton's ownership of guns had been called into question, but the senior officer responsible for firearms licensing dismissed the concerns. He later admitted to have been worried that if his certificate had been revoked, Hamilton would have successfully appealed. Hamilton therefore retained his certificate and was able to buy and keep dangerous weapons.

Some other types of firearms were prohibited. In 1988 many self-loading and pump-action rifles and shotguns had been banned in the aftermath of a mass shooting in August 1987 in Hungerford, Berkshire, where another legal gun owner killed sixteen people, half of whom were shot with a semi-automatic rifle. However, the Conservative Party government failed to tighten controls over handguns even though the other victims were killed with a pistol. It did set up a Firearms Consultative Committee to advise the Home Secretary

(The United Kingdom's equivalent of the United States Attorney General), but the membership was biased in favor of those with interests in shooting. Victims' voices were absent and the Committee became a means by which the gun lobby could influence Home Office policy and its implementation. Traditionally the Conservative Party had close links with the shooting community and there were accusations that the post-Hungerford response had been watered down because of vested interests.

Immediate Response to Dunblane

The Conservatives were still in power in 1996, and the Government faced awkward questions about why it had not dealt with handguns after Hungerford. Michael Forsyth, the local Member of Parliament (MP) in Dunblane, was Secretary of State for Scotland, a connection which undoubtedly gave weight to the case for tighter gun control within government. One of his first moves was to set up a Public Inquiry chaired by a senior judge, Lord Cullen, which "sought to answer questions about the circumstances that led up to and surrounded the shootings and make recommendations with a view to safeguarding the public against the misuse of firearms and other dangers" (Cullen 1996).

In the United Kingdom, Public Inquiries are held after major disasters to shed light on the causes and to offer recommendations on the lessons that can be learned. The forthcoming Inquiry provided breathing space for the Government which could delay announcing its position. On legal advice, other interested parties also had to wait until after the Inquiry's hearings were over before commenting. In retrospect, this proved to be a good thing for the victims' families, giving time for their thoughts to be collected. However, aided by continuous media coverage a widespread debate on gun control had already begun. Campaigns for a ban on handguns were initiated.

At Parliament, backbench MPs on the Home Affairs Committee held an inquiry into the possession of handguns, but evidence was heard predominantly from those with shooting interests with no input from victims. The MPs' report exposed a political split, the Conservative majority proposing that no significant new controls were necessary, and the Labour minority advocating a ban. The Government had hoped to keep politics out of the debate but the report reinforced a widely held perception that the Conservatives gave too much weight to the views of the shooters.

The ongoing national debate ensured that by the time the Cullen Report was published most groups and political parties had already established their positions, making it unlikely that anything Lord Cullen recommended would make a difference.

Campaign for a Handgun Ban

During the early 1990s there was a perception, supported by official crime data, that handgun crime was on the increase leading to anxieties about an “American-style” gun culture taking hold, something that had little appeal to the British. There was speculation about the provenance of guns used in crime and varying estimates of the numbers of illegal weapons. Firearms enthusiasts argued that the crime problem was entirely the result of unlicensed guns. To them, and indeed many policy makers, legal guns posed no problems. Hungerford, and then Dunblane, were reminders this was not the case.

Gun ownership is low in Great Britain, with most of the population unfamiliar with what weapons can be owned legally. There was widespread shock, including among politicians, at the amount of firepower that Hamilton had available to him. Shooting with handguns in gun clubs had been on the rise and increasingly involved weapons more powerful than those used for traditional Olympics-style target shooting. In his report Cullen commented on the growth of activities like combat shooting and said that its trappings “caused others to feel uneasy about what appears to be the use of guns as symbols of personal power” (Cullen 1996).

Campaigns in support of a handgun ban began almost immediately, reflecting a majority public view confirmed in opinion polls, that handguns were too dangerous for private possession because they were easily concealable, rapidly fired, not justifiable for shooting game and criminals’ weapon of choice. Most of those who became active campaigners had little, if any, prior knowledge of guns. Gun enthusiasts argued that this precluded them from influencing policy and that only those with a working knowledge of guns were qualified to discuss firearms legislation. Advocates for gun control were said to be too emotional and seeking an ill-informed knee-jerk response. For many, including the Dunblane victims’ families the Inquiry hearings were, however, providing a crash course in gun-related issues.

The prime motivation of the campaigners was to minimize the risk of another shooting like Dunblane. Most thought that a minority sport (target

shooting with handguns) was insufficient justification for compromising public safety through the private ownership of dangerous weapons. Hamilton's own history with guns suggested it was impossible to design a licensing system which would ensure handguns were never owned by those who would potentially misuse them. Psychological testing, something favored by the shooting organizations to eliminate potential "madmen," was said by the British Medical Association to have no predictive measure. Campaigners concluded that in the interest of public safety it was better to keep handguns out of all private hands.

Most national newspapers immediately called on the Government to introduce tighter gun controls, and media support during the various campaigns ensured a continuous source of pressure on politicians. Individual campaigns arose spontaneously and independently around the country. Two petitions in particular gained national prominence, one launched by a Scottish tabloid newspaper, the *Sunday Mail*, and the Dunblane Snowdrop Petition, organized by parents of young families living in Central Scotland. Each called for a handgun ban and was eventually supported by hundreds of thousands of signatures before being handed into Parliament. The Snowdrop Campaign gained considerable media coverage. Gun Control Network (GCN), whose aim was to provide a permanent voice for gun control beyond the current campaign, was also set up and its founding members included parents of victims of both the Hungerford and Dunblane shootings together with lawyers and academics. The campaigns ran on limited budgets, occasionally accepting *pro bono* help from PR companies, but relying mostly on the efforts of volunteers. They never came to depend on large organizations or high-profile celebrities.

Although unable to be directly involved during the initial stages, many of the Dunblane families became active participants once the Inquiry hearings were over. Each family made its own decision to join in, but without exception all came to support the aim of a handgun ban. The families' involvement in the Snowdrop Campaign and GCN ensured the various activities were coordinated. The families boosted the public profile of the campaign, which came to be portrayed, misleadingly, as entirely their own. It was critical that the issue was kept alive and, more than anyone else, the families could do this by talking to the media about themselves and their children as well as the handgun ban. They were able to gain access to politicians, and parliamentary lobbying would become a key activity.

Inevitably the shooting organizations were opposed to any change to the gun laws. They believed many were being punished for the actions of one man. They

said Dunblane could be dismissed as another “one-off” event and were adamant that tighter controls would not stop it happening again. Pro-gun representatives gave evidence to the Public Inquiry and participated in media debates but probably believed their previous close political contacts would ensure that little would be changed. They told the Government not to react to special pleading of the Dunblane families, that a handgun ban would have no impact on gun crime, and that a “madman” cannot be stopped. The groups opposed to the ban failed to win over the general public or much of the media. Their rallies were only modestly attended, and when their tactics became more aggressive the media were quick to expose their personal attacks on gun control campaigners. The gun lobby could still rely on some support among parliamentarians, but the influence they had was limited. Some in the shooting community had, prior to Dunblane, been concerned by trends in handgun shooting that might be giving shooting the “wrong image,” but all the groups stood firm against any legislative changes. Their intransigence made it inevitable that those seeking a tightening of controls would harden their position since any compromise over gun safety measures appeared impossible.

As the Cullen Report was awaited the political parties had been assessing the arguments and monitoring public opinion. The Government waited until the Report’s publication, but the main opposition parties all announced that they were favoring a total ban.

Legislative Changes

The Cullen Report was published in October 1996, six months after the shootings. Although he did not recommend an outright ban on handguns, Cullen did recommend restrictions on how handguns were kept, suggesting measures such as disablement of guns when not in use and locked barrel blocks. However, he went on to add that “if such a system is not adopted the Government should consider restricting the availability of self-loading pistols and revolvers of any caliber by banning of the possession of such handguns by individual owners” (Cullen 1996).

At the time the Government was weak; its party divided on a number of issues, and had a very small parliamentary majority. Facing an imminent general election, Conservative MPs were sensitive to the public mood, which had been reflected in the campaigns, but they also had traditional links to the shooting community. The Government opted for a compromise. Choosing

to go further than Cullen's recommendations, ministers proposed a partial ban—prohibiting all large-caliber handguns, though smaller guns (.22s) used by target shooters for events like the Olympic Games were still permitted with tighter restrictions. The compromise satisfied neither the campaigners nor the gun lobby, and within Parliament the Government faced opposition from both sides of the argument. Some MPs, mostly in the Government's own party, opposed any kind of ban whilst the main opposition parties wanted a total ban.

Through press conferences, interviews and lobbying, the Dunblane families immediately attempted to persuade more MPs to support a bill for a complete ban, highlighting the fact that .22 handguns could be just as lethal as other calibers. However, the Government retained sufficient support for the partial ban, and despite dissatisfaction from both sides of the debate a bill was passed to ban just the higher caliber handguns.

Three months after the bill had been enacted the Labour party won a general election with a huge majority. A number of the new Labour ministers had had the opportunity during the previous year to meet with the Dunblane families and listen to their views. As a result Labour had made a commitment in its election manifesto to prohibit the remaining small caliber handguns. A new law was duly passed and by February 1998 all handguns had become prohibited weapons. Handgun owners received compensation for the weapons they were required to surrender.

While there has since been a sustained attempt on the part of some shooting organizations to reverse the handgun ban this has been largely unsuccessful. The only concession was to allow an elite group of Olympic pistol shooters to practice on British soil during a limited period before the 2012 London Games.

In Great Britain the gun issue was not clouded by arguments over self-defense and the right to bear arms. Cullen's report had unambiguously rejected guns for self-defense. The United Kingdom's dominant view that guns were part of the problem, not part of the solution, remained intact and the eventual handgun ban was very much in keeping with this viewpoint (Squires 2000).

Impact and Legacy

The precise impact of the handgun ban on the complex pattern of gun crime would be impossible to quantify. The gun lobby, rightly pointing out that

criminals were unlikely to surrender illegal handguns, claimed a handgun ban could have no effect on criminal activity. It was inevitable that it would take some time to reduce the pool of illegal handguns after the ban, but there is plenty of anecdotal evidence, for example from the National Ballistics Intelligence Service (Nabis), that there are now fewer guns on the street. In England and Wales gun crime did continue to rise during the period immediately following the ban, but after reaching a peak in 2003 and 2004 the total number of firearm offenses has fallen in every subsequent year (Lau 2012). In Scotland gun crime has decreased in almost every year since 1998 and is now less than a third of the 1996 level (Anon. 2012). Gun homicides are even rarer. In 2012 there were only six gun homicides in London reported in the media and a total of 32 across Great Britain. This is not the picture of a country in the grip of gun violence, and the risk for most of the British population remains extremely low. If there had been a drift towards an “American-style” gun culture in the 1990s the handgun ban stopped it.

Some concerns do remain, not least the difficulty some policy makers still have in recognizing any problems with other legal guns. There has been no other mass shooting involving handguns, but Britain did suffer another tragedy in 2010 when a man killed 12 people in Cumbria before killing himself. Derrick Bird’s weapons, a shotgun and a rifle, were legally owned, raising questions about remaining inadequacies in Great Britain’s gun laws.

Dunblane led to the birth of a gun control movement in Great Britain. Gun control advocates and campaign groups representing victims are now accepted as important participants in discussions on firearms, something which has ensured a far more balanced approach. GCN has been invited to give evidence to a number of Parliamentary Select Committees, has had regular meetings with ministers and shadow ministers and pressed for the introduction of further legislation which, since the handgun ban, has tightened controls over imitation firearms and airguns.

The handgun ban in Britain created interest around the world. It has been cited as an example of what can and should be done to stem gun violence elsewhere. The international gun lobby has sought to discredit the ban with distorted claims about its impact, especially on the level and type of violent crime in Britain. But for most of the British population it remains a positive step which has helped maintain a society that wishes to be as free as possible from the threat of gun violence.

Acknowledgments

My daughter was one of the victims of the Dunblane shootings. I wish to acknowledge the support provided since 1996 by the other Dunblane families and express my thanks to my GCN colleagues, especially Peter Squires whose book has been an invaluable help in the preparation of this essay.

References

- Anon. 2012. *Recorded Crimes and Offences Involving Firearms. Scotland, 2011-2012*. Edinburgh: Scottish Government.
- Cullen, Lord W. Douglas. 1996. *The Public Inquiry into the Circumstances Leading up to and Surrounding the Events at Dunblane Primary School on Wednesday 13th March 1996*. Edinburgh: The Stationery Office.
- Lau, Ivy. 2012. *Recorded Offences Involving the Use of Firearms*. In “Homicides, Firearm Offences and Intimate Violence 2010/11: Supplementary Volume 2 to Crime in England and Wales,” ed. Kevin Smith. London: Home Office.
- North, Mick. 2000. *Dunblane: Never Forget*. Edinburgh: Mainstream.
- Squires, Peter. 2000. *Gun Culture or Gun Control*. London: Routledge.

This page intentionally left blank

Rational Firearm Regulation

Evidence-based Gun Laws in Australia

Rebecca Peters

Australians understand how Americans feel after the mass shooting at Sandy Hook Elementary School in Newtown, Connecticut, on December 14, 2012, because we had a similar experience in April 1996. In our case a disturbed young man with assault weapons killed 35 people at the Port Arthur historic site in Tasmania, one of Australia's most popular tourist destinations. Nineteen other people were seriously injured in the attack. Most of the victims were tourists from other states; some were local residents and workers. The guns used were legally available in Tasmania but banned in most other states.

It was the largest massacre by a single shooter ever recorded in the world and ignited an explosion of public sorrow and outrage as the nation demanded that the gun laws be overhauled. Responding to public pressure, the Prime Minister summoned the Australasian Police Ministers' Council (APMC) and proposed a plan for strict uniform gun laws. The Police Ministers also read the mood of the nation, and 12 days after the massacre they agreed to

Rebecca Peters is a violence prevention specialist who has worked for more than 20 years on arms control, women's rights, public health, and human security.

adopt the National Firearms Agreement into law in all eight states and territories.

Guns in Australia

Australia is a former frontier country, with a well-established gun culture. Guns are owned mainly for sport, recreational hunting, and for use on farms. Each state and territory has its own gun laws, and in early 1996 these varied widely between the jurisdictions. Guns that were banned in some states were legally available in others; some states required all guns to be registered while others did not. The license screening process also varied, so a person barred from owning guns in one state could legally own them in another. One important element was consistent across the nation: the relatively strict regulation of handguns. All jurisdictions limited these weapons to pistol club members and security guards, and all required the ownership and transfer of handguns to be registered with police. As a result of this restrictive approach, handguns made up only around 5% of the Australian stockpile (Harding 1988).

In 1996 Australia's firearm mortality rate was 2.7/100,000 (Mouzos 1999), or about one quarter the US rate. Australia had suffered mass shootings before Port Arthur. As in the United States, each tragedy provoked calls for stronger gun laws, and a grassroots campaign had been building for a decade. Until Port Arthur, however, gun law reform tended to advance in a piecemeal fashion, one tweak in one state at a time.

The Battle Over Firearm Regulation

The campaign for stronger laws was waged by hundreds of community and professional organizations which made up the National Coalition for Gun Control (NCGC): public health and medical societies, women's groups, senior citizens' associations, rural counselors, youth agencies, parents' groups, legal services, human rights organizations, churches, researchers, trade unions, and police. Participants ranged across the political spectrum, from the Country Women's Association to the Council for Civil Liberties, from the War Widows' Guild to the Gay & Lesbian Anti Violence Project.

This diversity reflected the multiplicity of dangers that guns pose in society: some NCGC members were especially concerned about domestic violence, others about crime on the streets, youth suicide, or workplace violence. Their

common conviction was that guns are inherently dangerous products whose availability should be strictly regulated. However useful or enjoyable guns may be for their owners, the interests of public health and public safety must prevail.

The size and breadth of the coalition also reinforced the fact that gun law reform was a mainstream concern rather than the preserve of a single-issue lobby group. Opinion polls had long indicated that the overwhelming majority of Australians wanted tough uniform gun laws; yet the issue was usually framed by the media as a tug-of-war between gun control activists and the gun lobby.

Australia has a strong pro-gun lobby which for years had blocked proposed reforms by threatening parliamentarians whose seats were held by a slim electoral margin. Although most gun owners were not opposed to tighter gun laws, the gun lobby could count on a small number of zealots who were prepared to vote solely on this issue. Thus, despite legislators from both major political parties privately acknowledging the need for reform, neither party was prepared to make the first move publicly. Campaigners had long attempted to persuade the two parties to move simultaneously toward tighter laws, but the highly adversarial nature of Australian politics prevented this shift from occurring before 1996.

The breakthrough after Port Arthur came because John Howard, the newly elected Prime Minister, showed extraordinary leadership and took a stand for stronger gun laws. His courage was especially remarkable because he is the more conservative of our two major political parties, and traditionally considered the natural ally of the gun lobby. In fact this political configuration facilitated a bipartisan agreement: a conservative government inviting progressives to support gun control was more likely to succeed than vice versa. The bipartisan policy gave cover to state and federal parliamentarians from both parties, allowing them to support the reforms without fear of their opponents using the issue against them in an election. As one parliamentarian observed to me, "We go into public life to try to make things better, but then politics gets in the way. It's good to get the chance to do what's right without worrying about politics." John Howard still refers to reform of the gun laws as one of his proudest achievements (Howard 2012).

The bipartisan agreement was a major defeat for the gun lobby, but it continued to fight against the reforms. Rural communities were leafleted warning of total gun prohibition; government officials were harassed with floods of form letters; new political parties were formed to represent shooters.

Outlandish declarations, conspiracy theories, and threats voiced by pro-gun extremists made us realize Australia had its own “lunatic fringe”—and that it was heavily armed. Death threats were made against activists and parliamentarians. An image seared on the collective memory was our Prime Minister addressing a gathering of rural gun owners, obviously wearing a bullet-proof vest under his suit. This was said to be the first time such a precaution had been taken in Australia.

The Importance of Information and Research

In 1996 the World Health Assembly declared violence a leading worldwide public health problem, and urged countries to develop science-based solutions to prevent it (World Health Assembly 1996).

The National Coalition for Gun Control was seeking a comprehensive regulatory system based on prevention, designed to address the real nature of gun violence in Australia. That reality, according to public health, legal and criminology research, was

- Most gun deaths were suicides; though most suicides did not involve guns (Moller 1994).
- Guns were used in about 23% of all homicides, but more often in family killings and in multiple-victim attacks (Strang 1993; Wallace 1986; Bonney 1989).
- Most homicides involved victims and perpetrators who knew each other. Among these cases, most involved close personal relationships—the victim was a family member, current or former sexual partner or rival of the perpetrator, or a person attempting to assist someone in one of those categories (Strang 1993; Wallace 1986; Bonney 1989; Gallagher et al. 1994).
- Family homicides were usually preceded by a pattern of domestic violence (Wallace 1986; Law Reform Commission of Victoria 1991; Neal 1992); but most domestic violence was not reported to police (Department of Premier & Cabinet (Victoria) 1985; Queensland Domestic Violence Task Force 1988; Task Force on Domestic Violence (WA) 1986).
- Most homicide offenders had not previously been adjudicated mentally ill or convicted of criminal violence (Strang 1993; Wallace 1986).

The last two points highlighted the limitations of gun laws based on reacting after the fact. A system that waits until violence is officially recorded before taking any action will fail to assist most victims.

In addition, research from two similar jurisdictions, New Zealand and Canada, showed many firearm homicides involved weapons owned by licensed shooters (Alpers 1995; Dansys Consultants Inc. 1992).

The NCGC consulted closely with researchers and practitioners in academia, public agencies and service delivery organizations. The campaign's policy demands were based mainly on the reports of national and state expert review committees that had considered the regulation of firearms, either as a primary focus or as part of wider violence prevention (National Committee on Violence 1990; National Committee on Violence Against Women 1993; Australian Police Ministers' Council 1991; Australian Law Reform Commission 1986; Joint Select Committee Upon Gun Law Reform 1991; New South Wales Domestic Violence Committee 1991a,b,c; Queensland Domestic Violence Task Force 1988; Task Force on Domestic Violence (WA) 1986; Women's Policy Coordination Unit 1985; Parliament of Victoria, Social Development Committee 1988; Law Reform Commission of Victoria 1991).

The most important review had been by the National Committee on Violence (NCV), established in 1988 in the wake of two mass shootings. After hearing evidence around the country over the course of a year, the NCV made some 20 recommendations for firearms regulation (National Committee on Violence 1990). It called for national uniform gun laws and uniform guidelines for their enforcement; and for the development of a national gun control strategy aimed at (a) reducing the number of firearms in Australia and (b) preventing access to firearms by individuals who were not "fit and proper persons."

Ultimately the National Firearms Agreement contained almost all the measures recommended by the NCV and sought by the NCGC. One recommendation notably omitted from the Agreement was that handguns be required to be stored at pistol clubs.

The New Laws

The National Firearms Agreement is summarized in Table 15.1 (Australasian Police Ministers' Council 1996).

Once the National Firearms Agreement was settled, campaigners pushed for rapid implementation. As time passed and media interest waned, politicians

Table 15.1 National Firearms Agreement (1996) Australia**Ban on automatic and semi-automatic long arms—and buyback**

- Ban on import, sale, resale, transfer, ownership, possession, manufacture and use

Nationwide registration of all firearms

- Integration of licensing and registration systems across the country

License applicants must prove ‘genuine reason’ for every firearm they wish to possess

- Personal protection is not a genuine reason; applicants for Category B, C, D and H must also prove ‘genuine need’

Uniform basic licence requirements

- Age 18, prove genuine reason, be a ‘fit and proper person’, pass an adequate safety test, waiting period at least 28 days
- Photo licence showing the holder’s address, the category of firearm, issued for a maximum of five years.
- Conditions include storage requirements, inspection by police, licence withdrawal/seizure of guns in certain circumstances.
- Categories of licenses and firearms:
 - Category A: air rifles; rimfire rifles (excluding self-loading); single and double barrel shotguns
 - Category B: muzzle-loading firearms; single shot, double barrel and repeating centrefire rifles; break action shotgun/rifle combinations
 - Category C (prohibited except for certain occupational purposes, later expanded to include some clay target shooters): semi-automatic rimfire rifles with max 10-round magazine; semi-automatic shotguns with max 5-round magazine; pump action shotguns with max 5-round magazine.
 - Category D (prohibited except for official purposes): semi-automatic centrefire rifles; semi-automatic shotguns; pump action shotguns with a capacity over 5 rounds; semi-automatic rimfire rifles with capacity over 10 rounds.
 - Category H: all handguns, including air pistols.

Safety training as a prerequisite for licensing

- An accredited course required for first-time licence; a specialized course for persons employed in the security industry.

Grounds for licence refusal / cancellation and seizure of firearms, including:

- General reasons: not of good character, conviction for violence in past five years, contravene firearm law, unsafe storage, no longer genuine reason, not notifying change of address, licence obtained by deception, not in the public interest.
- Specific reasons: applicant/licence holder has had a restraining order or serious assault conviction in past 5 years.
- Mental or physical fitness: reliable evidence of a condition that would make the applicant unsuitable to possess a gun.

Permit to acquire

- Separate permits required for the acquisition of every firearm, with a waiting period of at least 28 days.

Table 15.1 (Continued)**Uniform standard for the security and storage of firearms**

- Guns must be kept locked, ammunition stored separately; failure to store firearms safely is an offense.
- Specific storage requirements for different categories of firearms.
- Rules for safekeeping of firearms when temporarily away from the usual place of storage.

Recording of sales

- No private or backyard sales: all sales must be conducted by or through licensed firearm dealers.
- Dealers must ensure purchaser is licensed, and provide details of each purchase and sale to firearms registry.
- Ammunition sold only for those guns for which the purchaser is licensed; limits on the quantity that can be purchased.

No mail order sales

- Mail order only allowed from licensed gun dealer to licensed gun dealer.
- Advertising guns may only be conducted by or through a licensed gun dealer.
- The movement of Category C, D and H firearms must be in accordance with prescribed safety requirements.

became more susceptible to gun lobby pressure for a weak interpretation of the Agreement. However, within one year, all states and territories had amended or replaced their gun laws to comply.

The reform that received most publicity internationally was the buyback and destruction of the newly prohibited weapons. Owners had 12 months to surrender these guns for compensation, funded by a temporary increase in the national health levy. The financial carrot was backed up by a stick: after the buyback ended, possession of these weapons was a serious criminal offense. The stocks held by gun dealers were also bought back. Some 640,000 banned firearms were melted down in this 12-month program; though as discussed in the essay by Philip Alpers (in this volume), the final number of guns destroyed was considerably larger.

The legal reforms and buyback were accompanied by a large public awareness and information campaign. In addition, the computer systems of state and territory police forces were upgraded and linked together.

In 2002, following the shooting murder of two university students, the APMC made two more agreements on guns. The National Firearms Trafficking Policy Agreement strengthened border protection, regulation of gun dealers,

and penalties for gun trafficking. The National Handgun Control Agreement restricted the types of handguns allowed for civilians.

Over the years, individual states and territories have amended their laws. There is no mechanism to maintain the uniform standard, and some cracks are beginning to emerge. In 2008 New South Wales made it easier for unlicensed individuals to have handguns at target clubs, with lethal consequences: in 2011 a patron walked out of a pistol club with one of the club's guns, and used it to shoot her father dead (*Sydney Pistol Club v Commissioner of Police, NSW Police Force* 2012). Campaigners point to tragedies like this as justifying further restrictions on handguns.

Overall, Australia's reforms have proved a resounding success. We have not had another mass shooting since 1996, and the firearms mortality rate today is 1/100,000—less than half what it was then (Australian Bureau of Statistics 2012), and one tenth the current United States rate.

This dramatic improvement in public safety has not stopped the United States gun lobby from misrepresenting the Australian experience as part of its campaign against firearm regulation. A National Rifle Association (NRA) infomercial video produced in 2000 claims crime rates have skyrocketed and Australia is overrun by criminals as a result of the reforms. The misinformation was so outrageous that our Attorney General took the unusual step of writing a letter of complaint to Charlton Heston, then president of the NRA. Attorney General Daryl Williams wrote, "There are many things that Australia can learn from the United States. How to manage firearm ownership is not one of them . . . I request that you withdraw immediately the misleading information from your latest campaign" (Williams 2000).

The NRA ignored that request back in 2000, and now the video is once again in circulation on the Internet. But the reality is that firearm regulation has fulfilled its promise to make Australia safer. We hope our experience can help the United States find its own solutions.

r e f e r e n c e s

- Alpers, Philip. 1995. "Firearm homicide in New Zealand: victims, perpetrators and their weapons 1992–1994." Paper presented at Public Health Association Conference, Dunedin NZ, June 27–30.
- Australian Bureau of Statistics. 2012. *Causes of Death, Australia, 2010*, 3303.0. Canberra: Australian Bureau of Statistics.

- Australian Law Reform Commission. 1986. *Domestic Violence*, Report No30. Canberra: Australian Government Publishing Service.
- Australasian Police Ministers' Council. 1996. Resolutions from a Special Firearms Meeting. Canberra: APMC, May 10.
- Australian Police Ministers' Council. 1991. "Draft resolutions." October 23.
- Bonney, Roseanne. 1989. *Homicide II*. Sydney: NSW Bureau of Crime Statistics & Research.
- Dansys Consultants Inc. 1992. *Domestic Homicides Involving the Use of Firearms*. Ottawa: Department of Justice (Canada), March.
- Gallagher, Patricia, Nguyen Da Huong, Marie Therese, and Bonney, Roseanne. 1994. *Trends in homicide 1968–1992*. Sydney: NSW Bureau of Crime Statistics & Research.
- Harding, Richard. 1988. "Everything you need to know about gun control in Australia." Briefing paper prepared for the Australian Bankers' Association.
- Howard, John. 2012. "Brothers in arms, yes, but the US needs to get rid of its guns." *The Age*, August 1. <http://www.theage.com.au/opinion/politics/brothers-in-arms-yes-but-the-us-needs-to-get-rid-of-its-guns-20120731-23ct7.html#ixzz2HbNM2pA7>
- Joint Select Committee Upon Gun Law Reform. 1991. *Report of the Joint Select Committee Upon Gun Law Reform*. Sydney: NSW Parliament.
- Law Reform Commission of Victoria. 1991. Homicide, Report No. 40. Melbourne: LRCV.
- Moller, Jerry. 1994. "The spatial distribution of injury deaths in Australia: Urban, rural and remote areas." *Australian Injury Prevention Bulletin* Issue 8, December.
- Mouzos, Jenny. 1999. *Firearm-related Violence: The Impact of the Nationwide Agreement on Firearms*. Trends & Issues No. 116. Canberra: Australian Institute of Criminology.
- National Committee on Violence Against Women. 1993. *National Strategy on Violence Against Women*. Canberra: Australian Government Publishing Service.
- National Committee on Violence. 1990. *Violence—Directions for Australia*. Canberra: Australian Institute of Criminology.
- Neal, David. 1992. "The murder mystery." *Modern Times*, June. Fitzroy, Victoria: Australian Modern Times.
- NSW Domestic Violence Committee. 1991a. *Report of the NSW Domestic Violence Committee, NSW Domestic Violence Strategic Plan*. Sydney: Women's Coordination Unit.
- NSW Domestic Violence Committee. 1991b. *Report on Submissions, Consultations and Forums, NSW Domestic Violence Strategic Plan*. Sydney: Women's Coordination Unit.
- NSW Domestic Violence Committee. 1991c. "Submission to Joint Select Committee Upon Gun Law Reform." Sydney: Women's Coordination Unit.
- Parliament of Victoria, Social Development Committee. 1988. *First Report Upon the Inquiry into Strategies to Deal with the Issue of Community Violence*. Melbourne: Jean Gordon Government Printer.
- Queensland Domestic Violence Task Force. 1988. *Beyond These Walls, Report of the Queensland Domestic Violence Task Force*, Brisbane.

- Strang, Heather. 1993. *Homicide in Australia, 1991-1992*. Canberra: Australian Institute of Criminology.
- Sydney Pistol Club v Commissioner of Police, NSW Police Force*. 2012. NSW Administrative Decisions Tribunal 121, 21.
- Task Force on Domestic Violence (WA). 1986. *Break the Silence: Report of the Task Force on Domestic Violence to the Western Australian Government*. Perth: Western Australian Government.
- Wallace, Alison. 1986. *Homicide: The Social Reality*. Sydney: NSW Bureau of Crime Statistics & Research.
- Williams, Daryl. 2000. Letter to Charlton Heston, March 22.
- Women's Policy Co-ordination Unit. 1985. *Criminal Assault in the Home: Social and Legal Responses to Domestic Violence*. Melbourne: Department of Premier & Cabinet (Victoria).
- World Health Assembly. 1996. "WHA49.25 Prevention of violence: a public health priority." Geneva: Forty-Ninth World Health Assembly, May 20-25.

The Big Melt

How One Democracy Changed after Scrapping
a Third of Its Firearms

Philip Alpers

In recent years, several democracies have dramatically reduced the availability of firearms to private individuals. I emphasize the word *democracies* because, contrary to Internet chatter, the countries in which voters have supported gun amnesties and buybacks are not dictatorships. They include the United Kingdom, Brazil, Argentina, and Australia, which in recent years destroyed a third of its privately owned guns.

Many observers continue to cite the official tally of guns destroyed by smelting in the Australian National Firearms Buyback as 659,940 newly prohibited weapons (Australia 2002). Yet the actual number of private weapons destroyed is now estimated at well over one million. As outlined in the essay by Rebecca Peters (in this volume), in the late 1990s all Australian states and territories agreed to new uniform legislation, the primary declared purpose of which was to reduce the risk of mass shootings. Owner licensing was tightened to require proof of “genuine reason” to possess a gun; the sale and transfer of

Philip Alpers is an adjunct associate professor at the Sydney School of Public Health, the University of Sydney.

firearms was limited to licensed dealers; rapid-fire rifles and shotguns were banned, bought back, and destroyed; and remaining firearms were registered to uniform national standards (Australia 1996). Two nationwide, federally funded gun buybacks made the headlines, but until now the number of additional, voluntary, and unrecompensed surrenders for destruction remained unquantified.

In the seven years up to January 1988 and before the Port Arthur shootings in 1996, six gun massacres (five or more victims shot dead) had already claimed the lives of 40 Australians (Chapman, Alpers, et al. 2006). According to articles in the print media published during the twenty-four years that followed, we know that 38 state, territory, and federal firearm amnesties ran for a minimum combined total of 3,062 weeks. From the reports in which numbers were published, a total of 948,388 firearms were surrendered to police for destruction. Of these, 67,488 (7.1%) were collected before the federal long-gun buyback which followed the 1996 Port Arthur tragedy. In the 1996–97 National Firearms Buyback of rapid-fire long guns (mainly semi-automatic rifles but also self-loading and pump-action shotguns) and in the 2003 National Handgun Buyback which followed, Australians gave up for destruction 728,667 newly prohibited firearms in return for market-value compensation.

Having measured the scale of the Australian experiment with more accuracy, I have found that at least 219,721 additional firearms were surrendered for destruction—a number which until now has been untallied and largely unrecognized. Although the Australian initiative was most often described as a “buyback” in which gun owners received cash compensation, of all the weapons handed in for destruction since 1988, nearly one in four yielded no financial return to its owner (Alpers and Wilson 2013). Such was the swing in public opinion that large numbers of gun owners sent lawfully held firearms to the smelter, even when there was no obligation to do so.

This tally of just under a million weapons destroyed is conservative. In published reports of 20 gun amnesties we found no count of firearms collected and so were unable to include the numbers handed in for destruction (Alpers and Wilson 2013). In addition, many firearms seized by police and destroyed, for example by court order, are not included in amnesty totals. Two small “weapon” amnesties included non-firearms in their published totals without separation. Taking into account these uncertainties, it seems likely that Australia collected and destroyed well over a million firearms—

that is, between five and six firearms per 100 people. A commonly accepted estimate of the number of firearms in Australia at the time of the Port Arthur shootings is 3.2 million (Reuter and Mouzos 2003, 130). This suggests that post-massacre destruction efforts reduced the national stock of firearms by one-third. If we accept a frequently cited estimate of 270 million privately owned guns in the United States (Karp 2007, 47), a similar effort in that country would require the destruction of 90 million firearms.

This is not to say that such a massive reduction in the national stockpile could be effected in the United States. Because no two jurisdictions share the same problems or legislative or social settings—let alone attitudes—none can claim to have discovered the magic bullet. The Australian experience also suggests that a reduction in the availability of firearms might only be temporary, as removal of several types of newly banned firearms was followed by a surge of replacement buying.

Australia no longer has a firearm manufacturing industry. Gun dealers source their stock from overseas—mainly from the United States. In the year of the main Australian buyback, firearm imports briefly doubled as owners replaced their banned, surrendered multi-shot rifles and shotguns with new single-shot replacements. But in the two years that followed, annual gun imports crashed to just 20 percent of that 1996–97 peak. For two years the trade remained stagnant and then began to recover. By mid-2012, following a steady ten-year upward trend in gun buying, Australians had restocked the national arsenal of private guns to pre-Port Arthur levels. They did this by importing 1,055,082 firearms, an average of 43,961 each year since destruction programs began (Alpers, Wilson, and Rossetti 2013) (this total excludes 52,608 handguns imported for law enforcement and other non-civilian use). To this should be added the national stock of illicit firearms, which by definition cannot be counted. Although claims of large-scale gun smuggling to Australia are common, almost all such stories are evidence-free. But a recent study from the Australian Institute of Criminology, recounting a cross-governmental effort to trace firearms seized in crime, confirms a more influential source. Smuggled guns represent a much smaller proportion of recovered illicit firearms in this island nation than do legally imported firearms that were subsequently diverted or lost to the black market by lawful owners (Bricknell 2012, 41–43).

A range of public health benefits has been both observed and disputed. As policy changes took effect in the wake of the Port Arthur massacre, the risk of

an Australian dying by gunshot fell more than 50 percent and stayed at that level (Alpers, Wilson, and Rossetti 2013a). The number of gun homicides fell from 69 in 1996 (this total excludes the 35 victims shot dead at Port Arthur) to 30 in 2012 (Alpers, Wilson, and Rossetti 2013b). In the decade before the country's change of direction, 100 people died in eleven mass shootings (Chapman, Alpers, et al. 2006). Following the 1996 announcement of legislation specifically designed to reduce gun massacres, Australia has seen no more mass shootings. Firearm-related deaths that attract smaller headlines still occur, yet the national rate of gun homicide—which before Port Arthur was already one-fifteenth the U.S. rate—has now plunged to 0.13 per 100,000, or 27 times lower than that of the United States (Alpers, Wilson, and Rossetti 2013c).

The most comprehensive impact study of the Australian interventions found that “the buyback led to a drop in the firearm suicide rates of almost 80%, with no significant effect on non-firearm death rates. The effect on firearm homicides is of similar magnitude but is less precise.” Important for any discussion of causality, the authors also found that “the largest falls in firearm deaths occurred in states where more firearms were bought back.” This study went on to cite survey results to suggest that Australia had nearly halved its number of gun-owning households and then estimated that, by withdrawing firearms on such a scale, this nation of nearly 23 million people had saved itself 200 deaths by gunshot and US\$500 million in costs each year (Leigh and Neill 2010).

The evidence is clear that following gun law reform, Australians became many times less likely to be killed with a firearm (Alpers, Wilson, and Rossetti 2013a). That said, causality and standards of proof are as contentious in Australia as in any community polarized by the gun debate. Central to the differing interpretations is that Australia's gun death rates were already declining prior to its major public health interventions. Taking this into account, one study concluded nevertheless that “the rates per 100,000 of total firearm deaths, firearm homicides and firearm suicides all at least doubled their existing rates of decline after the revised gun laws” (Chapman, Alpers, et al. 2006).

A countervailing study interpreted essentially the same empirical findings to conclude the opposite, namely that “the gun buy-back and restrictive legislative changes had no influence on firearm homicide in Australia” (Baker and McPhedran 2007). In an article for the National Rifle Association of America, one of the coauthors of this study was quoted as saying “The findings were

clear . . . the policy has made no difference. There was a trend of declining deaths which has continued” (Smith 2007). A third paper relied on different tests to find that Australia’s new gun laws “did not have any large effects on reducing firearm homicide or suicide rates” (Lee and Suardi 2010). These two “little or no effect” studies and their methodology have since been heavily criticized (Neill and Leigh 2007, Hemenway 2009, 2011).

To date, one conclusion has gone uncontested. In finding “no evidence of substitution effect for suicides or homicides,” the initial study of impacts showed that Australia’s interventions were not followed by displacement from firearms to other methods (Chapman, Alpers, et al. 2006).

The Australian experience, catalyzed by 35 deaths in a single shooting spree, marked a national sea change in attitudes, both to firearms and to those who own them. Led by a conservative government, Australians saw that, beliefs and fears aside, death and injury by gunshot could be as amenable to public health intervention as were motor vehicle-related deaths, drunk driving, tobacco-related disease, and the spread of HIV/AIDS. The obstructions to firearm injury prevention are nothing new to public health. An industry and its self-interest groups focused on denial, the propagation of fear, and quasi-religious objections—we’ve seen it all before. But the future is also here to see (Mozaffarian, Hemenway, and Ludwig 2013). With gun violence, as with HIV/AIDS, waste-of-time notions such as evil, blame, and retribution can with time be sluiced away to allow long-proven public health procedures. Given the opportunity and the effort, gun injury prevention can save lives as effectively as restricting access to rocket-propelled grenades and explosives or mandating child-safe lids on bottles of poison.

Acknowledgments

The author thanks Belinda Gardner and Amélie Rossetti, skilled and willing researchers at GunPolicy.org.

References

Alpers, Philip, and Marcus Wilson. 2013. *Australian Firearm Amnesty, Buyback and Destruction Totals: Official Tallies and Media-reported Numbers, 1987–2012*. Sydney: GunPolicy.org, Sydney School of Public Health. <http://www.gunpolicy.org>

- /documents/doc_download/5337-alpers-australian-firearm-amnesty-buyback-and-destruction-totals.
- Alpers, Philip, Marcus Wilson, and Amélie Rossetti. 2013. *Guns in Australia: Facts, Figures and Firearm Law (Imports)*. Sydney: GunPolicy.org, Sydney School of Public Health. http://www.gunpolicy.org/firearms/compareyears/10/firearm_imports_number.
- Alpers, Philip, Marcus Wilson, and Amélie Rossetti. 2013a. *Guns in Australia: Facts, Figures and Firearm Law (Total Number of Gun Deaths)*. Sydney: GunPolicy.org, Sydney School of Public Health. http://www.gunpolicy.org/firearms/compareyears/10/total_number_of_gun_deaths.
- Alpers, Philip, Marcus Wilson, and Amélie Rossetti. 2013b. *Guns in Australia: Facts, Figures and Firearm Law (Number of Gun Homicides)*. Sydney: GunPolicy.org, Sydney School of Public Health. http://www.gunpolicy.org/firearms/compareyears/10/number_of_gun_homicides.
- Alpers, Philip, Marcus Wilson, and Amélie Rossetti. 2013c. *Guns in Australia: Facts, Figures and Firearm Law (Compare Australia: Rate of Gun Homicide)*. Sydney: Gun Policy.org, Sydney School of Public Health. http://www.gunpolicy.org/firearms/compare/10/rate_of_gun_homicide/31,66,69,87,91,128,178,192,194.
- Australia. 1996. *Resolutions from a Special Firearms Meeting*. Canberra: Australian Police Ministers Council.
- Australia. 2002. *The Australian Firearms Buyback: Tally for Number of Firearms Collected and Compensation Paid*. Canberra: Commonwealth Attorney-General's Department.
- Baker, Jeanine, and Samara McPhedran. 2007. Gun Laws and Sudden Death: Did the Australian Firearms Legislation of 1996 Make a Difference? *British Journal of Criminology* 47:455–69.
- Bricknell, Samantha. 2012. *Firearm Trafficking and Serious and Organised Crime Gangs*. Canberra: Australian Institute of Criminology Research and Public Policy Series 116.
- Chapman, Simon, Philip Alpers, Kingsley Agho, and Michael Jones. 2006. Australia's 1996 Gun Law Reforms: Faster Falls in Firearm Deaths, Firearm Suicides and a Decade without Mass Shootings. *Injury Prevention* 12:365–72.
- Hemenway, David. 2009. How to Find Nothing. *Journal of Public Health Policy* 30:260–68.
- Hemenway, David. 2011. The Australian Gun Buyback. Boston: Harvard Injury Control Research Center *Bulletins* 4.
- Karp, Aaron. 2007. Completing the Count: Civilian Firearms. In *Small Arms Survey 2007: Guns and the City*, 38–71. Cambridge: Cambridge University Press.
- Lee, Wang-Sheng, and Sandy Suardi. 2010. The Australian Firearms Buyback and Its Effect on Gun Deaths. *Contemporary Economic Policy* 28:65–79.
- Leigh, Andrew, and Christine Neill. 2010. Do Gun Buybacks Save Lives? Evidence from Panel Data. *American Law and Economics Review* 12(2):462–508.
- Mozaffarian, Dariush, David Hemenway, and David S. Ludwig. 2013. Curbing Gun Violence: Lessons from Public Health Successes. *Journal of the American Medical Association* 1–2. Published online: Jan. 7, 2013. doi:10.1001/jama.2013.38
- Neill, Christine, and Andrew Leigh. 2007. Weak Tests and Strong Conclusions: A Re-analysis of Gun Deaths and the Australian Firearms Buyback. Canberra: The

Australian National University, Centre for Economic Policy Research. *EPS Journal*, Discussion Paper 555.

Reuter, Peter, and Jenny Mouzos. 2003. Australia: A Massive Buyback of Low-risk Guns. In *Evaluating Gun Policy: Effects on Crime and Violence*, edited by Jens Ludwig and Philip J. Cook. Washington, DC: The Brookings Institution.

Smith, Blaine. 2007. Dim Bulb! *America's 1st Freedom*. Fairfax, VA: National Rifle Association of America, 8(2):34–54.

This page intentionally left blank

Brazil

Gun Control and Homicide Reduction

Antonio Rangel Bandeira

Brazil accounts for 13% of the world's firearm homicides, despite having only 2.8% of the world's population. Brazil holds the sad world record for the highest number of annual deaths by firearms in absolute numbers. Faced with such deplorable rates of death by gun violence, Brazil has started reversing this trend by implementing a series of controls on these lethal products. The results have been impressive. According to the national Ministry of Justice, Brazil has reduced deaths by firearms from 39,284 in 2003 to 34,300 in 2010—a saving of 5,000 lives.¹ This essay analyzes the steps that have been taken.

Guns in Brazil

The research organization Viva Rio found that Brazil has about 16 million guns in circulation, half of which are illegal.² Recent gun control reforms have made it more difficult to qualify to buy weapons. This has resulted in a dramatic

Antonio Rangel Bandeira is the Coordinator of Firearms Control Programs at Viva Rio in Rio de Janeiro.

decrease in the annual sale of guns from 155,834 in 2010 to 93,334 in 2011 and down to 12,530 as of July 2012.³ To offset this decrease in domestic sales, the Brazilian gun industry has expanded its international exports by 370% since 2000. The country is now the fourth biggest firearm exporter, just behind the USA, Italy, and Germany, selling \$314 million worth of weapons internationally in 2010.⁴ In 1981, the Brazilian gun maker Taurus S.A. established a manufacturing facility in Florida. This plant and the exports from Brazil account for 20% of the pistols and revolvers sold in the North American market.⁵

Scientific Facts versus Myths

Nineteen years ago, faced with growing urban violence in Rio de Janeiro, Viva Rio sought to implement policies within the classical progressive paradigm focusing on unemployment, social inequality and illiteracy. It soon became clear that this was not enough; reducing urban violence required both gun control *and* reforms to the police force. The proliferation of weapons, which initially was viewed as a secondary cause of violence, turned out to be the key. This factor explained why personal conflicts that did not result in fatalities in other countries so often proved deadly in Rio de Janeiro. It became necessary to understand the universe of firearms.

At that time very little research had been done on gun markets, the use of guns by civilians, or their impact. Viva Rio had to create a research methodology to analyze the dynamics of arms and ammunition. (Researchers were fortunate to have as a colleague Dr. Pablo Dreyfus, an expert from Argentina, who had done field research on drug trafficking before becoming a researcher for the Small Arms Survey. He was a brilliant pioneer in this new field and his work influenced research on guns elsewhere, both in developing and developed countries. Sadly he died in the Air France crash on June 1, 2009.)

We found that guns belong to a nebulous, almost secret world. Those who profit from the production and sale of guns have no interest in sharing information with outside analysts. In Latin America gun control authorities frequently are co-opted by those who profit from the firearms trade. The arms market had never been studied in a serious manner in Latin America and usually governments did not share data with independent experts.

In 1999 a progressive city government gave us information on 250,000 weapons seized by police in Rio de Janeiro. Our analysis of this data drastically altered the public perspective about guns in Brazil. The prevailing belief

was that most illegal weapons were smuggled in from abroad, but we discovered that no more than 14% were imported⁶ (and we later showed that the figure was only 10% nationwide).⁷ Thus the overwhelming majority of guns used in crime had been manufactured and originally sold legally in Brazil.

Furthermore, it had been assumed that most of the guns used in crime were large caliber rifles and machine guns, but we showed that 83% were actually revolvers and pistols. In other words, because of a lack of research, the police were battling the illegal arms trade based on completely erroneous information. Our analysis provided the foundation for better policies based on factual knowledge rather than myths and ideology.

New Law on Arms and Ammunition

With the data showing that illegal guns originated from the poorly controlled legal market, we began a campaign for stronger regulations. Those opposed to our efforts did not present research, only ideological arguments like those of the National Rifle Association (NRA). Despite having support from the major media organizations, we initially had no luck with members of the national Congress. The arms industry in Brazil, as in the United States, donates money to election campaigns for many politicians. We tried unsuccessfully to persuade them to reform the weak gun law which had been originally enacted under the influence of the arms industry and the former military dictatorship.

It was clear that in order to change the law we needed to gain the support of the electorate, to exert popular pressure on Congress for reform. We identified strategic allies (churches, women, social groups victimized by guns, physicians, academics and sympathetic journalists and politicians, and unions). With their support, we toured the country disseminating our research and countering myths about weapons and disarmament. As public awareness increased, hundreds of thousands of people marched in the major cities demanding tougher gun laws. When the polls showed that 81% of Brazilians favored a new gun law,⁸ the climate changed in the Congress. Although the arms industry had the money, the voters were on our side. In December 2003 our bill was approved by all political parties. President Lula signed the Disarmament Statute into law as a Christmas gift to the people of Brazil.⁹

The new law is very advanced and is serving as inspiration for several other countries. The law banned the carrying of weapons by civilians, prohibited

guns above .38 caliber for civilians, raised the minimum age for gun purchases to 25 years, and added 15 requirements to the process of qualifying to buy a gun, including evidence of psychological stability and knowledge of gun safety. A national database was set up to monitor gun ownership, and ammunition sold to the police and armed forces is now marked to enable tracing. (The marking of ammunition sold to civilians is now also under discussion, with the same objective.) Once marked, cartridges left at the scene of crimes or confrontations can be traced. This procedure was used to prove that police officers were responsible for the 2009 killing of Patricia Acioli, a young judge who took a stand against organized crime and corrupt police, in Rio de Janeiro.

Myths about Firearms

The campaign for gun control drew on research to challenge widely held but mistaken beliefs about firearms.¹⁰ For example:

- A firearm is a good instrument for attack, but not for defense. The attacker uses the element of surprise and thus controls the circumstances of the attack.¹¹
- Of the nearly 30 countries that have promoted voluntary disarmament, none is a dictatorship. Democracies seek to reduce the level of armament in their society, depending instead on good police and a strong rule of law to achieve public safety. Democratic regimes may be overthrown by military coups, but it is an illusion to imagine that citizens with guns can defend democracy against tanks and aircraft. We Latin Americans know what we're talking about, having suffered military coups and dictatorships.
- It is a simplistic analysis to merely consider the polarization between "good guys and bad guys" or "good guns and bad guns." This represents just a small part of the discussion of self-defense. In Brazil, as well as in most countries with high levels of gun homicides, interpersonal conflicts represent more than 80% of murders perpetrated with firearms. If we add together men killing women; fights between neighbors, in nightclubs, and in traffic jams; fired employees fighting against former bosses; and suicides and accidents involving children, these deaths represent many more casualties than those inflicted by

bandits and burglars. All reliable research demonstrates that, when there is a lack of governmental gun control, the most accurate sentiment is that “good guys kill good guys,” usually with legal weapons. This situation represents a major part of the problem. Although the use of guns for self-defense sometimes results in successful self-protection, public policies cannot be established based on exceptions; they must be built on the facts of daily life.

- The old slogan says “Guns don’t kill people. People kill people.” In reality, “People with guns kill people.”

Public Destruction of Weapons

The campaign coincided with the request by the United Nations that countries publicly destroy their surplus firearms. In July 2001, on the eve of the United Nations Conference on Small Arms, the Rio de Janeiro government, with technical support from Viva Rio and the army, carried out a public destruction of 100,000 weapons. It also highlighted the danger created by the police stockpiling huge quantities of surplus weapons that are often diverted to organized crime.

Voluntary Programs to Hand in Weapons

Another aspect of Brazil’s attempt to stem gun violence has been a series of voluntary weapons buybacks. The first buyback in 2004 to 2005 saw Brazilians hand in 459,855 weapons, which were then destroyed.¹² Some of the country’s largest advertising agencies worked on the campaign pro bono, and famous performers and football stars donated their services as well. Feminist and women’s organizations also played an important role in changing the culture. Ad campaigns were implemented in which grandmothers, mothers, and girlfriends urged men to get rid of their guns, while pretty female soap opera stars ridiculed “insecure men who need firearms to prove their masculinity.” These initiatives were especially well-received among young people. The campaign slogan was *Choose Gun Free. It Is Your Weapon or Me!* The campaign symbol was a tube of lipstick, which appeared to look like a bullet.

In addition, the 2004 to 2005 campaign featured significant involvement by community groups and the nonprofit sector (churches, NGOs, unions, etc.), which oversaw buyback locations for guns and ammunition. These sites

were numerous and easily accessible, particularly for groups reluctant to trust the police. The guns were damaged with a small hammer upon receipt; a cheap and efficient way to immediately improve public safety by eliminating the risk of diversion or reuse. Citizens were paid between US\$50 and US\$150 for their guns, depending on the caliber. (The amounts paid were deliberately modest to reduce the likelihood that recipients would use the money to buy new guns, as happened in Australia and Haiti.) The exchanges were anonymous and amnesty was offered to owners of illegal weapons.

From 2008 to 2009, the Brazilian government launched a second campaign involving the police, but at this time without the participation of civil society. Compared with the 2004 to 2005 effort, the results were modest: only 30,721 weapons were received.¹³ Then in May 2011, a month after the Rea-lengo School shooting in Rio de Janeiro (where 12 teenagers were killed by a former student), the government announced another buyback, which continues today.

Before the 2011 launch, an international conference was convened to review the results of successful exchange programs from Angola, Argentina, Colombia, Mozambique, and Brazil. This analysis led to several improvements on our previous campaigns. Participants were paid within 24 hours, whereas previously there had been a three-month delay. And although only 18% who turn in guns do so for the money,¹⁴ compensation was increased to between US\$80 and US\$225.

The new campaign's slogan is *Hand in Your Weapon. Protect Your Family*, to counter the misguided practice of arming oneself to defend family and loved ones. Activities include programs exchanging toy guns for peaceful toys. The current campaign has some shortcomings—including not compensating for ammunition (as Argentina does, with excellent results) and a continued lack of involvement by the community sector. In a period of 19 months, about 65,144 weapons were handed in.¹⁵

According to the Ministry of Health, the following measures have reduced firearm homicides significantly: half a million guns were removed from circulation, public carrying of firearms was outlawed, and police reform was initiated.¹⁶ Gun deaths have dropped by more than 70% in São Paulo and by 30% in Rio de Janeiro.¹⁷ In addition, a process of “pacification” of the largest favelas of Rio de Janeiro has taken place over the past few years, which has contributed to the decrease. (Pacification refers to the institution of community-based police forces in the favelas, which were previously dominated by the

drug traffickers and by improved investments in health, education, and urban development.)

Parliamentary Oversight of Weapons and Ammunition

In 2004, a Parliamentary Commission of Inquiry (PCI) was formed to investigate Brazil's illicit arms trade. Among other things, the Commission investigated Brazil's international borders and was able to identify major smuggling points for arms and ammunition. Viva Rio supplied expert technical support and performed the field work for this endeavor.¹⁸ The PCI also forced Brazilian gun manufacturers to identify the initial purchasers of 36,000 weapons that had been seized by the Rio de Janeiro police, which revealed that most weapons used in organized crime had been diverted from initially legal sources.¹⁹ These included guns bought by civilians from gun shops, guns purchased by private security companies, private police and military officers guns, guns stolen from legal owners, and guns diverted from police stocks by corrupt police officers. The court system also turned out to be a significant source of diversion of guns to the criminal market, as hundreds of thousand of guns are stored in court evidence rooms. The PCI's final report has been called a pioneering document—mapping the previously unexplored world of one country's illegal arms trade.²⁰

A permanent Subcommittee on Control of Arms and Munitions was established in the Parliament in 2007, created with our influence and support, to oversee the implementation of the Disarmament Statute, conduct research on weapons and ammunition, and propose new control measures. Last year the parliamentary gun lobby got control of the Subcommittee and has been trying to revoke the Disarmament Statute.

In response to the PCI's work, the International Latin American Parliamentary group, PARLATINO, asked Viva Rio and an international team of experts to draft a model law. The Model Law on Firearms, Ammunition and Related Materials was developed from this effort, to assist other countries with improved gun control measures.²¹

The Disarmament Statute mandated a referendum be held on the question of whether all sales of guns and ammunitions to civilians should be banned in Brazil. The referendum was held in October 2005, and our side lost. Although public support for strong gun control was extremely high, 64% of voters voted against the total ban. Analysts suggested several possible reasons for our

defeat. Institutions receiving funds from abroad were barred from campaigning, preventing the participation of historically active groups such as most churches and nongovernmental organizations. Also relevant was the strong financial support provided by the gun lobby to the other side, as well as a slump in popularity of the Lula government, which had been accused of corruption around the time of the referendum. Even so, national support for gun control remained above 80%.

In addition to the voluntary disarmament program, the Brazilian government decided to organize an arms legalization campaign. This campaign was aimed at the large number of people who were not “criminals,” but who held weapons illegally (i.e., without a license). In 2008 to 2009 the government, with support from the gun dealers, shooting clubs and pro-gun associations, secured the registration of 1,408,285 weapons²²—a good start toward regulating 4 million illegal weapons estimated to be in the hands of non-criminals. The legalization initiative included suspending the license fee and providing an amnesty for these gun owners.

The International Agenda—and Soccer

Trafficking arms and ammunition is an international phenomenon which requires a correspondingly international approach. The agenda for international action is clear but remains largely on paper. It includes harmonizing laws within and among countries (we recommend the Model Law as a starting point). Bilateral and multilateral agreements, regionally and internationally (like the Arms Trade Treaty) are necessary for collaboration between police in different countries. An important new regional initiative is the centralization of information about arms and ammunition in the database operated by the Observatory on Citizen Security, run by the Organization of American States.²³

In 2014 the Soccer World Cup will be in Brazil and the social theme of the tournament will be “disarmament.” Soccer fans will be able to hand in guns in exchange for tickets to the matches. Whenever the Brazilians play they will display a banner supporting disarmament, as they did before their game against the United States in Washington, DC, in May 2011. We want to unite the sporting spirit of fraternity with the culture of peace and disarmament. We invite the United States to organize gun hand-in programs during the Cup, joining other nations that have already made the commitment. We do

not want a violent society where people are armed, but rather a peaceful one where people are protected against guns.

Notes

1. Brazilian Minister of Justice Declaration, Brasília, December 10, 2010.
2. Purcena and Nascimento, *Estoques*, 23.
3. Bergamo, “Venda de Armas no Brasil Despenca.”
4. Guerra, “Fabricantes de Armas Triplicam Receita no Brasil em Apenas Cinco Anos.”
5. Author’s conversation with ATF officials, during their visit to Viva Rio’s office, 2000.
6. Bandeira and Bourgeois, *Armas de Fogo*, 168–171.
7. Purcena and Nascimento, *Seguindo a Rota das Armas*, 20.
8. Instituto Sensus, June 2003, cited by Bandeira and Bourgeois, *Armas de Fogo*, 200.
9. *Estatuto do Desarmament*.
10. For more detailed analysis, see Bandeira, “Armas Pequenas y Campañas de Desarme.”
11. Cano, *Pesquisa sobre Vitimização nos Roubos*.
12. Secretaria Nacional de Segurança Pública (Brasilia: Ministry of Justice, January 2006).
13. *Idem* (January 2010).
14. Viva Rio’s research, cited by Bandeira and Bourgeois, *Armas de Fogo*, 206.
15. Secretaria Nacional de Segurança Pública (Brasilia, Ministry of Justice, January 2013).
16. Based on Sistema Nacional de Saúde (SUS), Secretaria Nacional de Segurança Pública (Brasília: Ministry of Justice, December 2010).
17. Instituto de Segurança Pública (Rio de Janeiro, Secretaria de Segurança Pública, July 2012).
18. Dreyfus and Bandeira, *Watching the Neighborhood*.
19. Jungmann, *Comissão Parlamentar*.
20. *Ibid*.
21. Parliamentary Forum on Small Arms and Light Weapons and CLAVE.
22. Sistema Nacional de Armas e Munições (SINARM), Federal Police Department, cited by Purcena and Nascimento, *Estoques*, 39.
23. Bandeira, “Gun Control in Brazil,” 38.

References

Bandeira, Antonio. “Armas Pequenas y Campañas de Desarma. Matar los Mitos y Salvar las Vidas.” In *Seguridad Regional en América Latina y el Caribe*, ed. Hans Mathieu and Catalina Niño Guarnizo. Bogotá: Friedrich Ebert Stiftung, 2012.

- Bandeira, Antonio. "Gun Control in Brazil and International Agenda." In *Report on Citizen Security in the Americas—2012*. Washington, DC: Secretariat for Multidimensional Security, OAS, 2012. www.alertamerica.org
- Bandeira, Antonio, and Bourgeois, Josephine. *Armas de Fogo: Proteção ou Risco?* Rio de Janeiro: Viva Rio, 2005. http://www.comunidadessegura.org/files/active/0/armas%20de%20fogo%20protecao%20ou%20risco_port1.pdf
- Bandeira, Antonio, and Bourgeois, Josephine. *Firearms: Protection or Risk?* Stockholm: Parliamentary Forum on Small Arms and Light Weapons, 2006. <http://parliamentaryforum.org/sites/default/files/firearms%20protection%20or%20risk.pdf>
- Bergamo, Monica. "Venda de Armas no Brasil Despenca." *Folha de São Paulo*, August 14, 2012.
- Cano, Ignácio. *Pesquisa sobre Vitimização nos Roubos*. Rio de Janeiro: ISER, 1999.
- Dreyfus, Pablo, and Bandeira, Antonio. *Watching the Neighborhood: An Assessment of Small Arms and Ammunition "Grey Market Transactions" on the Borders Between Brazil and Paraguay, Bolivia, Uruguay and Argentina*. Rio de Janeiro: Viva Rio, 2006. http://www.comunidadessegura.org/files/active/0/Watching_Neighborhood_ing.pdf
- Estatuto do Desarmamento*, Law N. 10.826/2003. Brasília: Congresso Nacional, 2003. http://www.planalto.gov.br/ccivil_03/Leis/2003/L10.826.htm
- Godnick, William, and Bustamente, Julián. *El Tráfico de Armas en América Latina y el Caribe: Mitos, Realidades y Vacíos en la Agenda Internacional de Investigación*. Lima: UNLIREC, 2012.
- Guerra, Natália. "Fabricantes de Armas Triplicam Receita no Brasil em Apenas Cinco Anos." *R7*, September 23, 2012.
- ISER. *Referendo do Sim ao Não: Uma Experiência da Democracia Brasileira*. Rio de Janeiro: ISER, 2006. http://www.comunidadessegura.com.br/files/referendodosi_maonao.pdf
- Jungmann, Raul. *Comissão Parlamentar de Inquérito Sobre Organizações Criminosas do Tráfico de Armas, Sub-Relatoria de "Indústria, Comércio e C.A.C. (Colecionadores, Atiradores e Caçadores)"*. Brasília: Congresso Nacional, 2006. <http://www.comunidadessegura.org/files/active/0/Relatorio%20sub-relatoria%20de%20industria%20comercio%20e%20cac.pdf>
- Parliamentary Forum on Small Arms and Light Weapons and CLAVE (Coalición latinoamericana para la prevención de la violencia armada). *Model Law on Firearms, Ammunition and Related Materials*. Stockholm: Parliamentary Forum on Small Arms and Light Weapons, CLAVE, Swedish Fellowship of Reconciliation, and Parlatino, 2008. http://parliamentaryforum.org/sites/default/files/model_law_on_firearms_ammunition_and_related_materials_final.pdf
- Purcena, Julio Cesar, and Nascimento, Marcelo. *Estoques e Distribuição de Armas de Fogo no Brasil*. Rio de Janeiro: Viva Rio, 2010. http://www.vivario.org.br/publique/media/Estoques_e_Distribuição.pdf
- Purcena, Julio Cesar, and Nascimento, Marcelo. *Seguindo a Rota das Armas: Desvio, Comércio e Tráfico Ilícitos de Armamento Pequeno e Leve no Brasil*. Rio de Janeiro: Viva Rio, 2010. http://www.vivario.org.br/publique/media/Seguindo_a_Rota_das_Armas.pdf

Part V / Second Amendment

This page intentionally left blank

The Scope of Regulatory Authority under the Second Amendment

Lawrence E. Rosenthal and Adam Winkler

The Second Amendment to the U.S. Constitution provides: “A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.” In *District of Columbia v. Heller*,¹ the U.S. Supreme Court ruled that the District of Columbia’s prohibition on handguns and requirement that long guns in the home be kept inoperable at all times violated this provision. In *McDonald v. City of Chicago*,² the Court subsequently held that the Second Amendment applies equally to federal and state laws burdening the right to keep and bear arms.

The “inherent right of self-defense has been central to the Second Amendment,” the Court explained in *Heller*, and D.C.’s “handgun ban amounts to a prohibition on an entire class of ‘arms’ that is overwhelmingly chosen by American society for that lawful purpose. The prohibition extends, moreover, to the home, where the need for defense of self, family, and property is most acute.” “Few laws in the history of our Nation,” the Court wrote, “have

Lawrence E. Rosenthal, JD, is a professor at Chapman University School of Law in Orange, California. Adam Winkler, JD, MA, is a law professor at the University of California, Los Angeles.

come close to the severe restriction of the District of Columbia's handgun ban." Nevertheless, the Court cautioned, "[l]ike most rights, the right secured by the Second Amendment is not unlimited." Indeed, "[f]rom Blackstone through the 19th-century cases," the Court recounted, "commentators and courts routinely explained that the right was not a right to keep and carry any weapon whatsoever in any manner whatsoever and for whatever purpose." For example, "the majority of 19th-century courts to consider the question held that prohibitions on carrying concealed weapons were lawful under the Second Amendment or its state analogues." The Court added that "nothing in our opinion should be taken to cast doubt on longstanding prohibitions on the possession of firearms by felons or the mentally ill, or laws forbidding the carrying of firearms in sensitive places such as schools and government buildings, or laws imposing conditions and qualifications on the commercial sale of arms." The Court characterized such firearms regulations as "presumptively lawful," while also noting its list of presumptively permissible regulations "does not purport to be exhaustive." Accordingly, while the precise boundaries of the Second Amendment remain somewhat opaque, it is settled that many forms of gun control are consistent with the right of the people to keep and bear arms.

In this chapter, we consider the constitutionality under the Second Amendment of a number of gun control reforms that might be adopted in the wake of the tragic shooting at Sandy Hook Elementary School in Newtown, Connecticut. Discussion to date has focused on a number of potential reforms, such as universal background checks for gun purchasers, restrictions on "assault weapons," and restrictions on high-capacity ammunition magazines. While the permissibility of any reform hinges on its details, we can nevertheless begin to identify what sorts of laws are likely to be constitutional under the Second Amendment.

Since the decision in *Heller*, the lower courts have ruled on hundreds of Second Amendment challenges to a wide variety of laws. Although the overwhelming majority of these cases have upheld the challenged laws, the courts have invalidated a few held to be unusually severe burdens on the right to possess or use a firearm for self-defense. From the reasoning and language of *Heller*, *McDonald*, and the subsequent cases, we can discern an emerging jurisprudential framework for analyzing the constitutionality of gun control laws.

This emerging framework involves what the courts have called a "two-pronged approach to Second Amendment challenges."³ The first question courts

must ask is whether a challenged law burdens conduct within the scope of the Second Amendment.⁴ In *Heller*, the Court defined the right to “keep” arms as the right to possess them,⁵ and the right to “bear” arms as the right to “carry[] for a particular purpose—confrontation.”⁶ The Court offered no explicit definition of what amounted to an unconstitutional infringement of these rights, but treated as unconstitutional laws that effectively nullified the core interest at the heart of the Second Amendment—the right of a law-abiding citizen to have in his or her home a functional firearm suitable for personal protection. To determine whether other conduct is within the ambit of the Second Amendment, the lower courts have since *Heller* looked to the limitations recognized in *Heller* and the historical tradition of gun rights and gun regulation.

When a law burdens conduct within the scope of the Second Amendment, courts then ask a second question: does the government have adequate justification for the law? Not all regulations restricting guns burden the right to keep and bear arms, and not all regulations that do burden the right are unconstitutional.

Scope of the Second Amendment

The threshold inquiry asks whether a gun law burdens conduct within the scope of the Second Amendment. Although, as we have seen, the Second Amendment protects a right to possess and carry “Arms,” *Heller* also makes clear that not every regulation is an unconstitutional infringement of the right to keep and bear arms.

There is a well-established historical tradition of gun regulation, which has been a prominent feature of the law since the birth of America. In the framing era, not only were portions of the population barred from owning guns—including law-abiding citizens unwilling to swear allegiance to the Revolution, in addition to slaves and free blacks—but the founding generation also had laws requiring the safe storage of firearms and gunpowder.⁷ In the 1820s and 1830s, laws prohibiting the carrying of concealed firearms became commonplace;⁸ as the Court in *Heller* recognized, a majority of nineteenth-century courts upheld these laws.

After the Civil War, the same Congress that drafted the Fourteenth Amendment, which was designed in part to make the Second Amendment applicable to state and local laws, abolished the militia in most southern states because such armed groups had proven “dangerous to the public peace and to the security of

Union citizens in those states.⁹ This legislation was one of a series of gun control measures undertaken at the time in an effort to suppress violence in the then-turbulent South. In the early twentieth century, Congress in the National Firearms Act of 1934 severely restricted access to machine guns and sawed-off shotguns.¹⁰ Meanwhile, many states passed laws restricting the public possession of firearms, imposed waiting periods on the purchase of certain firearms, and barred violent felons from possessing guns.¹¹ Thus, the right to keep and bear arms has been understood to permit lawmakers considerable leeway to regulate.

It seems equally clear that in determining the scope of the Second Amendment right, lawmakers are not restricted to enacting only the regulations in place when the Second Amendment was adopted. For example, the laws characterized as presumptively valid in *Heller*—bans on possession by felons and the mentally ill, restrictions on guns in sensitive places like schools and government buildings, and commercial sale qualifications—did not exist at the time of ratification.¹² Instead, the history of innovation in firearms regulation since the framing has led courts to conclude that legislatures are not limited to framing-era regulations.¹³ One approach to assessing the permissibility of regulation is to inquire whether the challenged law comports with historical traditions broadly defined. For example, the ban on possession by felons and the mentally ill reflects a longstanding tradition of restricting access to firearms by people deemed dangerous to public safety. So, too, do laws barring possession of firearms by people convicted of domestic violence misdemeanors or subject to a domestic violence restraining order, which have been consistently upheld even though no such restrictions existed at the framing.¹⁴

Nothing in the text of the Second Amendment suggests that the government's power to regulate guns is limited to those regulations common in the framing era or even of long standing. As we have seen, its preamble contemplates a "well regulated Militia," which *Heller* explained meant not a formal military organization but rather "the body of all citizens capable of military service, who would be expected to bring the sorts of lawful weapons that they possessed at home to militia duty." The Court wrote that the Second Amendment's preamble is properly consulted to clarify the meaning of the Second Amendment, adding that "well regulated" meant "the imposition of proper training and discipline." The Second Amendment therefore contemplates a body of citizens that is subject to whatever regulations are warranted to impose proper discipline on those qualified to keep and bear arms. Accordingly,

the Second Amendment's preamble offers textual support for a variety of limitations on the ability of individuals to possess or carry firearms that are justified in terms of contemporary exigencies.¹⁵

If, after examining the history and tradition of gun regulation, a court determines a challenged law burdens only conduct outside of the protection of the Second Amendment, the inquiry is over and the law upheld. Only if a challenger can show that the law does create such a burden will the courts proceed to the next step: scrutiny of the law's burdens and justifications.

Judicial Scrutiny of Burdens and Justification

The second step of the emerging Second Amendment jurisprudence asks whether a challenged regulation can be sufficiently justified in light of the burden it imposes on the interests protected by the Second Amendment.

In *Heller*, the Court declined to decide what types of justification are required to sustain a challenged regulation on access to or use of firearms. Nonetheless, it did hold that rational basis review, the weakest and most deferential level of judicial scrutiny, was inappropriate, as was the “freestanding ‘interest-balancing’ approach” proposed in Justice Stephen Breyer's dissent.¹⁶ The Court's rejection of Justice Breyer's approach, however, does not mean that no standard of review is ever appropriate in Second Amendment cases. The Court explicitly distinguished Justice Breyer's unique formulation from “the traditionally expressed levels (strict scrutiny, intermediate scrutiny, rational basis).”¹⁷

The most rigorous form of judicial scrutiny is strict scrutiny, which requires that a challenged law be “justified by a compelling government interest” and “narrowly drawn to serve that interest.”¹⁸ Because of the requirement of narrow tailoring, strict scrutiny forbids regulations that are overinclusive—covering more conduct than necessary—or underinclusive—covering less.¹⁹ The vast majority of courts to consider strict scrutiny have rejected it as inconsistent with the language and reasoning of *Heller*.²⁰ After all, *Heller* characterizes a wide variety of prophylactic regulations as presumptively lawful, which is contrary to strict scrutiny's traditional presumption of unconstitutionality. Moreover, the Second Amendment's text explicitly contemplates regulation. At the same time, *Heller* also explains that the most severe burdens on the core right of armed self-defense on the part of law-abiding persons are invalid on their face. Second Amendment jurisprudence must accommodate both points.

The prevailing view in the lower courts is that a form of intermediate scrutiny, inquiring whether a challenged law is substantially related to an important governmental objective, is appropriate for laws that impose something less than the most serious burdens on the core right of armed self-defense recognized in *Heller*.²¹ Other courts have taken something of a “sliding scale” approach, concluding that laws imposing more onerous burdens on the right to keep or bear firearms should be subject to concomitantly more demanding scrutiny.²²

These two approaches are united by consideration of the aggregate burden imposed by a challenged regulation rather than its impact on a particular individual. Laws prohibiting convicted felons from possessing firearms, for example, impose an absolute burden for the affected individuals on their right to keep and bear arms. Yet, they were treated as presumptively valid in *Heller*, and such laws have been consistently sustained, even when they also reach other categories of high-risk individuals such as convicted domestic violence misdemeanants or those subject to a domestic violence order of protection.²³ Similarly, a statute prohibiting individuals from carrying handguns in public unless they could demonstrate a special need entitling them to a carry permit was sustained, even though it imposed an absolute prohibition on those unable to qualify for the permit.²⁴

Most gun control laws to date have satisfied the requirement that they be substantially related to the government’s objective of enhancing public safety.²⁵ As the Supreme Court explained in the context of the First Amendment, where this same test often applies, “substantial deference to the predictive judgments” of the legislature is warranted.²⁶ Yet courts do not require lawmakers to have overwhelming proof before they act; reliable studies may not always be available, especially for innovative reforms. Courts ordinarily look to the legislative record and available empirical data to assess whether there is sufficient reason to credit the legislature’s judgment.²⁷

In the wake of the Newtown shooting, a number of different types of gun control laws have been proposed to reduce the likelihood of mass shootings and gun crime more generally. In this section, we consider the constitutionality of some particular reforms: universal background checks for gun purchases and regulation of trafficking and restrictions on “assault weapons” and high-capacity magazines. In our assessment, most of the types of reforms being

considered are capable of surviving judicial review under the prevailing standards.

Universal Background Checks and Regulation of Dealers

Under current federal law, background checks are only required on people who seek to purchase a firearm from a federally licensed gun dealer. Yet, because people without a federal license are permitted to sell firearms, a significant percentage of gun transfers occur with no background check. A law designed to close this loophole, and to ensure that firearms are transferred only by licensed dealers who can perform background checks and are subject to regulatory oversight, would almost certainly be constitutional. The Supreme Court has already made clear that prohibiting felons and the mentally ill from possessing arms is not an infringement of the right to keep and bear arms. Background checks are preventative measures designed for a compelling governmental interest: to ensure that people prohibited from possessing firearms cannot lawfully purchase them. Universal background checks and comprehensive regulation of firearms sales substantially further this governmental interest. Moreover, given the instantaneous verification offered by the federal National Instant Criminal Background Check System, or NICS, a background check imposes only a minor, incidental burden on lawful gun purchasers. This is no more of a burden than we impose on numerous other fundamental rights including the right to vote, which allows states to require preregistration, and the right to marry, which allows states to require a marriage license. Using the moment of sale to confirm the eligibility of a person to possess firearms is also appropriate given the Supreme Court's approval of "laws imposing conditions and qualifications on the commercial sale of arms."

"Assault Weapons"

One measure Congress may consider is the reenactment of the federal ban on the sale of "assault weapons." Although this terminology has been controversial, for purposes of this essay we'll accept the definition included in the 1994 assault weapons law, which applied generally to semi-automatic firearms with a detachable ammunition magazine and military-style features, like a bayonet fitting or a pistol grip.²⁸

A restriction on the sale or possession of assault weapons would likely be constitutional because such firearms may not be “Arms” under the meaning of the Second Amendment. In *Heller*, the Court held that the Second Amendment preserves access to firearms that are “in common use” and are not “dangerous or unusual.” The “Arms” protected include “weapons that were not specifically designed for military use and were not employed in a military capacity,” including those arms “typically possessed by law-abiding citizens for lawful purposes” such as “self-defense within the home.” This construction is consistent with historic traditions, in which “dangerous and unusual weapons” have long been subject to heavy restriction. Handguns, by contrast, were held to be constitutionally protected because they are “the most popular weapon chosen by Americans for self-defense in the home.”

Arguably, assault weapons do not meet *Heller*’s definition of a protected arm. While such firearms may be commonplace, they are primarily used for recreational purposes, not self-defense. Because of their size, they can be difficult to maneuver in a tight space, and they propel bullets with such force as to travel easily through residential walls, endangering family members or neighbors. Of course, one can use an assault weapon, like any firearm, for self-defense. Yet more is required under the Second Amendment. Just as “dangerous and unusual weapons” like machine guns, which can also be used for self-defense, can be restricted consistent with the Second Amendment, so can assault weapons.

Heller’s language may be read to compel an alternate conclusion. On one reading, *Heller* protects any arm that is typically used for any “lawful purpose,” even if that purpose isn’t personal protection. While assault weapons are not primarily used for self-defense in the home, they may be typically used for other lawful purposes, like recreational shooting and hunting. Yet, there are reasons to believe this reading is too broad; machine guns, too, can be used for lawful purposes, like recreational shooting.

Another potential constitutional difficulty with an assault weapons ban is that it may not meet the requirements of means–ends scrutiny. The 1994 law was easily evaded by manufacturers who simply eliminated the distinguishing military-style features, like bayonet fittings and pistol grips, and sold what were essentially the same guns. These legal firearms may have been just as dangerous as the prohibited assault weapons, with the same lethality and fire-power. Unless lawmakers can show that military-style features like bayonet fittings and pistol grips make a weapon unusually dangerous, and a sufficiently

comprehensive law is enacted that limits the possibility of evasion, it will be difficult to prove that the government's interest in public safety is substantially furthered when effectively similar guns remain legal.

Even so, the emerging jurisprudential framework provides reason to believe an assault-weapon ban could be sustained. In light of the availability of many other firearms, including handguns, characterized by *Heller* as the “quintessential self-defense weapon,” it may be that a prohibition on assault-type weapons places a sufficiently modest burden on the right of armed self-defense that it would require only modest justification. Indeed, the U.S. Court of Appeals for the District of Columbia Circuit recently held that a ban on assault rifles was constitutional. In that case, the court ruled that, while assault rifles may be “in common use,” a prohibition on such firearms “does not effectively disarm individuals or substantially affect their ability to defend themselves.” Furthermore, the court wrote, “the evidence demonstrates a ban on assault weapons is likely to promote the Government's interest in crime control in the densely populated urban area that is the District of Columbia.”²⁹

High-Capacity Ammunition Magazines

An analysis similar to that for assault weapons applies to high-capacity ammunition magazines. The District of Columbia Circuit that upheld the ban on assault weapons also upheld D.C.'s prohibition on magazines that carry more than ten rounds of ammunition. Although the court said that high-capacity magazines may be in common use, a prohibition on such magazines does not significantly burden self-defense. In fact, the court held that high-capacity magazines may be unusually dangerous when used in self-defense because so many rounds can be fired unnecessarily.³⁰ As with a prohibition on assault weapons, the burden imposed on the core right of armed self-defense by this type of restriction is modest.

Moreover, restricting ammunition magazines substantially furthers the government's important interest in public safety. Mass shooters and criminals prefer high-capacity magazines in order to maximize the threat they pose without having to reload. While people with malicious intent can carry multiple magazines and reload their weapons, magazine size restrictions can force them to take the two or three seconds pause necessary to reload. Even this short pause, the D.C. Circuit held, can be a “critical benefit to law enforcement,” affording officers, potential victims, or bystanders the opportunity to

intercede. Requiring mass shooters to pause even an instant can be the difference between life and death for intended victims; indeed, bystanders stopped the man who shot Rep. Gabrielle Giffords when he was forced to reload his weapon. Thus, a restriction on high-capacity magazines may substantially serve the government’s interest in public safety without significantly burdening the ability of law-abiding individuals to defend themselves.

The Second Amendment leaves Congress and the state and local governments significant regulatory power, at least when they do not compromise the core right recognized in *Heller* and regulate with substantial justification. Indeed, in conducting this inquiry, there is a strong case to be made for judicial modesty. As one federal appellate tribunal put it: “This is serious business. We do not wish to be even minutely responsible for some unspeakably tragic act of mayhem because in the peace of our judicial chambers we miscalculated as to Second Amendment rights.”³¹

Notes

1. 554 U.S. 570 (2008).
2. 130 S. Ct. 3020 (2010).
3. *United States v. Greeno*, 679 F.3d 510, 518 (6th Cir. 2012) (quoting *United States v. Marzzarella*, 614 F.3d 85, 89 (3d Cir. 2010)).
4. *See, e.g., Nat’l Rifle Ass’n of Am., Inc. v. BATFE*, 700 F.3d 185, 194 (5th Cir. 2012); *Georgia Carry.Org, Inc. v. Georgia*, 687 F.3d 1244, 1260 n.34 (11th Cir. 2012); *Greeno*, 679 F.3d at 518; *Heller v. District of Columbia*, 670 F.3d 1244, 1252 (D.C. Cir. 2011); *Ezell v. City of Chicago*, 651 F.3d 684, 701–04 (7th Cir. 2011); *United States v. Chester*, 628 F.3d 673, 680 (4th Cir. 2010); *United States v. Reese*, 627 F.3d 792, 800–01 (10th Cir. 2010); *United States v. Marzzarella*, 634 F.3d 85, 89 (3d Cir. 2010); *People v. Alvarado*, 964 N.E.2d 532, 547 (Ill. App. Ct. 2011); *Pohlbel v. State*, 268 P.3d 1264, 1266–67 (Nev. 2012); *Johnston v. State*, 2012 WL 6595935 * 6 (N.C. App. Ct. Dec. 18, 2012).
5. 554 U.S. at 582.
6. *Id.* at 584.
7. *See, e.g., Adam Winkler, Gunfight: The Battle over the Right to Bear Arms in America* 115–17 (2011); Saul Cornell & Nathan DeDino, *A Well-Regulated Right: The Early American Origins of Gun Control*, 73 *For dham L. Rev.* 487, 506–08, 510–12 (2005).
8. *See, e.g., Saul Cornell, A Well-Regulated Militia: The Founding Fathers and the Origins of Gun Control in America* 138–44 (2006); Clayton E. Cramer, *Concealed Weapon Laws of the Early Republic: Dueling, Southern Violence, and Moral Reform* 2–3, 139–41 (1999); Winkler, *supra* note 7, at 166–69.

9. Cong. Globe, 39th Cong., 1st Sess. 1849 (1866) (Sen. Lane). *Accord id.* at 1848–49 (Sen. Wilson). See Carole Emberton, *The Limits of Incorporation: Violence, Gun Rights, and Gun Regulation in the Reconstruction South*, 17 *Stan. L. & Pol’y Rev.* 615, 621–23 (2006).

10. See Pub.L. 474, 48 Stat. 1236 (1934).

11. See Winkler, *supra* note 7, at 209–12; C. Kevin Marshall, *Why Can’t Martha Stewart Have a Gun?*, 32 *Harv. J.L. & Pub. Pol’y* 695, 698–728 (2009).

12. See, e.g., Carlton F.W. Larson, *Four Exceptions in Search of a Theory: District of Columbia v. Heller and Judicial Ipse Dixit*, 60 *Harv. L.J.* 1371, 1373–79 (2009); Nelson Lund, *The Second Amendment, Heller, and Originalist Jurisprudence*, 56 *UCLA L. Rev.* 1343, 1356–62 (2009); Marshall, *supra* note 11 at 698–728.

13. See, e.g., *Nat’l Rifle Ass’n, Inc. v. BATFE*, 700 F.3d 185, 196–97 (5th Cir. 2012); *United States v. Skoien*, 614 F.3d 638, 641 (7th Cir. 2010) (en banc).

14. See, e.g., *United States v. Chapman*, 666 F.3d 220, 227–31 (4th Cir. 2012); *United States v. Staten*, 666 F.3d 154, 160–67 (4th Cir. 2012); *United States v. Booker*, 644 F.3d 12, 25 (1st Cir. 2011) (same); *United States v. Reese*, 627 F.3d 792, 800–04 (10th Cir. 2010); *Skoien*, 614 F.3d at 641–42.

15. On the role of the preamble in determining permissive gun regulation, see Lawrence Rosenthal, *Second Amendment Plumbing after Heller: Of Standards of Scrutiny, Incorporation, Well-Regulated Militias, and Criminal Street Gangs*, 41 *Urb. Law.* 1, 80–81 (2009).

16. See *id.* at 629 n.27, 634–35.

17. *Id.* at 634.

18. *Brown v. Entertainment Merchants Association*, 131 S. Ct. 2729, 2738 (2011).

19. See, e.g., *id.* at 2738–42; *Church of the Lukumi Babalu Aye, Inc. v. City of Hialeah*, 508 U.S. 520, 546 (1993); *Arkansas Writers’ Project, Inc. v. Ragland*, 481 U.S. 221, 231–32 (1987); *First Nat’l Bank of Boston v. Bellotti*, 435 U.S. 765, 786, 792–94 (1978).

20. See, e.g., *Heller v. District of Columbia*, 670 F.3d 1244, 1252, 1256–57 (D.C. Cir. 2011).

21. See, e.g., *Schrader v. Holder*, 2013 WL 135246 * 8–10 (D.C. Cir. Jan. 11, 2013) (upholding prohibition on possession of firearms by individuals convicted of misdemeanors punishable by more than two years’ imprisonment); *Heller*, 670 F.3d at 1260–64 (upholding ordinance prohibiting possession of semi-automatic rifles and large-capacity magazines); *United States v. Staten*, 666 F.3d 154, 160–67 (4th Cir. 2012) (upholding statute prohibiting possession of firearms by individuals convicted of misdemeanor domestic violence); *United States v. Booker*, 644 F.3d 12, 25 (1st Cir. 2011) (same); *United States v. Reese*, 627 F.3d 792, 800–04 (10th Cir. 2010) (upholding statute prohibiting possession of firearms by individuals under a domestic violence order of protection); *United States v. Skoien*, 614 F.3d 638, 641–42 (7th Cir. 2010) (en banc) (upholding statute prohibiting possession of firearms by individuals convicted of misdemeanor domestic violence); *United States v. Marzarella*, 614 F.3d 85, 95–99 (3d Cir. 2010) (upholding statute prohibiting possession of firearms with obliterated serial number).

22. See, e.g., *Moore v. Madigan*, 2012 WL 6156062 * 6–7 (7th Cir. Dec. 11, 2012) (invalidating a statute prohibiting carrying readily operable firearms in public); *Kachalsky v. County of Westchester*, 701 F.3d 81, 93–97 (2d Cir. 2012) (upholding statute prohibiting

carrying firearms absent a permit issued on a showing of special need); *Nat'l Rifle Ass'n, Inc. v. BATFE*, 700 F.3d 185, 195–98 (5th Cir. 2012) (upholding statute prohibiting the sale of handguns to persons under age 21); *United States v. DeCastro*, 682 F.3d 160, 166–68 (2d Cir. 2011) (upholding statute prohibiting purchasing firearms in another state and transporting them to state of residence); *Ezell v. City of Chicago*, 651 F.3d 684, 707–09 (7th Cir. 2011) (granting preliminary injunction against ordinance prohibiting firing ranges within city).

23. *See, e.g.*, *United States v. Chapman*, 666 F.3d 220, 227–31 (4th Cir. 2012); *United States v. Staten*, 666 F.3d 154, 160–67 (4th Cir. 2012); *United States v. Booker*, 644 F.3d 12, 25 (1st Cir. 2011) (same); *United States v. Reese*, 627 F.3d 792, 800–04 (10th Cir. 2010); *United States v. Skoien*, 614 F.3d 638, 641–42 (7th Cir. 2010) (en banc).

24. *See Kachalsky v. County of Westchester*, 701 F.3d 81, 99–101 (2d Cir. 2012).

25. For a representative sample, see cases cited *supra* at notes 21–22.

26. *Turner Broad. Sys., Inc. v. FCC*, 520 U.S. 180, 195 (1997).

27. *See, e.g., Kachalsky*, 701 F.3d at 97–99.

28. *See* 18 U.S.C. § 921(a)(30)(B) (1994), *repealed by* Pub. L. No. 103-322, tit. XI, § 11015(2), 108 Stat. 2000 (1994).

29. *Heller v. District of Columbia*, 670 F.3d 1244, 1262–63 (D.C. Cir. 2011).

30. *Id.* at 1263–64.

31. *United States v. Masciandaro*, 638 F.3d 458, 475 (4th Cir. 2011).

Part VI / Public Opinion on Gun Policy

This page intentionally left blank

Public Opinion on Proposals to Strengthen U.S. Gun Laws

Findings from a 2013 Survey

Emma E. McGinty, Daniel W. Webster, Jon S. Vernick,
and Colleen L. Barry

In the aftermath of the tragedy at Sandy Hook Elementary School in Newtown, Connecticut, policy proposals to reduce gun violence are being actively considered and debated at the national, state, and local levels. Within weeks of the mass shooting in Newtown, public opinion data emerged indicating some shift in views among Americans toward greater support for strengthening gun laws. For example, a Gallup survey conducted December 19 through December 22, 2012, found that 58% of Americans supported stricter gun laws, compared with only 43% in support of stricter gun laws in an October 2011 poll.¹

By and large, these opinion data focused on general attitudes about gun policy rather than public support for specific policy proposals to reduce gun

Emma E. McGinty, MS, is a research assistant and fourth-year PhD candidate in Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Daniel W. Webster, ScD, MPH, is a professor in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Jon S. Vernick, JD, MPH, is an associate professor and associate chair in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Colleen L. Barry, PhD, MPP, is an associate professor and associate chair for Research and Practice in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health.

violence. For example, a national survey conducted December 17 through December 19, 2012, by the Pew Center for the People and the Press examined trends in public views about whether it was more important to control gun ownership or to protect gun rights, but examined public support for only four specific policies: bans of handguns, semi-automatic guns, high-capacity ammunition magazines, and exploding bullets, respectively.² The December 19–22, 2012, Gallup survey assessed support for four policies: requiring background checks at gun shows and banning handguns, semi-automatic guns, and high-capacity ammunition magazines.³ Another survey by YouGov conducted December 21 and 22, 2012, examined public attitudes about the National Rifle Association (NRA) but did not examine specific gun policies beyond support for armed guards in schools.⁴

Following the Sandy Hook shooting, experts are recommending and policymakers are considering a much wider range of gun policy options than those assessed in recent public opinion polls. In addition, most recent polls did not examine how public opinion varied by gun ownership or by political party affiliation, and none oversampled gun owners to obtain more precise estimates of policy attitudes among this group. Prior evidence has shown that attitudes about gun policies vary significantly by gun ownership and by partisanship.^{5,6}

It has been nearly 15 years since research studies have examined attitudes among the American public about a broad set of public policies aimed at curbing gun violence.^{7,8,9} Given the fast-moving pace of deliberations over gun policy, it is critical to understand how the American public views specific proposals to strengthen gun laws and how policy support varies across important subgroups. To fill these gaps, we fielded the Johns Hopkins National Survey of Public Opinion on Gun Proposals in 2013 from January 2 to 14, 2013. This survey examined support for 33 different policies to reduce gun violence in America. These measures were chosen in conjunction with the policy options analyzed by gun violence experts at the 2013 Johns Hopkins Summit on Reducing Gun Violence in America and reported on in this volume.

Data and Methods

We used the survey research firm GfK Knowledge Networks (GfK KN) to conduct this study. GfK KN has recruited a probability-based online panel of 50,000 adult members older than 18, including persons living in cell phone

only households, using equal probability sampling with a sample frame of residential addresses covering 97% of U.S. households. The survey was pilot-tested between December 28 and 31, 2012. In order to avoid priming, the specific nature of the survey was not described to respondents. They were asked to answer “some questions about public affairs,” and there was no mention of the Sandy Hook school shooting. Policy item order was randomized. The survey completion rate was 69%.¹⁰ To compare rates stratified by gun ownership, we oversampled gun owners and non-gun owners living in households with guns. We tested differences in proportions by group using the Pearson’s chi square test. To make estimates representative of the U.S. population, all analyses used survey weights adjusting the sample for known selection deviations and survey nonresponse. This study was approved as exempt by the Johns Hopkins School of Public Health Institutional Review Board (#4850).

Results

Consistent with recent data reported elsewhere,^{11,3} we found that 33% of Americans reported having guns in their home or garage. Twenty-two percent of Americans identified the guns as personally belonging to them (referred to henceforth as gun owners), and 11% identified as non-gun owners living in a household with a gun. Among gun owners, 71% reported owning a handgun, 62% owned a shotgun, and 61% owned a rifle. The remaining 67% of Americans identified as non-gun owners living in non-gun households (referred to henceforth as non-gun owners).

Table 19.1 indicates that a majority of Americans supported banning the sale of military-style semi-automatic assault weapons, banning large-capacity ammunition magazines, and a range of measures to strengthen background checks and improve oversight of gun dealers. In the case of assault weapon and ammunition policies, public views differed substantially by gun ownership. Although 69% of the public overall supported banning assault weapon sales, a much higher proportion of non-gun owners (77%) and non-gun owners living in households with guns (68%) than gun-owners (46%) or self-reported NRA members (15%) supported this policy. Sixty-eight percent of the general public supported banning the sale of large-capacity ammunition magazines that allow some guns to shoot more than 10 bullets before reloading, and this policy was supported by most non-gun owners (76%), most non-gun owners living in households with guns (69%), a near majority of gun-owners

Table B.1 Percentage of people who favor gun policies, overall and by gun ownership

Item	Overall (N = 2,703)	Non-gun owners ^a (n = 913)	Non-gun owner, gun in household (n = 843)	Gun owners (n = 947)	NRA members (n = 169)
Assault weapon and ammunition policies					
Banning the sale of military-style, semi-automatic assault weapons that are capable of shooting more than 10 rounds of ammunition without reloading?	69.0	77.4	67.7**	45.7***	14.9***
Banning the sale of large-capacity ammunition clips or magazines that allow some guns to shoot more than 10 bullets before reloading?	68.4	75.5	69.2*	47.8***	19.2***
Banning the sale of large-capacity ammunition clips or magazines that allow some guns to shoot more than 20 bullets before reloading?	68.8	75.6	69.9	49.4***	19.9***
Banning the possession of military-style, semi-automatic assault weapons that are capable of shooting more than 10 rounds of ammunition without reloading if the government is required to pay gun owners the fair market value of their weapons?	56.0	63.3	52.6**	36.9***	17.0***
Banning the possession of large-capacity ammunition clips or magazines that allow some guns to shoot more than 10 bullets before reloading if the government is required to pay gun owners the fair market value of their ammunition clips?	55.0	61.9	51.6**	37.0***	22.9***

Prohibited person policies							
Prohibiting a person convicted of two or more crimes involving alcohol or drugs within a three-year period from having a gun for 10 years?	74.8	76.1	74.8	70.5*	64.2		
Prohibiting a person convicted of violating a domestic violence restraining order from having a gun for 10 years?	80.8	82.9	79.1	75.6**	61.5**		
Prohibiting a person convicted of a serious crime as a juvenile from having a gun for 10 years?	83.1	84.4	81.3	80.0	70.0		
Prohibiting a person under the age of 21 from having a handgun?	69.5	76.4	63.6***	52.3***	42.3***		
Prohibiting a person on the terror watch list from having a gun?	86.0	87.5	85.6	82.2*	75.5		
Prohibiting people who have been convicted of each of these crimes from having a gun for 10 years:							
Public display of a gun in a threatening manner excluding self-defense	71.1	69.8	78.7**	71.3	58.5		
Domestic violence	73.7	72.4	80.4**	73.7	61.4		
Assault and battery that does not result in serious injury or involve a lethal weapon	53.0	54.6	53.4	48.5*	33.1		
Drunk and disorderly conduct	37.5	39.7	36.6	32.1*	29.1*		
Carrying a concealed gun without a permit	57.8	60.3	61.3	49.0***	43.3**		
Indecent exposure	25.9	28.1	23.7	21.2*	27.1*		
Background check policies							
Requiring a background check system for all gun sales to make sure a purchaser is not legally prohibited from having a gun?	88.8	89.9	91.5	84.3**	73.7*		

(Continued)

Table D.1 (Continued)

Item	Overall (N = 2,703)	Non-gun owners ^a (n = 913)	Non-gun owner, gun in household (n = 843)	Gun owners (n = 947)	NRA members (n = 169)
Increasing federal funding to states to improve reporting of people prohibited by law from having a gun to the background check system?	66.4	67.8	65.5	63.4	60.9
Allowing law enforcement up to five business days, if needed, to complete a background check for gun buyers? ^b	76.3	79.8	79.2	67.0***	47.1***
Policies affecting gun dealers					
Allowing the U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives to temporarily take away a gun dealer's license if an audit reveals record-keeping violations and the dealer cannot account for 20 or more of the guns?	84.6	86.4	84.1	78.9**	64.0**
Allowing cities to sue licensed gun dealers when there is strong evidence that the gun dealer's careless sales practices allowed many criminals to obtain guns?	73.2	77.0	72.2	62.9***	43.5***
Allowing the information about which gun dealers sell the most guns used in crimes to be available to the police and the public so that those gun dealers can be prioritized for greater oversight?	68.8	74.1	64.3**	56.5***	41.2***
Requiring a mandatory minimum sentence of two years in prison for a person convicted of knowingly selling a gun to someone who cannot legally have one?	76.0	77.7	76.3	70.7**	69.8**

Other gun policies						
Requiring a person to obtain a license from a local law enforcement agency before buying a gun to verify their identity and ensure that they are not legally prohibited from having a gun?	77.3	83.5	76.4**	59.4***	37.6***	
Providing government funding for research to develop and test "smart guns" designed to fire only when held by the owner of the gun or other authorized user?	44.2	47.4	43.4	35.3***	23.0***	
Requiring by law that people lock up the guns in their home when not in use to prevent handling by children or teenagers without adult supervision?	67.2	75.3	62.6***	44.4***	32.2***	

Note: We asked respondents whether they favored or opposed each policy using a 5-point Likert scale (strongly favor, somewhat favor, neither favor nor oppose, somewhat oppose, strongly oppose). We coded strongly favor and somewhat favor responses as being in support of a given policy.

* $p < .05$, ** $p < .01$, *** $p < .001$

^aResponses among non-gun owners with a gun in their household, gun owners, and NRA members were compared with responses among non-gun owners (no gun in household) using chi-square tests.

^bQuestion informed respondents that under current federal law, most background checks for gun buyers are completed in just a few minutes. But if law enforcement needs additional time to determine if a gun buyer is not legally allowed to have a gun, they may only take up to a maximum of three business days to complete the check.

(48%), but by few NRA members (19%). Support levels did not differ meaningfully for a policy banning the sale of large-capacity ammunition magazines that allow some guns to shoot more than 20 bullets. As expected, support was lower for policies banning the possession (as opposed to the sale) of assault weapons and large-capacity ammunition magazines even if the government was required to pay gun owners their fair market value.

For many policies, differences in policy support between gun and non-gun owners were smaller in magnitude than might have been expected. Majorities of gun owners supported all policies bolstering background checks and strengthening oversight of gun dealers and almost all policies prohibiting gun ownership by certain types of persons deemed to be dangerous. A majority of NRA members supported many of these categories of policies, as well. For example, 84% of gun owners and 74% of NRA members supported requiring a background check system for all gun sales; 71% of gun owners and 64% of NRA members supported prohibiting a person convicted of two or more crimes involving alcohol or drugs from having a gun for 10 years; and 71% of gun owners and 70% of NRA members supported requiring a mandatory minimum sentence of two years in prison for a person convicted of selling a gun to someone who cannot legally have a gun. These measures were supported by large majorities of non-gun owners, as well.

We found larger differences in support between non-gun owners and gun owners for policies prohibiting handguns for those under age 21 (76% versus 52%) and requiring gun owners to lock guns when not in use to prevent handling by children or teens without adult supervision (75% versus 44%). Support for government funding to develop and test smart guns designed to fire only when held by the owner or authorized user also differed between non-gun owners and gun owners (47% versus 35%). Support among non-gun owners and gun owners was similar on those policies attracting overall low levels of support, such as prohibiting individuals with misdemeanor convictions for drunk and disorderly conduct (40% versus 32%) or indecent exposure (28% versus 21%) from having guns.

For many policies, the views of non-gun owners living in households with guns were aligned more closely with other non-gun owners than they were with gun owners. For instance, 76% of non-gun owners living in households with guns supported requiring a person to obtain a license from a local law enforcement agency before buying a gun (versus 84% of other non-gun owners and 59% of gun owners). Seventy-nine percent of non-gun owners living

in households with guns supported allowing law enforcement up to five business days to complete a background check for gun buyers (versus 80% of other non-gun owners and 67% of gun owners).

As Table 19.2 indicates, policies specifically targeting gun access by persons with mental illness received widespread public support. Most of these policies were supported by a large majority of non-gun owners and gun owners. Eighty-five percent of the general public supported requiring states to report to the background check system individuals who are prohibited from having guns due to either involuntary commitment or having been declared mentally incompetent by a court. While these mental health-related prohibitions have been in place since before the implementation of the background check system in 1998, many states do not report mental health records due to concerns about confidentiality and lack of data systems to track mental health records at the state level.¹² Seventy-five percent of the public supported requiring health care providers to report people who threaten to harm themselves or others to the background check system for a period of six months, and 79% supported requiring the military to report persons rejected from service for mental health or substance abuse reasons to the background check system to prevent them from having a gun. Public support was lower for a policy allowing police officers to search for and remove guns without a warrant from persons they believe to be dangerous due to mental illness or a tendency toward violence (53%), and only 32% of the public supported restoring the right to have a gun to people with mental illness who are determined no longer to be dangerous.

In addition to supporting policies to limit gun access among persons with mental illness, the majority of the public supported increasing government spending on mental health screening and treatment as a strategy to reduce gun violence (60%). However, far fewer supported increasing government spending on drug and alcohol abuse screening and treatment as a violence reduction strategy (44%).

Table 19.3 indicates that, in most cases, Republicans were less likely than Independents and Democrats to support gun violence prevention policies. However, support for most policies prohibiting certain persons from having guns, bolstering background checks, and strengthening oversight of gun dealers was high regardless of political party identification. For example, 77% of Republicans, 79% of Independents, and 85% of Democrats supported prohibiting a person convicted of violating a domestic violence restraining order

Table 19.2 Percentage who favor gun policies affecting persons with mental illness, overall and by gun ownership

Item	Overall (N=2,703)	Non-gun			NRA members (n=169)
		owners ^a (n=913)	owner, gun in household (n=843)	Gun owners (n=947)	
Background check policies					
Requiring states to report a person to the background check system who is prohibited from buying a gun due either to involuntary commitment to a hospital for psychiatric treatment or to being declared mentally incompetent by a court of law?	85.4	85.3	86.5	85.6	80.7
Requiring health care providers to report people who threaten to harm themselves or others to the background check system to prevent them from having a gun for six months?	74.5	75.4	76.1	72.0	66.0
Requiring the military to report a person who has been rejected from service due to mental illness or drug or alcohol abuse to the background check system to prevent them from having a gun?	78.9	79.6	79.7	76.2	67.5

Other gun policies							
Allowing police officers to search for and remove guns from a person, without a warrant, if they believe the person is dangerous due to a mental illness, emotional instability, or a tendency to be violent?	52.5	55.3	53.4	43.6***	31.1**		
Allowing people who have lost the right to have a gun due to mental illness to have that right restored if they are determined not to be dangerous?	31.6	31.6	28.9	34.0	41.6		
Government spending							
Increasing government spending on mental health screening and treatment as a strategy to reduce gun violence?	60.4	61.8	60.6	55.1*	57.2		
Increasing government spending on drug and alcohol abuse screening and treatment as a strategy to reduce gun violence?	43.5	46.6	44.2	35.0***	36.6***		

Note: We asked respondents whether they favored or opposed each policy using a 5-point Likert scale (strongly favor; somewhat favor; neither favor nor oppose; somewhat oppose; strongly oppose). We coded strongly favor and somewhat favor responses as being in support of a given policy.

* $p < .05$, ** $p < .01$, *** $p < .001$

^aResponses among non-gun owners with a gun in their household, gun owners, and NRA members were compared with responses among non-gun owners (no gun in household) using chi-square tests.

Table 19.3 Percentage who favor gun policies by political party affiliation

Item	Democrats ^a (n = 788)	Independents (n = 1,121)	Republicans (n = 794)
Assault weapon and ammunition policies			
Banning the sale of military-style, semi-automatic assault weapons that are capable of shooting more than 10 rounds of ammunition without reloading?	86.6	63.9***	51.6***
Banning the sale of large-capacity ammunition clips or magazines that allow some guns to shoot more than 10 bullets before reloading?	83.2	65.6***	51.0***
Banning the sale of large-capacity ammunition clips or magazines that allow some guns to shoot more than 20 bullets before reloading?	82.8	66.7***	51.9***
Banning the possession of military-style, semi-automatic assault weapons that are capable of shooting more than 10 rounds of ammunition without reloading if the government is required to pay gun owners the fair market value of their weapons?	72.1	51.3***	40.2***
Banning the possession of large capacity ammunition clips or magazines that allow some guns to shoot more than 10 bullets before reloading if the government is required to pay gun owners the fair market value of their ammunition clips?	68.6	52.4***	38.9***
Prohibited person policies			
Prohibiting a person convicted of two or more crimes involving alcohol or drugs within a three-year period from having a gun for 10 years?	79.4	72.2*	75.2*
Prohibiting a person convicted of violating a domestic violence restraining order from having a gun for 10 years?	85.1	79.2*	77.3*
Prohibiting a person convicted of a serious crime as a juvenile from having a gun for 10 years?	88.5	79.2**	82.0*
Prohibiting a person under the age of 21 from having a handgun?	83.6	66.1***	54.5***
Prohibiting a person on the terror watch list from having a gun?	88.3	84.0	86.3

Prohibiting people who have been convicted of each of these crimes from having a gun for 10 years:			
Public display of a gun in a threatening manner excluding self-defense	70.7	71.1	71.7
Domestic violence	76.1	73.5	70.2
Assault and battery that does not result in serious injury or involve a lethal weapon	58.2	50.4*	49.9*
Drunk and disorderly conduct	42.3	33.7*	37.4
Carrying a concealed gun without a permit	64.2	56.8*	50.0***
Indecent exposure	28.4	24.7	24.4
Background check policies			
Requiring a background check system for all gun sales to make sure a purchaser is not legally prohibited from having a gun?	92.1	87.5	86.3*
Increasing federal funding to states to improve reporting of people prohibited by law from having a gun to the background check system?	76.2	64.0***	56.1***
Allowing law enforcement up to five business days, if needed, to complete a background check for gun buyers? ^b	87.3	70.8***	71.1***
Policies affecting gun dealers			
Allowing the U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives to temporarily take away a gun dealer's license if an audit reveals record-keeping violations and the dealer cannot account for 20 or more of the guns?	88.5	83.3	80.9*
Allowing cities to sue licensed gun dealers when there is strong evidence that the gun dealer's careless sales practices allowed many criminals to obtain guns?	82.2	69.5***	66.5***
Allowing the information about which gun dealers sell the most guns used in crimes to be available to the police and the public so that those gun dealers can be prioritized for greater oversight?	79.5	65.3***	58.8***
Requiring a mandatory minimum sentence of two years in prison for a person convicted of knowingly selling a gun to someone who cannot legally have a gun?	81.1	73.4*	73.0*

(Continued)

Table 19.3 (Continued)

Item	Democrats ^a (n = 788)	Independents (n = 1,121)	Republicans (n = 794)
Other gun policies			
Requiring people to obtain a license from a local law enforcement agency before buying a gun to verify their identity and ensure that they are not legally prohibited from having a gun?	87.8	73.5***	68.7***
Providing government funding for research to develop and test “smart guns” designed to fire only when held by the owner of the gun or other authorized user?	51.4	43.8*	34.1***
Requiring by law that people lock up the guns in their home when not in use to prevent handling by children or teenagers without adult supervision?	80.8	65.3***	49.5***

Note: We asked respondents whether they favored or opposed each policy using a 5-point Likert scale (strongly favor, somewhat favor, neither favor nor oppose, somewhat oppose, strongly oppose). We coded strongly favor and somewhat favor responses as being in support of a given policy. N = 2,703.

^ap < .05, **p < .01, ***p < .001

^bResponses among Independents and Republicans were compared with responses among Democrats using chi-square tests.

^cQuestion informed respondents that under current federal law, most background checks for gun buyers are completed in just a few minutes. But if law enforcement needs additional time to determine if a gun buyer is not legally allowed to have a gun, they may only take up to a maximum of three business days to complete the check.

from having a gun for two years. Similarly, 82% of Republicans, 79% of Independents, and 89% of Democrats supported prohibiting a person convicted of a serious crime as a juvenile from having a gun for 10 years. A large majority of Republicans (86%) also supported universal background checks for gun sales (versus 88% among Independents and 92% among Democrats) and requiring a mandatory minimum sentence of two years in prison for a person convicted of making an illegal gun sale (73% among Republicans, 73% among Independents, and 81% among Democrats). A wider gradient of support across party affiliation was evident for assault weapon and ammunition policies. Fifty-two percent of Republicans supported banning the sale of assault weapons, compared with 64% of Independents and 87% of Democrats. A similar gradient of support was observed for banning the sale of large-capacity magazines capable of holding 10 or more ammunition rounds (51% among Republicans, 66% among Independents, and 83% among Democrats).

As Table 19.4 indicates, we did not find large differences by political party affiliation in support for policies aimed at restricting access to guns by persons with mental illness. Like Democrats and Independents, Republicans were supportive of bolstering background check policies and resistant to allowing people who had lost their right to have a gun due to mental illness to have that right restored if they were determined not to be dangerous. Republicans and Independents were significantly less willing than Democrats to allow police officers to search for and remove a gun from a person, without a warrant, if they believed the person was dangerous due to mental illness, emotional instability, or a tendency to be violent. A wider gradient of support by party affiliation was also evident for increasing government spending on mental health treatment and on drug and alcohol abuse treatment as a strategy to reduce gun violence. We found that 50% of Republicans, 57% of Independents, and 71% of Democrats were in support of increased spending on mental health screening and treatment as a strategy for reducing gun violence. In contrast, 33% of Republicans, 41% of Independents, and 53% of Democrats supported increased spending on substance abuse treatment to reduce to gun violence.

Discussion

Findings from this national survey indicate high support—including among gun owners, in most cases—for a range of policies aimed at reducing gun

Table B.4 Percentage who favor gun policies affecting persons with mental illness, by political party affiliation

Item	Democrats ^a (n = 788)	Independents (n = 1,121)	Republicans (n = 794)
Background check policies			
Requiring states to report a person to the background check system who is prohibited from buying a gun due either to involuntary commitment to a hospital for psychiatric treatment or to being declared mentally incompetent by a court of law?	87.1	84.5	84.5
Requiring health care providers to report people who threaten to harm themselves or others to the background check system to prevent them from having a gun for six months?	80.0	71.3**	72.1*
Requiring the military to report a person who has been rejected from service due to mental illness or drug or alcohol abuse to the background check system to prevent them from having a gun?	84.7	74.9**	77.5*
Other gun policies			
Allowing police officers to search for and remove guns from a person, without a warrant, if they believe the person is dangerous due to a mental illness, emotional instability, or a tendency to be violent?	60.7	47.9***	48.5**
Allowing people who have lost the right to have a gun due to mental illness to have that right restored if they are determined not to be dangerous?	31.1	30.7	33.8
Government spending			
Increasing government spending on mental health screening and treatment as a strategy to reduce gun violence?	71.1	57.2***	50.0***
Increasing government spending on drug and alcohol abuse screening and treatment as a strategy to reduce gun violence?	53.4	41.1**	32.7***

Note: We asked respondents whether they favored or opposed each policy using a 5-point Likert scale (strongly favor, somewhat favor, neither favor nor oppose, somewhat oppose, strongly oppose). We coded strongly favor and somewhat favor responses as being in support of a given policy.

*p < .05, **p < .01, ***p < .001

^aResponses among Independents and Republicans were compared with responses among Democrats using chi-square tests.

violence. All but 5 of the 33 gun policies assessed were supported by a majority of the American public. The most feasible policies from a political perspective include 19 with support by majorities of the public regardless of gun ownership or political party identification. These policies would require a universal background check system and strengthen how the system operates, help curtail dangerous sales practices by gun dealers, require firearm licensing by law enforcement, and restrict gun access to certain groups that are not currently prohibited under federal law from possessing firearms, including individuals with a range of serious criminal convictions and on the terror watch list. Other policies supported by a majority of Americans and across all partisan affiliations, including bans on the sale of assault weapons and large-capacity magazines, had support among a majority or close to a majority of gun owners but few NRA member gun owners. These findings suggest that policymakers have a large range of options for curbing gun violence to choose from that are supported by the majority of the American public.

Among the most popular policies were those affecting access to guns by persons with mental illness. The majority of Americans also supported increasing government spending on mental health treatment as a strategy to reduce gun violence. Given substantial rates of undertreatment of mental health problems in the United States,¹³ it is worth considering whether gun policies targeting persons with mental illness might negatively affect treatment-seeking behavior. This may be of particular concern if there are efforts to broaden how mental illness is defined for the purpose of screening potentially dangerous individuals from having guns.

As with all research studies, our study findings should be assessed within the context of our methodological approach. While web-based panels provide an attractive alternative to the increasing challenges of national telephone surveys, methodological issues related to their use should be considered with some care. GfK KN uses probability-based recruitment consistent with established standards.¹⁴ We assessed these data by comparing detailed respondent socio-demographic characteristics (both weighted and unweighted) with national rates to confirm their representativeness of the U.S. population (available upon request from authors). In addition, as with all public opinion survey research, differences in question wording can lead to differences in respondent ratings about the same policy across survey instruments; therefore, it is critical to interpret all public opinion studies with a careful eye to the language used to describe policy items.

Conclusion

The tragic mass shooting at Sandy Hook Elementary School appears to have shifted the policy debate about gun violence in America. These 2013 national public opinion data collected three weeks after the Sandy Hook massacre suggest that the American public is supportive of a range of policy options for reducing gun violence. Time will tell how public sentiments about proposals to strengthen U.S. gun laws translate into policy action in Washington, D.C., and in state capitals around the country.

Acknowledgments

The authors gratefully acknowledge funding to conduct this study from an anonymous donor to the Johns Hopkins Center for Gun Policy and Research.

Notes

1. Gun Control Support Soars in New Polls. http://www.huffingtonpost.com/2012/12/27/gun-control-support-poll_n_2370265.html
2. After Newtown Modest Change in Opinion about Gun Control. <http://www.people-press.org/2012/12/20/after-newtown-modest-change-in-opinion-about-gun-control/>
3. Americans Want Stricter Gun Laws, Still Oppose Bans. <http://www.gallup.com/poll/159569/americans-strictor-gun-laws-oppose-bans.aspx>
4. Sides J. Gun Owners vs. the NRA: What the Polling Shows. *Washington Post*, December 23, 2012. <http://www.washingtonpost.com/blogs/wonkblog/wp/2012/12/23/gun-owners-vs-the-nra-what-the-polling-shows/>
5. New Poll of NRA Members by Frank Luntz Shows Strong Support for Common-Sense Gun Laws, Exposing Significant Divide between Rank-and-File Members and NRA Leadership. <http://www.mayorsagainstillegalguns.org/html/media-center/pr006-12.shtml>
6. Stricter Gun Control. <http://today.yougov.com/news/2011/01/20/stricter-gun-control/>
7. Vernick JS, Teret SP, Howard KA, Teret M, and Wintemute GJ, "Public Opinion Polling on Gun Policy," *Health Affairs* 12, no.4 (1993): 198–208.
8. Blendon RJ, Young JT, and Hemenway D, "The American Public and the Gun Control Debate," *Journal of the American Medical Association* 275, no. 22 (1996): 1719–1722.
9. Teret SP, Webster DW, Vernick JS, et al., "Support for New Policies to Regulate Firearms," *New England Journal of Medicine* 339, no.12 (1998): 813–818.

10. We report a sample completion rate rather than a sample response rate as is standard for online survey research panels. Given that we used an online panel based on probability sampling at the first stage of recruitment, it is important to note the GfK KN panel recruitment response rate of 16.6%.

11. Davis JA and Smith TW, *General Social Surveys*, 2010. Principal Investigator, James A. Davis; Director and Co-Principal Investigator, Tom W. Smith; Co-Principal Investigator, Peter V. Marsden, NORC ed. Chicago: National Opinion Research Center.

12. Schmidt MS, Gaps in FBI Data Undercut Background Checks for Guns. *New York Times*, December 20, 2012. http://www.nytimes.com/2012/12/21/us/gaps-in-fbi-data-undercut-background-checks-for-guns.html?pagewanted=all&_r=0

13. Frank RG and Glied, SA, *Better but not well: Mental health policy in the United States*. Baltimore: Johns Hopkins University Press, 2006

14. American Association for Public Opinion Research (AAPOR) Standards Committee. AAPOR Report on Online Panels. March 2010. http://www.aapor.org/AM/Template.cfm?Section=AAPOR_Committee_and_Task_Force_Reports&Template=/CM/ContentDisplay.cfm&ContentID=2223+

This page intentionally left blank

Consensus Recommendations for Reforms to Federal Gun Policies

On January 14 and 15, 2013, the Johns Hopkins University brought together more than 20 global leaders in gun policy and violence—representing the fields of law, medicine, public health, advocacy and public safety—for the Summit on Reducing Gun Violence in America.

The purpose was to distill the best research, analysis, and experience from these experts into a set of clear and comprehensive policy recommendations to prevent gun violence. By summarizing both new and prior research relevant to a number of policies, and issuing policy recommendations, the outcomes of the Summit can contribute to the prevention of gun violence through more informed legislative and regulatory proposals.

The researchers identified the policy recommendations described below as the most likely to reduce gun violence in the United States.*

*These recommendations represent the consensus of the experts presenting at the Johns Hopkins Summit on Reducing Gun Violence in America. However, it may not be the case that every expert endorsed every specific recommendation.

Background Checks

Fix the background check system by doing the following:

- Establish a universal background check system, which would require a background check for all persons purchasing a firearm (with an exception for inheritance transfers).
- Facilitate all sales through a federally licensed gun dealer. This would have the effect of mandating the same record keeping for all firearm transfers.
- Increase the maximum amount of time for the FBI to complete a background check from 3 to 10 business days.
- Require all firearm owners to report the theft or loss of their firearm within 72 hours of becoming aware of its loss.
- Subject even those persons who have a license to carry a firearm, permit to purchase, or other firearm permit to a background check when purchasing a firearm.

Prohibiting High-Risk Individuals from Purchasing Guns

Expand the conditions for firearm purchase:

- Persons convicted of a violent misdemeanor would be prohibited from firearm purchase for a period of 15 years.
- Persons who committed a violent crime as a juvenile would be prohibited from firearm purchase until 30 years of age.
- Persons convicted of two or more crimes involving drugs or alcohol within a three-year period would be prohibited from firearm purchase for a period of 10 years.
- Persons convicted of a single drug-trafficking offense would be prohibited from gun purchase.
- Persons determined by a judge to be a gang member would be prohibited from gun purchase.
- Establish a minimum of 21 years of age for handgun purchase or possession.
- Persons who have violated a restraining order issued due to the threat of violence (including permanent, temporary and emergency) would be prohibited from purchasing firearms.

- Persons with temporary restraining orders filed against them for violence or threats of violence would be prohibited from purchasing firearms.
- Persons who have been convicted of misdemeanor stalking would be prohibited from purchasing firearms.

Mental Health

- Focus federal restrictions on gun purchases by persons with serious mental illness on the dangerousness of the individual.
- Fully fund federal incentives for states to provide information about disqualifying mental health conditions to the National Instant Criminal Background Check System for gun buyers.

Trafficking and Dealer Licensing

- A permanent director for ATF should be appointed and confirmed.
- ATF should be required to provide adequate resources to inspect and otherwise engage in oversight of federally licensed gun dealers.
- Restrictions imposed under the Firearm Owners' Protection Act limiting ATF to one routine inspection of gun dealers per year should be repealed.
- The provisions of the Firearm Owners' Protection Act which raise the evidentiary standard for prosecuting dealers who make unlawful sales should be repealed.
- ATF should be granted authority to develop a range of sanctions for gun dealers who violate gun sales or other laws.
- The Protection of Lawful Commerce in Arms Act, providing gun dealers and manufacturers protection from tort liability, should be repealed.
- Federal restrictions on access to firearms trace data, other than those associated with ongoing criminal investigations, should be repealed.
- Federal law mandating reporting of multiple sales of handguns should be expanded to include long guns.
- Adequate penalties are needed for violations of the above provisions.

Personalized Guns

- Congress should provide financial incentives to states to mandate childproof or personalized guns.
- The Federal Consumer Product Safety Commission should be granted authority to regulate the safety of firearms and ammunition as consumer products.

Assault Weapons

- Ban the future sale of assault weapons, incorporating a more carefully crafted definition to reduce the risk—compared with the 1994 ban—that the law would be easily evaded.

High-Capacity Magazines

- Ban the future sale and possession of large-capacity (greater than 10 rounds) ammunition magazines.

Research Funding

- The federal government should provide funds to the Centers for Disease Control and Prevention, the National Institutes of Health, and the National Institute of Justice adequate to understand the causes and solutions of gun violence, commensurate with its impact on the public's health and safety.
- The Surgeon General of the United States should produce a regular report on the state of the problem of gun violence in America and progress toward solutions.

Biographies of Contributors

Ted Alcorn, MA, MHS, is a senior policy analyst in the Office of the Mayor of New York City. He contributes frequent public health reporting to *The Lancet* and has also published work in the *International Herald Tribune*, *The Financial Times*, *Guernica*, and the *American Journal of Tropical Medicine and Hygiene*. He earned an MHS from the Johns Hopkins Bloomberg School of Public Health and MA from the Johns Hopkins School for Advanced International Studies (SAIS), and then lived in Beijing, China, as a Henry Luce Scholar.

Philip Alpers is an adjunct associate professor at the Sydney School of Public Health, The University of Sydney. Alpers analyzes the public health effects of armed violence, firearm injury prevention, and small arms proliferation. His website GunPolicy.org compares armed violence and gun laws across more than 200 jurisdictions. Accredited to the United Nations small arms Programme of Action since 2001, Alpers participates in the United Nations process as a member of the Australian government delegation. Relevant work includes a 20-nation regional study (*Small Arms in the Pacific*), field work with users and traffickers (*Gunrunning in Papua New Guinea: From Arrows to Assault Weapons in the Southern Highlands*), a 10-year impact analysis of the world's largest firearm buyback (*Australia's 1996 Gun Law Reforms: Faster Falls in Firearm Deaths, Firearm Suicides, and a Decade without Mass Shootings*) and the disposal of military small arms (Papua New Guinea: small numbers, big fuss, real results).

Deborah Azrael, PhD, has been a member of the firearms research group at the Harvard School of Public Health for more than 20 years, working collaboratively with her colleagues David Hemenway, Matthew Miller, and Cathy Barber throughout that time. Dr. Azrael's academic training is in statistics and evaluative sciences. Much of her work over the past decades has been in designing and building injury surveillance systems, including the pilot for the National Violent Death Reporting System (of which she was co-director, with Cathy Barber), and the Boston Data System, a surveillance system designed to track youth violence at the neighborhood level in Boston (which she continues to direct). Her academic work has focused, often in collaboration with David Hemenway and Matt Miller, on the relationship between firearm availability and injury-related mortality. She has also worked extensively on studies that have used ecologic- and

individual-level data to understand risk of suicide across and within populations, e.g., suicide in the Veterans Administration, suicide among young African American men, and the effects of psychotropic medications on suicide risk.

Antonio Rangel Bandeira is coordinator for Firearms Control, Viva Rio, Brazil. Mr. Bandeira has served as an advisor for the Parliamentary Front for Disarmament for the new firearms control law, the Disarmament Statute (2003). He also serves as the civil society coordinator for the National Buy-Back Small Arms and Light Weapons (SALW) Campaign and has been a member of the Brazilian government delegation for the UN Conference on Illicit Traffic of SALW. In addition, he has advised the governments of Mozambique, Bolivia, Angola, El Salvador, Venezuela, and the province of Buenos Aires, Argentina, on SALW public policy and ammunition control and buy-back disarmament campaigns. Mr. Bandeira is a former vice-minister of Welfare in the Brazilian government and advisor to the president of Brazil. He is a founding member of the International Network on Small Arms. He earned an MA in Political Science from York University.

Colleen L. Barry, PhD, MPP, is an associate professor and associate chair for Research and Practice in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Dr. Barry's research focuses on policy and regulation affecting often-stigmatized health conditions with a focus on mental illness, substance use disorders, and obesity. She teaches courses in health policy and politics and public opinion research. She is principal investigator of an NIMH R01 to understand the effects of implementation of the recent federal mental health and addiction parity law, and is principal investigator on a NIDA R01 to evaluate the effects of regulations aimed at increasing rates of use of new treatments for substance use disorders. Dr. Barry has been involved with a number of projects examining the implications of various aspects of the Affordable Care Act (ACA) on mental illness and addiction treatment. She is also principal investigator on two Robert Wood Johnson Foundation Healthy Eating Research grants, studying how news media messages used to frame the issue of childhood obesity affect public attitudes about food-marketing regulation, and testing how media messages affect public opinion about sugar-sweetened beverage taxes. She received a PhD in Health Policy from Harvard University and a master's degree in public policy from the John F. Kennedy School of Government at Harvard.

Michael R. Bloomberg is the 108th Mayor of the City of New York. He began his career in 1966 at Salomon Brothers, and after being let go in 1981, he began Bloomberg LP, a global media company that today has over 310,000 subscribers to its financial news and information service. As his company grew, Michael Bloomberg started directing more of his attention to philanthropy. He has sat on the boards of numerous charitable institutions, including Johns Hopkins University, where he helped build the Bloomberg School of Public Health into one of the world's leading institutions of public health research and training. In 2001 he ran for mayor of the City of New York and, in a major upset, won the election. In office, Mayor Bloomberg has cut crime more than 35 percent and created jobs

by attracting new investment and supporting small business growth. He has implemented ambitious public health strategies, including the ban on smoking in restaurants and bars, and expanded support for arts and cultural organizations. His education reforms have driven graduation rates up 40 percent since 2005. The City has weathered the national recession much better than most other places. Since October 2009, the nation has gained back only one out of every four jobs that were lost in the recession. Meanwhile, New York City has gained back nearly all of its lost jobs. Michael Bloomberg attended Johns Hopkins University and received an MBA from Harvard Business School. He is the father of two daughters, Emma and Georgina.

Anthony A. Braga, PhD, is the Don M. Gottfredson Professor of Evidence-Based Criminology in the School of Criminal Justice at Rutgers University and a senior research fellow in the Program in Criminal Justice Policy and Management at Harvard University. He is also a member of the University of Chicago Crime Lab and a Senior Fellow in the Chief Justice Earl Warren Institute on Law and Social Policy at the University of California, Berkeley. He is currently the President and an elected Fellow of the Academy of Experimental Criminology. Dr. Braga's research involves collaborating with criminal justice, social service, and community-based organizations to address illegal access to firearms, reduce gang and group-involved violence, and control crime hot spots. Since 1995, Braga has worked closely with criminal justice practitioners in Boston to reduce youth gun violence. He was a member of the Boston Gun Project that implemented the Operation Ceasefire gang violence reduction strategy that was associated with a 63% reduction in youth homicides in Boston. Dr. Braga's research has been published in top criminal justice, medical, and public health journals. He received his MPA from Harvard University and his PhD in Criminal Justice from Rutgers University.

Philip J. Cook, PhD, is ITT/Sanford Professor of Public Policy and Professor of Economics and Sociology at Duke University. He has conducted research on crime and criminal justice throughout his career, with a sustained focus on gun violence and gun policy. He serves as co-organizer of the NBER Workshop on the Economics of Crime. He has served as consultant to the U.S. Department of Justice (Criminal Division) and to the U.S. Department of Treasury (Enforcement Division). His service with the National Academy of Science includes membership on expert panels dealing with alcohol-abuse prevention, injury control, violence, school rampage shootings, underage drinking, and the deterrent effect of the death penalty. Dr. Cook is a member of the Institute of Medicine of the National Academy of Sciences and an honorary Fellow in both the American Society of Criminology and of the Academy of Experimental Criminology. Dr. Cook completed his PhD in economics at the University of California, Berkeley, in 1973.

Ronald J. Daniels, JD, LL.M., is 14th president of The Johns Hopkins University. Previously, he was provost and professor of law at the University of Pennsylvania and dean and James M. Tory Professor of Law at the University of Toronto. Since arriving at Johns Hopkins, Daniels has focused his leadership on three overarching themes: enhanced interdisciplinary

collaboration, individual excellence, and community engagement. Under his leadership, a number of cross-school collaborations have emerged, including efforts related to individual health and the science of learning; significant investments have been made in undergraduate and graduate education and financial aid; and the university has strategically deepened its commitment to Baltimore, as evidenced by the new Elmer A. Henderson School in East Baltimore and the \$10 million Homewood Community Partners Initiative. Daniels's research focuses on the intersections of law, economics, development, and public policy, and he has also engaged on a range of policy issues from corporate governance and anti-terrorism legislation in Canada, to risk and disaster policy in the United States. Daniels received an LLM from Yale University and a BA and JD from the University of Toronto.

Shannon Frattaroli, PhD, MPH, is an associate professor at the Johns Hopkins Bloomberg School of Public Health where she is affiliated with the Center for Gun Policy and Research. Dr. Frattaroli's research in the area of gun violence prevention focuses on understanding and improving how policies are implemented and enforced, with particular attention to those that aim to limit batterers' access to guns. The role of policy makers, law enforcement, the courts, and advocates in assuring that laws designed to prevent gun violence are realized through implementation and enforcement strategies is a common theme in her work. Dr. Frattaroli is currently serving as a member of the Maryland Task Force to Study Access of Mentally Ill Individuals to Regulated Firearms.

Linda K. Frisman, PhD, is a research professor at the University of Connecticut School of Social Work and a senior research scientist with the Connecticut Department of Mental Health and Addiction Services. Dr. Frisman holds a PhD in Social Policy from the Heller School of Brandeis University and was a postdoctoral fellow in mental health services research at Yale University. She has been the principal investigator of several federally funded studies testing interventions that address homelessness, co-occurring mental health and substance use disorders, and criminal justice populations with behavioral health disorders. Currently she is the principal investigator of the Connecticut Criminal Justice Drug Abuse Treatment Studies Center funded by NIDA and co-principal investigator of an NIMH study regarding the impact of connection to entitlements by prisoners with mental illness who are being released.

Peter L. Gagliardi is senior vice president for Forensic Technology Inc. He has more than 40 years of experience extracting useful investigative information from crime guns and related evidence in both the public and private sectors. He spent 30 of those years in law enforcement, most of which were focused on the investigation of firearms and explosives-related crimes with ATF. In 1999, Mr. Gagliardi retired from ATF as the Special Agent in Charge of the New York Field Division. During his tenure in New York, he was responsible for managing all of ATF's law enforcement and regulatory operations within the New York/New Jersey metropolitan area. While assigned to ATF headquarters in Washington, DC, he served as the agency's principal liaison to Congress, the deputy assistant

director of Science and Technology, the deputy assistant director of Law Enforcement Programs, and the chief of Strategic Planning. In 2010, he authored the book, *The 13 Critical Tasks: An Inside-Out Approach to Solving More Gun Crime*, which Forensic Technology makes available at no cost to criminal justice agencies and educators. He currently serves on the Firearms Committee of the International Association of Chiefs of Police (IACP).

David Hemenway, PhD, is an economist and professor at Harvard School of Public Health (HSPH) and a former James Marsh Visiting Professor at Large at the University of Vermont. He is director of the Harvard Injury Control Research Center. He received the Excellence in Science award from the Injury and Violence Section of the American Public Health Association and fellowships from the Pew, Soros, and Robert Wood Johnson foundations. Dr. Hemenway was recognized in 2012 by the Centers for Disease Control and Prevention as one of the 20 “most influential injury and violence professionals over the past 20 years.” He has written more than 165 journal articles and is sole author of five books. Recent books include *Private Guns Public Health* (2006; University of Michigan Press) and *While We Were Sleeping: Success Stories in Injury and Violence Prevention* (2009; University of California Press). Dr. Hemenway has received 10 HSPH teaching awards.

Michael J. Klag, MD, MPH, is dean of the Johns Hopkins Bloomberg School of Public Health. Dr. Klag is an internist and kidney disease epidemiologist whose scientific contributions have been in the prevention and epidemiology of kidney disease, hypertension, and cardiovascular disease. He was one of the earliest investigators to apply epidemiologic methods to the study of kidney disease. For eight years, he was Director of the Division of General Internal Medicine and was the first Vice Dean for Clinical Investigation at the Johns Hopkins School of Medicine, where he instituted new policies and procedures for oversight of human subject research. He was the Editor-in-Chief of the *Johns Hopkins Family Health Book*, and from 1988 to 2011 he directed one of the longest running longitudinal studies in existence, the Precursors Study, which began in 1946. Dr. Klag received his medical degree from the University of Pennsylvania and his MPH degree from the Bloomberg School.

Christopher S. Koper, PhD, is an associate professor in the Department of Criminology, Law and Society at George Mason University and a senior fellow and co-director of the evidence-based policing research program in George Mason’s Center for Evidence-Based Crime Policy. Dr. Koper has more than 20 years of experience conducting criminological research at the Police Executive Research Forum, the University of Pennsylvania, the Urban Institute, the RAND Corporation, the Police Foundation, and other organizations, where he has written and published extensively on issues related to firearms, policing, federal crime prevention efforts, and other topics. His research on firearms, much of which he has conducted for the U.S. Department of Justice, has included studies of illegal gun markets, law enforcement strategies to reduce gun crime, trends in criminal weaponry, the 1994 federal assault weapons ban, and other federal and state policies to reduce firearms violence. He holds a PhD in criminology and criminal justice from the University of Maryland.

Hsiu-Ju Lin, PhD, is an associate research professor in the School of Social Work at the University of Connecticut and the principal data analyst for the Research Division at the Connecticut Department of Mental Health and Addiction Services. Dr. Lin plans and oversees data analyses of all the Division's quantitative work, including several federally funded studies. Her areas of specialization include longitudinal data analysis, multilevel modeling, structural equation modeling, and health behavior studies. She holds a doctorate in social/personality psychology from the University of Albany, State University of New York.

Jens Ludwig, PhD, MA, is the McCormick Foundation Professor of Social Service Administration, Law, and Public Policy at the University of Chicago, director of the University of Chicago Crime Lab, and co-director of the University of Chicago Urban Education Lab. He is also a non-resident senior fellow at the Brookings Institution, research associate of the National Bureau of Economic Research (NBER), co-director of the NBER's Working Group on the Economics of Crime, and member of the MacArthur Foundation's research network on housing and families. His research has been published in leading scientific journals across a range of disciplines, including *Science*, *New England Journal of Medicine*, *Journal of the American Medical Association*, *American Economic Review*, and *American Journal of Sociology*. He is co-author with Philip J. Cook of *Gun Violence: The Real Costs* (2000; Oxford University Press), co-editor with Cook of *Evaluating Gun Policy* (2003; Brookings Institution Press), and co-editor with Cook and Justin McCrary of *Controlling Crime: Strategies and Tradeoffs* (2011; University of Chicago Press). In 2012, he was elected to the National Academy of Science's Institute of Medicine. Ludwig received his BA in economics from Rutgers College and his MA and PhD in economics from Duke University.

Emma E. McGinty, MS, is a research assistant and fourth-year PhD candidate in Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. Her research interests include mental illness, gun violence, and the role of the news media in public policy. Her dissertation research examines the effects of news media coverage of gun violence by persons with serious mental illness, the public's support for gun control policies, and stigma toward persons with serious mental illnesses, such as schizophrenia and bipolar disorder. At the Center for Gun Policy and Research, she is collaborating on studies on the effects of minimum legal age restrictions for firearm purchasers and possessors on gun violence and the effects of state gun sales policies on interstate trafficking of guns. She also serves as a resource on mental illness and gun violence. Prior to coming to the Bloomberg School as a Sommer Scholar in 2009, she worked for the Centers for Disease Control and Prevention. She received an MS in Health and Behavior Science from Columbia University in 2006.

Adam D. Mernit, an undergraduate senior Public Health Studies major at Johns Hopkins University, is applying to the Master of Science in Public Health (MSPH) program at the Bloomberg School of Public Health. A native of Huntington, New York, he recently began

working with Stephen Teret in the field of gun policy. He plans to continue along the path of gun policy research and study the impact of health research on legislative action.

Matthew Miller, MD, ScD, MPH, is deputy director of the Harvard Injury Control Research Center and associate professor of Injury Prevention and Health Policy at the Harvard School of Public Health. Dr. Miller, a physician with training in internal medicine, medical oncology, medical ethics, health policy and management, epidemiology, and pharmaco-epidemiology, has authored more than 100 journal articles and op-ed articles on suicide, interpersonal violence, and unintentional injuries, many of which focus on the relationship between firearms and lethal violence. He has been recognized as an outstanding teacher at Harvard's School of Public Health and at Harvard College, most recently in 2011 when he received both the Burke Award from the Harvard Initiative for Global Health for teaching injury and violence prevention to undergraduates and the Harvard School of Public Health's annual Teaching Award for his graduate school course on suicide prevention. He is also the recipient of the 2011 Excellence in Science Award, an honor bestowed annually by the Injury Control and Emergency Health Services Section of the American Public Health Association.

Michael A. Norko, MD, MAR, is a forensic psychiatrist and serves as director of Forensic Services for the Connecticut Department of Mental Health and Addiction Services (DMHAS), where he oversees all public sector forensic services. He manages DMHAS reporting to the FBI of persons ineligible for gun purchase due to mental health adjudications. Dr. Norko is also an associate professor of psychiatry, Law & Psychiatry Division at Yale University School of Medicine. He served on the APA Task Force on the Assessment of Violence Risk. Dr. Norko collaborated in writing legislative proposals for the "Relief from Disabilities" provision required by the NICS Improvement Amendments Act.

Michael J. North, PhD, was a faculty member in Biochemistry at the University of Stirling in Scotland when, in March of 1996, his only daughter was killed in a mass shooting at Dunblane Primary School. Following that event, he became a tireless advocate for gun control. He participated in the Snowdrop Campaign for a handgun ban and helped to launch the Gun Control Network (GCN) to campaign for tighter gun legislation in the UK. He remains involved with the GCN and recently served on a panel advising the Scottish government on airgun legislation. He has participated in a number of international meetings relating to gun violence and public safety and has spoken about gun control in the UK to audiences in Europe, North America, and Australia. Until recently, he was on the board of the International Action Network on Small Arms.

Rebecca Peters is a violence prevention specialist who has worked for more than 20 years on arms control, women's rights, public health, and human security. A lawyer and a journalist, she was the first director of the International Action Network on Small Arms (IANSA), the global movement against gun violence. She previously worked for the Open Society Institute and was a Soros Senior Justice Fellow at the Johns Hopkins School of Hygiene

and Public Health. In the 1990s, she led the grassroots campaign in Australia that secured the overhaul of all state and territory gun laws. (Gun death rates in Australia have subsequently dropped by 50%.) For this work, she received the Australian Human Rights Medal, her country's highest human rights award. She is currently working for Surviving Gun Violence, a project aiming to increase assistance to survivors. A member of the IANSA Board and the Fundacio per la Pau's International Council, she is also a consultant to the University of Sydney and the Centre for Humanitarian Dialogue.

Allison Gilbert Robertson, PhD, MPH, is assistant professor in the Department of Psychiatry and Behavioral Sciences at Duke University School of Medicine. Dr. Robertson's interests span several areas of mental health law, policy, and services research, in particular the problems of co-occurring substance abuse and the intersection between these disorders and criminal justice involvement. She is currently an investigator on several projects including the multisite study on gun control laws, mental illness, and prevention of violence led by Dr. Jeffrey Swanson. She is principal investigator on a study funded by the Robert Wood Johnson Foundation Program on Public Health Law Research examining the effects of legal practices used in jail diversion programs for persons with serious mental illness that aim to improve participants' access to treatment and reduce recidivism. She received a PhD in Health Policy and Management from the University of North Carolina at Chapel Hill and an MPH in Health Management and Policy from the University of Michigan at Ann Arbor.

Lawrence E. Rosenthal, JD, is a professor at Chapman University School of Law in Orange, California. Previously, he was deputy corporation counsel for Counseling, Appeals and Legal Policy with the City of Chicago's Department of Law. In this capacity, he argued three cases before the U.S. Supreme Court and supervised a large volume of complex litigation, as well as legislative and policy matters. He entered the practice of law as an assistant U.S. attorney for the Northern District of Illinois, specializing in organized crime and public corruption prosecutions. He brought the first racketeering case involving insider trading, and secured the longest sentence—200 years—in the history of the District in an organized crime case. He clerked for Judge Prentice Marshall of the U.S. District Court for the Northern District of Illinois and for Justice John Paul Stevens of the U.S. Supreme Court. He graduated from Harvard Law School, where he won the Fay Diploma and was an editor of the Harvard Law Review. He continues to engage in litigation before the Supreme Court and other appellate courts, usually on a pro bono basis.

Jeffrey W. Swanson, PhD, is a professor in Psychiatry and Behavioral Sciences at Duke University School of Medicine. He is a medical sociologist with expertise in psychiatric epidemiology, mental health services research, and mental health law and policy studies. Dr. Swanson is principal investigator of a multisite study on gun control laws, mental illness and prevention of violence, cosponsored by the National Science Foundation and the Robert Wood Johnson Foundation's Program on Public Health Law Research (PHLR).

He received the 2011 Carl Taube Award from the American Public Health Association for outstanding career contributions to mental health research.

Marvin S. Swartz, MD, is professor and head of the Division of Social and Community Psychiatry and director of Behavioral Health for the Duke University Health System. Dr. Swartz's major research and clinical interests are in improving the care of mentally ill individuals. He has been extensively involved in policy issues related to the organization and care of mentally ill individuals at the state and national level. He was a Network Member in the MacArthur Foundation Research Network on mandated community treatment examining use of legal tools to promote adherence to mental health treatment, and led the Duke team studying the use of assisted outpatient treatment in New York. He co-led a North Carolina study examining the effectiveness of psychiatric advance directives and co-led the Duke team investigating the role of antipsychotics in treatment outcomes in schizophrenia as part of the landmark NIMH-funded Clinical Antipsychotics Trials of Intervention Effectiveness study. He is a co-investigator of a study of the cost of criminal justice involvement of mentally ill individuals and the effectiveness of gun laws in reducing gun-related deaths. Dr. Swartz is also director of the National Resource Center on Psychiatric Advance Directives and recipient of the 2011 American Public Health Association's Carl Taube Award and American Psychiatric Association's Senior Scholar, Health Services Research Award for career contributions to mental health services research.

Stephen P. Teret, JD, MPH, is a professor of Health Policy and director of the Johns Hopkins Center for Law and the Public's Health. Professor Teret holds joint faculty appointments in Pediatrics and in Emergency Medicine at the Johns Hopkins School of Medicine. He began his career working as a poverty lawyer and a trial lawyer in New York. Since 1979, he has been a full-time faculty member at the Johns Hopkins Bloomberg School of Public Health. His work includes research, teaching, and public service in the areas of injury prevention, vaccine policy, tobacco policy, food policy, preparedness, and, generally, public health law. Professor Teret's work has also focused on the understanding and prevention of violence, with an emphasis on gun policy. Teret is recognized as one of the first persons to write about and advocate for the use of litigation as a tool for protecting the public's health. Professor Teret is a frequent lecturer at major universities and has served as a consultant to the President, the Attorney General, the U.S. Congress, federal agencies, state legislatures, and health departments. Professor Teret is the recipient of distinguished career awards from the American Public Health Association, and the Association of Trial Lawyers of America.

Jon S. Vernick, JD, MPH, is an associate professor and associate chair in Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. He is co-director of the Johns Hopkins Center for Gun Policy and Research. In addition, Vernick is co-director of the Johns Hopkins Center for Law and the Public's Health and deputy director of the Center for Injury Research and Policy. His work has concentrated on ways

in which the law and legal interventions can improve the public's health. He is particularly interested in epidemiology, policy, and legal and ethical issues associated with firearm and motor vehicle injuries. He has also examined aspects of numerous other public health issues including tobacco control, preparedness and health advocacy. Vernick is also committed to graduate education, serving as an associate chair of the Johns Hopkins MPH Program. He received a BA from Johns Hopkins University, a law degree cum laude from George Washington University, and an MPH from the Johns Hopkins School of Hygiene and Public Health.

Katherine A. Vittes, PhD, MPH, is a research associate at the Johns Hopkins Center for Gun Policy and Research. Her research focuses on evaluating policies designed to prevent gun violence. She has published numerous articles on adolescent gun violence and gun use in intimate partner violence. In addition to having presented at more than a dozen professional conferences, Vittes has been called upon to testify in front of the Maryland legislature. Prior to joining the Bloomberg School faculty in 2008, Dr. Vittes earned her MPH and PhD at the UCLA School of Public Health and completed a post-doc at the University of Pennsylvania.

Daniel W. Webster, ScD, MPH, is a professor in Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. He serves as director of the Johns Hopkins Center for Gun Policy and Research, as well as deputy director of research for the Center for the Prevention of Youth Violence. He is also affiliated with the Johns Hopkins Center for Injury Research and Policy. Webster is the author of numerous articles on the prevention of gun violence and firearm policy. His current research interests include evaluating the effects of various efforts to reduce violence, including state gun and alcohol policies, policing strategies focused on deterring gun violence, a community gun violence prevention initiative (Safe Streets) and Maryland's Lethality Assessment Program for reducing the recurrence of intimate partner violence.

Adam Winkler, JD, MA, is a law professor at the University of California, Los Angeles. He is a specialist in American constitutional law, known primarily for his research on the right to bear arms and on corporate political speech. His work has been cited by the U.S. Supreme Court and numerous federal and state courts. His recent book, *Gunfight: The Battle Over the Right to Bear Arms*, was called "provocative" and "illuminating" by *The New York Times*; "a fascinating survey of the misunderstood history of guns and gun control in America" by *The Wall Street Journal*; and "an antidote to so much in the gun debate that is one-sided and dishonest" by the *Los Angeles Times*. A contributor to *The Daily Beast* and *The Huffington Post*, his commentary has been featured on NBC Nightly News, CNN, *The New York Times*, *The Wall Street Journal*, *Newsweek*, *The Atlantic*, *The New Republic*, and SCOTUSblog. He edited, along with Pulitzer Prize-winning historian Leonard Levy, the *Encyclopedia of the American Constitution*. He is a graduate of the Georgetown University School of Foreign Service and New York University School of Law. He also holds a master's degree in political science from UCLA.

Garen J. Wintemute, MD, MPH, is the inaugural Susan P. Baker-Stephen P. Teret Chair in Violence Prevention and director of the Violence Prevention Research Program at the University of California, Davis. He practices and teaches emergency medicine at UC Davis Medical Center, Sacramento (a level I regional trauma center), and is professor of emergency medicine at the UC Davis School of Medicine. Dr. Wintemute's research focuses on the nature and prevention of violence and on the development of effective violence prevention measures and policies. Selected studies include assessments of risk for criminal activity and violent death among legal purchasers of handguns, evaluations of the effectiveness of denying handgun purchase to felons and violent misdemeanants, in-depth studies of gun dealers who are disproportionate sources of crime guns, and the first empirical study of gun shows. He is the author of two books: *Ring of Fire* (1994), a study of the handgun makers of Southern California, and *Inside Gun Shows: What Goes on When Everybody Thinks Nobody's Watching* (2009). He has testified before committees of Congress and state and local legislatures as an expert on firearm violence and its prevention. In 1997 he was named a Hero of Medicine by Time magazine.

April M. Zeoli, PhD, MPH, is an assistant professor in the School of Criminal Justice at Michigan State University. In her research, she uses public health methods and models to increase the understanding of violence and homicide. Her main field of investigation is the prevention of intimate partner violence and homicide through public health policy.

This page intentionally left blank

Index

- “Access Denied” (Mayors Against Illegal Guns), xiv
- access to guns, restrictions on, 144
- accidental deaths, related to guns, 174–75
- Acioli, Patricia, 216
- alcohol, consumption of, laws relating to, 70
- alcohol abuse: federal denial criteria and, 68–69, 72, 78, 88; gun purchase and possession and, 79; personal gun ownership and, 82–83; as risk factor for gun-related violence, 82, 83. *See also* drunk driving
- ammunition, marking of, 216
- amnesty programs, 205
- Argentina, supporting gun amnesties and buybacks, 205
- Armatix GmbH, 177–78
- Arms Trade Treaty, 220
- assault weapons, 143; associated with drug trafficking and organized crime, 161; ban on, Americans’ support of, 241–44; as crime guns, 162–64; JHU Summit recommendations on, 262; mass shootings and, 161; as percentage of guns recovered by police, 164; prices for, 162–63; prohibitions on, constitutionality of, 230–33; restrictions on, public support for, 168
- assault weapons ban, federal, xii–xiii, 157; effects of, 162–65; exemptions in, 158, 160; features test provision of, 159, 160; impact on gun violence, 165–66; LCMs and, 159–60; lessons and implications from, 168–69; mixed effects of, 158; passage of, 161; provisions of, 159–61
- ATF. *See* U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives
- Aurora (CO), mass shootings at, 158
- Australasian Police Ministers’ Council (APMC), 195, 201–2
- Australia: battle in, over gun regulation, 196–98; effects in, of gun policy changes, 207–9; gun manufacturing industry gone from, 207; guns in, 196; lunatic fringe in, 198; Port Arthur, mass shooting at, 195; restocking, following gun legislation, 207; supporting gun amnesties and buybacks, 205, 206–7; weapons destroyed in, 205–7
- Australian Institute of Criminology, 207
- AWs. *See* assault weapons
- Azrael, Deborah, 6
- background checks, xii, xiii, 22, 27, 35; avoiding, 104; comprehensive requirements for, potential effects of, 103–5; constitutionality of, 230–31; costs of, 90; criminal records accessible for, 28–29; effectiveness of, 45, 57, 102–3; extending, to misdemeanor convictions and alcohol-related offenses, 89; improvements in, 60; JHU Summit recommendations on, 260; mentally ill people and, 36; nondomestic violence convictions and, 56–57; results of, 78, 79; speed of, 96; state regulation of, 97; strengthening, Americans’ support of, 241, 246–47; universal system for, 29; usefulness of, dependent on related databases, 90; waiving, 97. *See also* Brady Act, the
- Badger Guns and Ammo, 137, 138, 147
- BATF. *See* U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)
- batterers: convicted, prohibited from buying or possessing guns, 55, 56; prohibiting gun access for, 68; using weapons to threaten, 54.

- batterers (*continued*)
See also domestic violence; domestic violence restraining orders; intimate partner homicides
- Behavioral Risk Factor Surveillance System (BRFSS), 6, 9, 82
- Biden, Joseph, xi, xiii
- Bird, Derrick, 192
- Bloomberg, Michael R., 126
- Blose, J., 78
- Boston, gun market disruption strategy in, 146–47
- Brady, James, 23
- Brady, Sarah, 23
- Brady Act, the (Brady Handgun Violence Prevention Act), 23, 25, 110; background check requirement of, 28; gun running and, 25; homicide rates and, 22–23, 26–27, 78, 88; linked with decrease in crime gun imports, 147; not applicable to secondary-market transactions, 148; private-sale loophole in, 28 (*see also* private-sales loophole); risk of violent crime and, 44–45; suicide rates and, 22–23, 26; waiting periods and, 23, 26
- Braga, Anthony A., 28, 146
- Brazil: arms industry in, 214, 215; arms legalization campaign in, 220; buyback programs in, 217–18; destroying weapons in, 217, 218; dispelling myths in, about guns, 216–17; gun control reforms in, 213–15; as gun exporter, 214; gun homicides in, 213; gun regulation in, 219–20; illegal gun trade in, 219; pacification efforts in, 218–19; public opinion in, on gun control, 205, 219–20
- Breyer, Stephen, Justice, 229
- British Medical Association, 189
- Bureau of Alcohol, Tobacco and Firearms. *See* U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)
- Bush, George W., 179
- Bush (George W.) administration, 152
- buyback programs, 201, 205, 208, 217–18
- California: allowing seizure of guns from the dangerous mentally ill, 48–49; background checks and recordkeeping policies in, 98–99; denying gun purchases for violent misdemeanor convictions, 79–81; gun market in, 90, 99; gun shows in, 102; juvenile offenders in, gun possession and, 71
- California Armed and Prohibited Persons System, 61
- CAP laws. *See* child access prevention (CAP) laws
- Centers for Disease Control and Prevention (CDC), xiv, 152, 262
- Chicago, 146; action in, against gun dealers, 124–25, 136; crime guns in, 25
- child access prevention (CAP) laws, 70
- childproof guns. *See* personalized guns; youth children. *See* youth
- Clinton, Bill, 22, 177
- Clinton administration, 152
- college students, gun ownership among, 69
- Colt's, 177
- concealed weapon permits, 90
- Connecticut, NICS reporting in, 37–38, 40–44, 45
- Conservative Party (UK), 186–87, 190–91
- consignment sales, 99
- Consumer Product Safety Commission, 180, 262
- Cook, Philip J., 8, 28, 78, 95, 146, 175
- countermarketing, 130
- crime guns, 143; ATF definition of, 115; assault weapons as, 162–64; in Brazil, 215; exporting of, to other states, 114–17; illegally diverted from legal commerce, 144; purchase of, 28; regional processing protocols for, 150; sources of, 100, 114–15, 118, 119, 124, 133–34; trace data on, unavailable from ATF, 129, 130; tracing of, national report on, 151–52
- crime rates, drop in (U.S., 1990s), 24
- criminals: demand of, for guns, xiii, 28, 39–40, 143; guns diverted to, 112–18; guns of, sources for, 110–11, 123, 145–46; with mental illness, preventing gun violence among, 49; selling guns to, 99–101, 105
- Cullen, Lord W. Douglas, 187
- Cullen Report, 188, 190–91
- dealers, licensed, 101–2, 105, 110–11; constitutionality of regulating, 231; effect of, on the

- illicit market, 124; increasing oversight of, Americans' support of, 241; inspections of, 134–35, 138; interventions on, 134; JHU Summit recommendations on, 261; lawsuits against, 136; licensing of, 134; regulation and oversight of, 112, 124, 133–34; revocation of license for, 135; role of, in gun trafficking, 123; stings against, 136; supplying crime guns, 133–34. *See also* private-party sellers
- deaths: firearms-related, in the U.S., xv, 3–5; unintentional, firearms-related, 5, 13; violent, linked with gun prevalence, 13. *See also* *homicide, mortality, and suicide entries*
- Democrats, supporting gun violence prevention policies, 247–54
- denial criteria: based on prior felony conviction, effectiveness of, 85–87; federal, for gun purchase and possession, 77–78; including violent misdemeanors, 78–79, 88; support for expanding, 89–90
- denials, delayed, 89, 104
- depression: evidence-based treatment for, 50; suicide and, 49
- Detroit, actions against gun dealers in, 124–25, 136, 146
- disarmament, as social theme for 2014 World Cup, 220–21
- Disarmament Statute (Brazil), 215, 219
- disqualified individuals, removing guns from, 58, 59
- District of Columbia, handgun ban in, 225–26 *District of Columbia v. Heller*, 225–30, 232–34
- diversion of guns: to criminals, 111–13, 117–19, 125, 129–30, 134; to the illegal market, 123, 124
- document falsification violations, gun sales and, 149
- domestic violence, 79, 198; alcohol and, 68; gun prohibitions and, implementing and enforcing, 61; guns and, 54; increased risk of IPH and, 66; state-level gun legislation and, 55–56
- domestic violence restraining orders (DVROs), 54–56; associated with lower IPH rates, 68; gun laws and, 57–61; improving public safety through, 59–60; laws relating to, and reducing IPH risk, 57–58; permanent, 55; service of, 59; state-level gun prohibitions and, 87–88; temporary, 55–56, 60–61; violation of, 61
- Dreyfus, Pablo, 214
- drug abuse: associated with violent and criminal behavior, 66, 72; suicide and, 66
- drunk drivers, 69
- Dunblane Primary School (Scotland), shootings at, 185, 187–91, 192
- Dunblane Snowdrop Petition, 189
- DVROs. *See* domestic violence restraining orders
- Eddie Eagle GunSafe Program, 174
- federal firearms license (FFL), 22. *See also* dealers, licensed; sellers
- felons, committing subsequent violent crimes, 66
- FFL. *See* federal firearms license
- Firearm Owners' Protection Act (FOPA), 97, 135, 138, 148–49, 261
- firearms. *See* *assault weapons and guns entries*
- Firearms Act (UK), 186
- firearms convictions, data regarding, usefulness of, 38
- firearms disabilities program, federal, relief from, 71–72
- Firearms Transaction Record, 96
- Fix Gun Checks Act, 104–5
- FN Manufacturing, 177
- FOPA. *See* Firearm Owners' Protection Act
- Forsyth, Michael, 187
- Fox, Gerald, 176
- Fox Carbine, 176
- Gallup, 239, 240
- Gary (IN), stings of gun dealers in, 136
- GCA. *See* Gun Control Act of 1968
- GCN. *See* Gun Control Network
- General Social Survey (GSS), 5–6, 89
- Giffords, Gabrielle, 158
- Great Britain: gun control movement in, 192; gun legislation in, 186; gun ownership in, 188; handgun ban in, 185, 187–92. *See also* United Kingdom

278 *Index*

- grip recognition, 179
grip safety, 176
GSS. *See* General Social Survey
Gun Control Act of 1968 (GCA), 22, 35,
71–72; amendments to, 55, 72; applicability
of, 97
Gun Control Network (GCN), 189, 192
gun shows, 96, 98, 99, 100, 101–3, 112; gun show
loophole, 104; oversight of, 29
- Hamilton, Thomas, 185, 186, 188, 189
Handgun Control, Inc., 23
Hemenway, D., 8
high-capacity magazines. *See* large-capacity
magazines
high-risk individuals, gun purchases by, JHU
Summit recommendations on, 260–61
highway fatalities, reduction in, 173–74
History of Smith & Wesson (Jinks), 175
homicide rates: Brady Act and, 22–23, 26–27,
78, 88; dropping, 24; pre-*Brady* trends in,
25; women's, 8, 10–11; young people
and, 70
homicides, 3–4; ages of victims, 24; alcohol
and, 68; cyclical rates of, 4; demographics of,
4; gun ownership and, 6–10; guns and, 174,
192, 198, 208–9, 213; increased risk of, among
violent intimates, 54; perpetrators of, and
prior felony convictions, 28. *See also* intimate
partner homicides (IPHs)
Howard, John, 197, 198
Hungerford (Berkshire, UK), mass shooting at,
186, 187, 188, 189
- iColt, 177
Independents, supporting gun violence
prevention policies, 247–54
Indiana, dangerous persons law in, 48–49
integrity tests, of private-party sellers, 101
International Crime Survey, 8
intimate partner homicides (IPHs), 53; declines
in, for women, 87–88; effects on, of limiting
gun access, 57; guns and, 54; and laws
prohibiting purchase or possession, 57,
58; risk of, reducing, 57–58; risk factors for,
54, 56
intimate partners, defining, 55, 56, 61
IPHs. *See* intimate partner homicides
- Jersey City (NJ), handgun attacks in, 167
Jinks, Roy G., 175
Johns Hopkins Bloomberg School of Public
Health, xv, 176
Johns Hopkins Center for Gun Policy and
Research, xix, 179
Johns Hopkins National Survey of Public
Opinion on Gun Proposals, 240–53
Johns Hopkins University Summit on
Reducing Gun Violence in America,
recommendations of, 259–62
judicial scrutiny, of Second Amendment
cases, 229–30
junk guns, 111, 118–19, 137
juveniles. *See* youth
- Kellermann, A. L., 9, 10
Killias, M., 8
Knight, Brian G., 114
- Labour Party (UK), 187, 191
large-capacity magazines (LCMs): Americans'
support of ban on, 241; ban on, 158–60;
constitutionality of bans on, 230–31, 233–34;
JHU Summit recommendations on, 262;
limiting availability of, xii; mass shootings
and, 161; ownership of, 161; restrictions on,
168; used in gun crimes, 162, 164–65
life, value of, 29
litigation: against gun makers and sellers, 125;
detering certain gun sales practices, 124;
diminished effectiveness of, 136; of NYC gun
dealers' activities, 125–30
Ludwig, Jens, 28, 146
Lula (Luiz Inácio Lula da Silva), 215
Lula government, 220
- magazine capacity, restricting, 168. *See also*
large-capacity magazines
MAIG. *See* Mayors Against Illegal Guns
Maryland, banning junk guns, 118–19
Massachusetts, juvenile offenders in, gun
possession and, 71

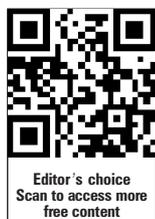
- mass shootings, xxv, 157–58, 161, 185, 186, 192, 195, 206, 218; as catalyst for assault weapons debates, 166; effect on, of the federal assault weapons ban, 166; rarity of, by disturbed persons, 34
- Mayors Against Illegal Guns, xi–xii, xiv, 114, 135
- McChrystal, Stanley, xii
- McClure-Volkmer Act. *See* Firearm Owners' Protection Act (FOPA)
- McDonald v. City of Chicago*, 225, 226
- means–ends scrutiny, 232–33
- mental health: JHU Summit recommendations on, 261; rates of adjudication, 45–48; revising federal criteria for prohibitions on guns and, 48
- mental illness: assumptions about, 36; and disqualification from buying guns, 39–40, 44; firearms prevalence and, 12; gun policy and, 34, 35–36; violence and, 34, 36; violent crime and, 38–44, 48
- Mercy, J. A., 57
- military, U.S., suicides in, xv
- military-style weapons, limiting availability of, xii
- militias, 227–29
- Miller, Matthew, 6, 8, 9
- Ministry of Health (Brazil), 218
- Ministry of Justice (Brazil), 213
- misdeemeanors: convictions for, and future arrest rates, 81–82; nonviolent, and new offenses, 81. *See also* violent misdemeanors
- Missouri, PTP licensing in, repeal of, 112–14, 117
- “Model Handgun Safety Standard Act,” 179
- Model Law on Firearms, Ammunition and Related Materials (Latin America), 219, 220
- mortality rate, gun-related, Australia vs. U.S., 196, 202, 208
- National Academies' Committee to Improve Research Information and Data on Firearms, 145
- National Ballistics Intelligence Service (Nabis), 192
- National Coalition for Gun Control (NCGC; Australia), 196–99
- National Committee on Violence (NCV; Australia), 199
- National Crime Victimization Survey (NCVS), 175
- National Criminal History Improvement Program (NCHIP), 28–29
- National Firearms Act of 1934, 228
- National Firearms Agreement (Australia), 195–96, 199–201
- National Firearms Buyback (Australia), 205–6
- National Firearms Survey, 96, 101–2
- National Firearms Trafficking Policy Agreement (Australia), 201–2
- National Handgun Buyback (Australia), 206
- National Handgun Control Agreement (Australia), 202
- National Instant Criminal Background Check System (NICS), 23, 29, 35, 96, 231, 261; comprehensive state reporting to, of mental health records, 45; Connecticut's reporting to, 37–38, 40–44, 45; reach of reporting, extending, 36–37; reporting effect of, 40–44, 45
- National Institute of Justice (NIJ), 152, 158, 177, 262
- National Institutes of Health (NIH), xiv, 152, 262
- National Integrated Ballistics Information Network (NIBIN), 150, 151
- National Rifle Association (NRA), 151, 174; members of, responding to gun proposals, 90, 246; misrepresenting the Australian experience, 202
- National Survey of Private Ownership of Firearms, 96, 101
- NCGC. *See* National Coalition for Gun Control
- NCHIP. *See* National Criminal History Improvement Program
- NCV. *See* National Committee on Violence
- NCVS. *See* National Crime Victimization Survey
- Nevada, gun shows in, 102
- New Jersey: personalized gun law in, 179–80; possession laws in, 67
- New Jersey Institute of Technology, 179

- Newtown (CT). *See* Sandy Hook Elementary School, shooting at
- New York, state of, enacting penalties for illegal handgun possession, xvi
- New York City: litigating gun dealers' activities, 125–30; murders in, dropping numbers of, xvi; stings and lawsuits in, against gun dealers, 136–37
- NIBIN. *See* National Integrated Ballistics Information Network
- NICS. *See* National Instant Criminal Background Check System
- NIH. *See* National Institutes of Health
- NIJ. *See* National Institute of Justice
- North, Mick, 186
- North Carolina, DVRO gun law in, 58
- Northern Ireland, gun legislation in, 186
- Obama, Barack, xi
- Observatory on Citizen Security, 220
- Office of Legislative Research (CT), 38
- one-gun-per-month limits, 115, 119
- Organization of American States, 220
- out-of-state residents, sales to, 100
- ownership of guns: and increased risk for alcohol abuse, 69; minimum federal standards for, 67; state laws relating to, differences in, 67
- pacification, 218–19
- PARLATINO, 219
- Parliamentary Commission of Inquiry (PCI; Brazil), 219
- Pennsylvania: juvenile offenders in, gun possession and, 71; prohibiting gun purchase by repeat DUI offenders, 69
- permit holders, exempting, from background checks, 104–5
- permit-to-purchase (PTP) licensing, 112–18
- personalized guns, 174, 246; achieving, 179–80; history of, 175–77; JHU Summit recommendations on, 262; need for, 174–75; presently available, 177–79; technology for, 176–79
- Pew Center for the People and the Press, 240
- Philip, J. C., 6
- PLCAA. *See* Protection of Lawful Commerce in Arms Act
- Port Arthur (Australia), mass shooting at, 195
- possession of guns, federal prohibitory criteria for, 65–66
- Powell, Colin, xii
- private-party sales, xii, 36, 102, 144, 147–48
- private-party sellers, 96–97, 99–101, 103–5, 110
- private-sales loophole, 28–29, 60, 149, 231
- product liability litigation, gun makers immune from, 179
- products, countermarketing of, 130
- Protection of Lawful Commerce in Arms Act (PLCAA), 125, 136, 139, 179, 180, 261
- psychiatric illness. *See* mental illness
- psychological testing, for handgun ownership, 189
- PTP. *See* permit-to-purchase licensing
- public health issues, 173–74: death-by-gunshot, 209; gun ownership as, 228
- public safety, gun control laws related to, 230
- purchases of guns, multiple, extending mandatory reporting for, 148
- Realengo School (Rio de Janeiro), mass shooting at, 218
- recidivism, criminal, 71, 88
- record-of-sale databases, 59–60
- registries: for gun ownership, 60; for handguns, 29
- regulation of guns, linked with firearm prevalence, 7
- Republicans, supporting gun violence prevention policies, 247–54
- research funding, JHU Summit recommendations on, 262
- retail outlets, supplying criminals with guns, 146
- retailers, licensed. *See* dealers, licensed
- Richmond (VA), LCM use in, 165
- rights: balancing, with safety, 48; of law-abiding citizens, 65
- Rio de Janeiro, violence in, 214, 218
- robbery, gun availability and, 8–9
- robbery–murder, gun availability and, 8–9
- Rossi, Peter H., 146

- safety of guns, U.S. Consumer Product Safety Commission prohibited from addressing, 179
- sales of guns: consignments, 99; to criminals, 99–101; differing laws among states, 111–12, 118; federal double standard for, 96–97; primary market for, 95; private, regulation of, 112; process for, 96; secondary market for, 95–96; special reports of, 96; state regulation of, 97–99. *See also* dealers; private-party sellers
- sale-to-crime intervals, 113–14
- Sandy Hook Elementary School (Newtown, CT): mass shooting at, xi, 158; policy response to shooting at, 33–34; U.S. public opinion after, on gun policy, 239, 256
- Saturday Night Specials. *See* junk guns
- Second Amendment, 225–26; “arms” in, meaning of, 232; challenges of, 226–27; core interest of, 227; gun lobby’s concern over, xiii; limits on, constitutionality of, 226; lower courts’ rulings on, 226; preamble of, 228–29; scope of, 227–29; “well-regulated militia” in, 228–29
- secondary-market transactions, 147
- selective prohibition, as approach to gun ownership, 21–22. *See also* Brady Act, the sellers. *See* dealers, licensed; private-party sellers
- semi-automatic weapons: attacks with, effects of, 166–67; legal, under assault weapons ban, 159; rifles, 143
- Sheley, Joseph, 146
- shooting organizations (UK), 187, 189–90, 191
- Shooting Sports Retailer*, 103
- SISCF. *See* Survey of Inmates in State Correctional Facilities
- smart guns. *See* personalized guns
- Smith & Wesson, 175–76, 177
- Squires, Peter, 186
- stalking, 54, 61
- state-level gun dealer’s licenses, 138
- state regulation, 97–99, 102
- states: assault weapons bans in, 161; gun dealer licensing requirements in, 134; gun export rates among, 116–17, 135; gun sales laws in, 111–12, 118
- sting operations, against gun sellers, 112, 124, 126, 136
- straw purchases, xvi, 103, 112, 117, 124, 125, 127, 134, 148
- Subcommittee on Control of Arms and Munitions (Brazil), 219
- substitution effect, 209
- suicide rates, 49; Brady Act and, 22–23, 26, 29; CAP laws and, 70
- suicides, xv, 3, 4–5; alcohol and, 68; demographics of, 5; depression and, 49; drug abuse and, 66; and guns obtained from FFLs, 30–31n6; gun ownership and, 6–7, 11–13; guns and, 174, 198, 208–9; mental illness and, 49
- Sunday Mail* (Scotland), 189
- supply-side approach to violence, support for, 152
- supply-side interventions, 144, 147
- Survey of Inmates in State Correctional Facilities (SISCF), 110
- Taurus S.A., 214
- theft of guns, 175
- Tiahr, Todd, xiv, 137
- Tiahr Amendment, xiv, 137–38, 139, 152
- trace data, 144–45; limiting the release of, 137–38; utility of, 137
- traces: for assault weapons, 163; difficult procedure for, 148
- traffickers, charged with other crimes, 150
- trafficking of guns, xii, 96, 97; Brady Act and, 25; indicia of, 137; international, 220; interstate, 135; intrastate, 124, 135; JHU Summit recommendations on, 261; licensed dealers and, 102, 111; no federal laws regarding, 148; private-party sales and, 100; reduced by enhanced dealer oversight, 135; revisiting sentencing guidelines for, 149–50; routes for, 145–46
- transfer agents, 98, 102
- TriggerSmart, 178–79
- Truscott, Carl, 151
- underground markets for guns, frictions in, 146
- United Kingdom: criminal recidivism in, 89; gun legislation in, 186–87; Public Inquiries in, following disasters, 187; supporting gun amnesties and buybacks, 205. *See also* Great Britain

- United States: female homicide victims in, 8, 10–11; gun homicides in, compared with other nations, xvii; gun laws in, dividing the population, 21; gun deaths in, 3–5, 15; gun ownership in, 5–7, 241; gun proposals in, responses from gun owners and non-gun owners, 246–48; gun regulation in, historical tradition of, 227–28; murders in, with guns, xi–xii; policy change in, driven by public sentiment, xx; premature mortality in, xxv, 3, 4; public opinion in, 239–40; regulation of gun sales in, 119; suicide rates in, compared with other nations, 4–5; violence in, compared with other nations, 3–4; violent deaths in, linked to gun prevalence, 13–15
- U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), xiv, 72, 96, 97, 100, 110, 111, 113, 115, 124, 134, 135, 159; approach of, to gun trafficking crimes, 148; granting permission for sale of personalized handguns, 178; JHU Summit recommendations on, 261; responsibility of, 147; sanctioning authority for, 138; strengthening, 150–51; tactics of, questioned, 151; trace data and, 136, 137, 144–45
- U.S. Congress, and gun lobby, xiv, xv
- U.S. Constitution, Second Amendment. *See* Second Amendment
- U.S. Consumer Product Safety Commission, 179, 180
- U.S. Court of Appeals (D.C. Circuit), and assault rifle ban, 233–34
- U.S. Department of Justice, xiii, 147, 177
- U.S. Supreme Court, Second Amendment rulings of, xiii, 78, 225–34
- U.S. Surgeon General, JHU Summit recommendations for, 262
- Vigdor, E. R., 57
- violence: alcohol and, 68; drug abuse and, 66; as public health problem, 198; rates of, in developed nations, 8
- violence with guns: societal costs of, 167; trends in, after expiration of the federal assault weapons ban, 165–66
- violent crime: Brady Act prohibitions and, 44–45; correlated with illegal gun usage, 38; effects on, of background checks, 45; factors associated with, 44; increasing in adolescence and early adulthood, 67; mental illness and, 38–44, 48; risks of committing, 44–45
- Violent Crime Control and Law Enforcement Act of 1994, 159, 161
- violent misdemeanors: federal denial criteria and, 77, 78, 85, 88; and new offenses, 79–80; state treatment of, and gun purchase and possession, 79
- Virginia Tech, mass shootings at, 158
- Viva Rio, 213, 214, 217, 219
- waiting periods, 23, 26; and dealers, licensed, 99; ending, before completion of background checks, 89; extending, in individual cases, 89; lifting, 104
- Walmart, gun sales practices of, 130
- weapon accessories, ban on, 159
- weapons, threatening with, associated with increased homicide risk, 54
- Webster, Daniel, xv–xvi, 135
- Wesson, D. B., 175
- Wesson, Joe, 175
- Wiebe, D. J., 10
- Williams, Daryl, 202
- Wintemute, Garen J., 68, 174
- women: domestic violence against, 54; homicide rates of, 8, 10–11; killed by intimate partners, 53; seeking justice system assistance for domestic violence, 54–55
- World Cup (soccer), in Brazil, 220–21
- World Health Assembly, 198
- Wright, James D., 146
- YouGov, 240
- youth: broadening gun prohibitions for, 70, 72; committing suicide with guns, 175; deaths of, related to firearms, 13; juvenile offenders, expanding gun prohibitions for, 71, 72; purchases by, 100; restricting gun access for, 67; training, in gun safety, 174. *See also* juvenile offenders
- Youth Crime Gun Interdiction Initiative, 151

GZJ ~~DKV~~'44''



Editor's choice
Scan to access more
free content

Legal status and source of offenders' firearms in states with the least stringent criteria for gun ownership

Katherine A Vittes, Jon S Vernick, Daniel W Webster

Center for Gun Policy and Research, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

Correspondence to

Dr Katherine A Vittes, Center for Gun Policy and Research, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway, Baltimore, MD 21205, USA; kvittes@jhsph.edu

Accepted 7 March 2012

Published Online First
23 June 2012

ABSTRACT

Background Gun possession by high-risk individuals presents a serious threat to public safety. U.S. federal law establishes minimum criteria for legal purchase and possession of firearms; many states have laws disqualifying additional categories for illegal possession.

Methods We used data from a national survey of state prison inmates to calculate: 1) the proportion of offenders, incarcerated for crimes committed with firearms in 13 states with the least restrictive firearm purchase and possession laws, who would have been prohibited if their states had stricter gun laws; and 2) the source of gun acquisition for offenders who were and were not legally permitted to purchase and possess firearms.

Results Nearly three of ten gun offenders (73 of 253 or 28.9%) were legal gun possessors but would have been prohibited from purchasing or possessing firearms when committing their most recent offense if their states had stricter prohibitions. Offenders who were already prohibited under current law acquired their gun from a licensed dealer, where a background check is required, five times less often than offenders who were not prohibited (3.9% vs. 19.9%; $\chi^2=13.31$; $p\leq 0.001$). Nearly all (96.1%) offenders who were legally prohibited, acquired their gun from a supplier not required to conduct a background check.

Conclusions Stricter gun ownership laws would have made firearm possession illegal for many state prison inmates who used a gun to commit a crime. Requiring all gun sales to be subject to a background check would make it more difficult for these offenders to obtain guns.

INTRODUCTION

Gun violence has long been one of the most significant public safety and social problems in the USA. In the USA, in 2008, gun violence resulted in 12 179 homicides and an estimated 56 626 assaultive injuries serious enough to warrant a hospital emergency room visit.¹ Among high-income countries, the USA is unique in its extraordinarily high rate of homicides. This disparity is most striking for homicides committed with firearms where the US rate is 20 times higher than other high-income countries.²

Despite the magnitude of the problem, US gun policy rarely considers appropriate criteria for disqualifying someone from lawfully possessing a firearm. Federal law disqualifies certain groups of high-risk individuals from owning guns, including felons, fugitives, unlawful users of or those addicted to controlled substances, those who have been 'adjudicated as a mental defective' or committed to a mental institution, individuals who

have been dishonourably discharged from the armed forces, persons subject to certain domestic violence restraining orders, persons less than the age of 18 years (for handguns) and domestic violence misdemeanants. Federal law does not set a minimum age requirement for the legal possession of long guns (ie, rifles and shotguns).³

Although the federal firearm prohibitions apply minimum standards for all US states, many states have enacted broader disqualifications for firearm possession including: a minimum age of 21 for all guns; convictions for some misdemeanour crimes involving violence, firearms or drugs; multiple convictions for alcohol-related offences; or convictions for serious crimes committed as a juvenile.⁴

Research supports the underlying premise of laws that widen exclusionary criteria for firearm possession: that some groups have higher rates of criminal offending than do those without a criminal history or other indicia of risk.^{5–9} For example, Wintemute and colleagues found that individuals denied legal handgun purchase, as a result of a new California law expanding firearm prohibitions to include misdemeanants convicted of crimes of violence, were less likely to commit a new crime of violence than were demographically-matched Californian misdemeanants who had been approved for handgun sales during the years just prior to the new restrictions.⁹ A study of homicide offenders in Illinois found that 42% would have been prohibited from possessing firearms as a result of a prior felony conviction; however, convictions for misdemeanours as an adult or more serious crimes as a juvenile were not reported.⁶

Under federal law, persons buying guns from licensed gun dealers must undergo a criminal history background check.¹⁰ But federal law and the law of most states do not require firearm sellers who are not licensed gun dealers to verify that purchasers of firearms are legally qualified to possess a firearm such as through a background check.⁴ Understanding how those with and without a criminal history acquire guns can also inform policies intended to keep guns from prohibited persons.

Prior research on firearm acquisition suggests that incarcerated adults often obtain their guns from casual sources such as from friends and family members, and 'off the street'.^{11–13} To our knowledge, whether and to what extent the source varies based on the legal status of the purchaser has not been investigated.

Therefore, the goals of the current study are to: (1) identify the proportion of state prison inmates

incarcerated for gun-related offences in states with the least strict standards for firearm purchase and possession who would have been prohibited from possessing firearms if laws in their states had included additional exclusion criteria and (2) describe how these inmates acquired their firearms.

METHODS

Data

This study used data from the most recent (2004) Survey of Inmates in State Correctional Facilities (SISCF), a nationally-representative survey of state prison inmates administered by the Bureau of the Census for the US Department of Justice.¹⁴ The 2004 SISCF consisted of computer-assisted personal interviews conducted between October 2003 and May 2004. Inmates were asked about a broad range of topics including: demographic characteristics; offences for which they were currently serving time; prior criminal history; gun possession and use; prior drug and alcohol use and treatment; and physical and mental health status. In the 2004 survey, 14 499 inmates were interviewed. Of those eligible to participate in the study, 89.1% participated.

Additional information about data collection and analysis methodology for the SISCF is available from the University of Michigan's Inter-university Consortium for Political and Social Research.¹⁵ Prior research using data from the SISCF include studies on incarcerated women, veterans and parents.^{16–18} No reported studies have used SISCF data on inmates who used firearms in their most recent crimes.

Study sample

To focus on the potential effects of broadening state laws regarding firearm restrictions, we limited our analysis to offenders currently serving time for an offence committed with a firearm in states that, as of 2004, did *not* have laws prohibiting persons in the following five groups from purchasing or possessing a firearm: (1) persons less than 21 years of age; (2) persons convicted of a serious juvenile offence; (3) violent misdemeanants; (4) drug misusers; and (5) alcohol abusers. To identify states meeting these criteria, we consulted the Bureau of Justice Statistics 2004 Survey of State Procedures Related to Firearm Sales,¹⁹ supplemented by legal research to confirm some state laws.

Because domestic violence misdemeanants are already prohibited from purchasing or possessing firearms under federal law,^{20–22} we included states with laws that prohibited domestic violence misdemeanants if the states did not also prohibit other violent misdemeanants from purchasing or possessing firearms. In addition, although federal law restricts firearm purchase or possession for drug misusers, the law's definition of a drug misuser does not provide objective criteria that can be implemented via a background check, limiting its practical use.²³ We excluded states with separate legal restrictions on possession of firearms by those convicted of serious offences, not technically classified as felonies, when committed by a juvenile.

Nine states—Arkansas, Idaho, Louisiana, Michigan, Mississippi, Montana, New Hampshire, Vermont and Wyoming—lacked all five types of expanded firearm disqualifications. Four additional states—Georgia, Maine, New Mexico and Wisconsin—lacked these expanded disqualifications with some exceptions. For example, New Mexico had a minimum age law stating that handgun possession is unlawful by persons <19-years-old²⁴ and Wisconsin restricted individuals convicted of a felony as a juvenile only if the offence occurred on or after 21 April 1994.²⁵ We excluded a total of 12 cases meeting these exceptions, because they were already prohibited from firearm

purchase and possession under state law. The final sample consisted of 13 states, though there were no inmates meeting our case definition in two states (New Hampshire, Wyoming; see table 1).

Measures

To determine whether offenders had a firearm while committing the crime for which they were currently incarcerated, SISCF interviewers asked, 'Did you use, carry or possess a weapon when the (...offense...) occurred?' If the answer was 'yes,' the interviewer asked, 'What kind of weapon was it?' Offenders who said they used a firearm were included in our analyses. Offenders who reported using a firearm in their current crime were asked follow-up questions, including questions about the type of gun(s) (eg, handgun, shotgun, rifle), how and where they obtained the gun, whether they fired it, and their reasons for having it.

SISCF interviewers also asked the offenders a series of questions about their prior arrests and convictions leading to probation or incarceration. Those who had been convicted and sentenced to probation or incarceration were asked about the type of offence, length of sentence, and whether they were sentenced as a juvenile or as an adult for up to 10 prior probations and 10 prior incarcerations. Offence information for juvenile convictions leading to probation and no incarceration was not collected in the SISCF.

To examine the potential for current and expanded disqualifications to curtail gun crime, we categorised offenders into the following groups based on their prior criminal convictions: (1) those who would have no firearm disqualification even under stricter state laws (described below); (2) those who were disqualified under current federal law; and (3) those who were legal firearm possessors under current federal law, but who would have been prohibited in states with stricter standards.

We further categorised offenders in the third group—those who might be impacted if the laws in their states were changed—based on whether they fell into any of the following categories: (1) age 18–20 years at incarceration for their current offence if that offence involved a handgun; (2) less than age 21 years at incarceration for their current offence if that offence involved a long gun; (3) committed a prior serious crime as a juvenile (<18-years-old); (4) conviction for a violent or firearms-related misdemeanour; (5) convictions for *two or more* drug-related misdemeanours; and (6) convictions for *two or more* alcohol-related misdemeanours. These laws were chosen because each is in effect in at least some states.¹⁹ Violent and firearm-related misdemeanours included convictions for a simple assault or a weapons offence. Drug-related misdemeanours included convictions for driving under the influence of drugs, possession or use of marijuana and unspecified drug-related offences (but did not include drug-related offences involving heroin, powder cocaine or crack cocaine which are generally felonies). Alcohol-related misdemeanours included DUI/DWI convictions or convictions for public drunkenness.

Analysis

We first calculated the proportion of offenders who would have been legally prohibited from purchasing or possessing firearms if their states had a variety of stricter laws. We then examined the method and source of firearm acquisition for offenders and calculated χ^2 statistics to identify any significant differences between offenders who were currently prohibited versus offenders who were not prohibited from purchasing and possessing firearms.

Table 1 Demographic and offence characteristics of state prison inmates incarcerated for an offence committed with a firearm in 13 states (n=253)

	n (%)
Demographic characteristics	
Sex	
Male	234 (92.5)
Female	19 (7.5)
Age when sentenced for current offence (years)	
14–17	48 (19.0)
18–20	58 (22.9)
21–24	46 (18.2)
25–29	35 (13.8)
30 and older	66 (26.1)
Race/ethnicity	
Non-Hispanic Black	169 (66.8)
Non-Hispanic White	63 (24.9)
Hispanic	9 (3.6)
Other	12 (4.7)
Education (n=251)	
Less than high school	185 (73.7)
High School or equivalent	41 (16.3)
More than high School	25 (10.0)
Marital status (n=252)	
Never married	177 (70.2)
Divorced/separated/widowed	48 (19.1)
Married	27 (10.7)
Employed in the month before incarceration (n=246)	
Full-time	129 (52.4)
Part-time/occasional	24 (9.8)
Unemployed: looking for work	32 (13.0)
Unemployed: not looking for work	61 (24.8)
State of current offence	
Arkansas	21 (8.3)
Georgia	64 (25.3)
Idaho	5 (2.0)
Louisiana	39 (15.4)
Maine	1 (0.4)
Michigan	67 (26.5)
Mississippi	27 (10.7)
Montana	5 (2.0)
New Hampshire	0 (0)
New Mexico	13 (5.1)
Vermont	1 (0.4)
Wisconsin	10 (4.0)
Wyoming	0 (0)
Current offences* †	
Violent offences	
Murder/voluntary non-vehicular manslaughter	86 (34.0)
Robbery	75 (29.6)
Aggravated assault/assault on police officer	32 (12.6)
Other violent acts	6 (2.4)
Property offences	
Burglary	6 (2.4)
Other property offences	3 (1.2)
Drug offences	
Trafficking	15 (5.9)
Possession or use	7 (2.8)
Public order offences	
Weapons offences	19 (7.5)
Parole/probation violation or contempt	2 (0.8)
Other public order offences	2 (0.8)

Continued

Table 1 Continued

	n (%)
Type of gun used in current offense‡	
Handgun	204 (80.6)
Rifle	30 (11.9)
Shotgun	25 (9.9)
Other firearm	4 (1.6)

*For inmates currently incarcerated for more than one offence, only the most serious is included here.

†All offence categories include attempted and completed offences.

‡Percentages do not sum to 100 because 10 respondents used more than one type of gun in their current offence.

RESULTS

The overall SISCf sample of 50 states included 14 499 inmates, 2046 of whom used a gun in the crime for which they were incarcerated. The distribution of the total sample of gun users was similar to the 13 states in our sample with regard to crime type, type of gun, sex, education, marital status and employment status. Our 13-state sample had a somewhat higher proportion of younger (age 14–17 years) and non-Hispanic Black offenders than for all 50 states.

Sample characteristics

Our initial sample consisted of 281 offenders who were incarcerated for offences involving firearms from the 13 states with the most lenient firearm restrictions (no stricter than existing federal law). Due to missing or insufficiently specific information about the nature of the prior convictions, 28 offenders were excluded from the analyses for a final sample of 253. The majority of the respondents came from Georgia, Louisiana, Michigan, Mississippi and New Mexico. Some of the more populous US states (eg, California, New York, Texas) were excluded from our analysis because they did not meet our legal inclusion criteria.

Three-quarters (n=190) of offenders committed their current offence (ie, the offence for which they were serving time when the interview occurred) in their state of residence. All offenders were sentenced as adults and age at sentencing for the current incarceration ranged from 14 to 55 years with a mean of 25 years. A majority of the offenders were male subjects, non-Hispanic Black, had not completed high school, were employed in the month before they were incarcerated and had never been married (table 1).

Current offences

More than three-quarters (n=199) of the offenders were serving time for a violent offence at the time of the SISCf interview. In all, 43% of these violent offenders were incarcerated for an attempted or completed murder, or voluntary non-vehicular manslaughter (table 1). The remainder of the sample was incarcerated for property, drug or public order offences (all involving firearms).

Although fewer than half (44.3%) of the offenders reported that they fired a gun while committing the current crime, most (83.4%) identified one or more other or additional reasons for possessing the gun, including using the gun to scare the victim(s) (42.7%), or for self-protection (32.4%).

Legal status for firearm possession prior to firearm offence leading to current incarceration

Inmates were categorised into three mutually-exclusive groups based on their actual or potential legal status for firearm possession (table 2). In all, 31% (n=78) of offenders would not

Table 2 Firearm prohibition status of state prison inmates incarcerated for offence committed with firearm in 13 states (n=253)

	n (%)
May possess even under stricter standards	78 (30.8)
No prior arrests or convictions and offender age \geq 21 years	28 (11.1)
Prior arrests but no convictions and offender age \geq 21 years	34 (13.4)
Prior non-disqualifying misdemeanour convictions, and no convictions for serious juvenile offence, and offender age \geq 21 years	16 (6.3)
Prohibited under current state or federal laws	102 (40.3)
Prior adult (\geq 18 years) felony conviction(s) or dishonourable discharge	69 (27.3)
Offender age <18 years at sentencing and used handgun in current offence	33 (13.0)
Would be prohibited only under stricter standards*	73 (28.9)
Handgun offender age 18–20 years at sentencing for current offence	43 (17.0)
Long gun offender age 1–20 years at sentencing for current offence	17 (6.7)
Prior conviction for serious juvenile offence	13 (5.1)
Prior conviction for firearms or violent misdemeanour	9 (3.6)
Prior conviction for 2+ drug misdemeanours	2 (0.8)
Prior conviction for 2+ alcohol misdemeanours	1 (0.4)

*These subcategories are *not* mutually exclusive.

have been disqualified from firearm possession based on prior convictions or minimum age even if their states had laws prohibiting the legal purchase and possession of firearms by persons <21-years-old, persons with a conviction for a serious juvenile offence, violent misdemeanants, and drug and alcohol misusers.

In the second group, 40% (n=102) of offenders were already prohibited from legal firearm possession under current state or federal law and, thus, would be unaffected by the implementation of the stricter firearm prohibition standards we considered.

The third group consists of 73 offenders (28.9%) who were not prohibited under current standards, but would have been prohibited if their states adopted stricter standards similar to those already in place in a number of other states. Most of this group (58.9% and 17.0% of all firearm offenders, n=43) would have been prohibited if their state had a law that raised the minimum age to possess a handgun to 21 years. An additional 17 offenders would have been prohibited if their state passed a law restricting possession to *all* firearms, including long-guns, for persons <21 years. If persons convicted of a serious crime as a juvenile were to become prohibited, it would have been illegal for 13 offenders (5.1% of all firearm offenders) to purchase or possess a firearm. Nine offenders (3.6% of all firearm offenders) would also have been disqualified if their states had prohibited persons convicted of a violent or firearms-related misdemeanour from purchasing or possessing a firearm. Two offenders would have been prohibited if states were to restrict firearm purchase and possession for those with two or more drug-related misdemeanours and one offender would be prohibited if the same restriction were applied to alcohol-related misdemeanours.

How and where criminals obtained their firearms

About eight of every 10 offenders reported using a handgun (vs rifle or shotgun) in the offence for which they were serving time. Half of the offenders reported that they had bought the gun used in the crime (table 3). The second most common method of gun acquisition—cited by fewer than one in five offenders—was borrowing or holding the gun for someone. Regardless of how they obtained the gun, friends and family members were the most common source (34.0%), followed by drug dealers or other black market sources (30.4%). Only 13.4% got the gun directly from a gun store or pawnshop where federal law requires

prospective firearm purchasers to pass a background check. It is important to recognise, however, that table 3 represents only the most recent acquisition of a specific gun: it does not indicate whether the gun *ever* passed through a particular distribution channel (eg, a gun show).

There were few differences between the groups of offenders with regard to how and where they got the gun used in their most recent offence. More than half (55.6%) of offenders for whom firearm purchase and possession was legal under current standards (adding the 45 inmates who would be legal even under stricter standards with the 39 inmates who would be prohibited only under stricter standards) bought or traded for the gun used in their most recent crime compared with two-fifths (39.2%) of offenders who were prohibited under current state or federal law ($\chi^2=6.56$; $p\leq 0.01$). Offenders who were prohibited from purchasing and possessing a gun under current law acquired their gun from a licensed dealer, where a background check would be required, five times less often than offenders who were not prohibited (3.9% vs 19.9%; $\chi^2=13.31$; $p\leq 0.001$). Similarly, nearly all (96.1%) offenders who were legally prohibited from possessing a firearm acquired their gun from a supplier not required to conduct a background check.

DISCUSSION

Our findings indicate that 40% of offenders incarcerated for committing crimes with a gun in the 13 US states with the least strict standards for legal firearm purchase and possession were in possession of the gun illegally. If these states had adopted more restrictive standards like those in place in a number of other states, an additional 29% of the persons incarcerated for committing a crime with a firearm would have been legally prohibited from possessing a firearm at the time of their current offence. The vast majority of these individuals—nearly a quarter of the entire sample of firearm offenders—would have been prohibited if the minimum legal age for possessing any type of firearm was 21 years. An additional 9.9% would have been legally prohibited from firearm possession as a result of convictions for serious crimes as a juvenile or for misdemeanours involving violence, firearms, drugs or alcohol.

Nearly one in five offenders was <18-years-old at the time they were sentenced for the current offence; 41.9% were less than age 21 when sentenced. An even greater proportion would

Table 3 Source of gun used in current offence by state prison inmates incarcerated for offence committed with firearm in 13 states, by firearm prohibition status*

	Total (n=253) N (%)	Legal even under stricter standards (n=78) n (%)	Prohibited under current state or federal law (n=102) n (%)	Would be prohibited only under stricter standards (n=73) n (%)
How gun was got				
Stole	8 (3.2)	0 (0)	4 (3.9)	4 (5.5)
Borrowed	44 (17.4)	12 (15.4)	17 (16.7)	15 (20.6)
Bought/traded	124 (49.0)	45 (57.7)	40 (39.2)	39 (53.4)
Given as gift	21 (8.3)	8 (10.3)	9 (8.8)	4 (5.5)
Other	23 (9.1)	4 (5.1)	13 (12.8)	6 (8.2)
Don't know (DK)/refused	33 (13.0)	9 (11.5)	19 (18.6)	5 (6.9)
Where gun was got				
Gun store or pawnshop	34 (13.4)	24 (30.8)	4 (3.9)	6 (8.2)
Gun show	1 (0.4)	0 (0)	0 (0)	1 (1.4)
Friend/family member	86 (34.0)	25 (32.1)	35 (34.3)	26 (35.6)
Street/black market	77 (30.4)	14 (18.0)	36 (35.3)	27 (37.0)
Burglary	1 (0.4)	0 (0)	1 (1.0)	0 (0)
Other	21 (8.3)	6 (7.7)	8 (7.8)	7 (9.6)
DK/refused/skipped†	33 (13.0)	9 (11.5)	18 (17.7)	6 (8.2)

*If inmate used more than one gun in current offence, response pertains to the most recently acquired gun.

†Respondents who refused to disclose how they got the gun were not subsequently asked where they got it.

have fallen into the <18 group if we had data on offenders' age at the time the offence occurred rather than age at incarceration. These findings underscore the importance of minimum-age restrictions for firearms possession and disqualifications for serious offences committed as juveniles, even if the duration of these disqualifications is limited.

It is also important to consider the political feasibility of any new restrictions on access to firearms. In a 1998 survey, a large majority of respondents—including the majority of gun owners—favoured laws that would restrict guns from various categories of misdemeanants including assault and battery without a lethal weapon or serious injury, driving under the influence of alcohol, and carrying a concealed weapon without a permit.²⁶ Although public support was strong for a variety of firearm laws, firearm restrictions based on criminal history may be among the most politically feasible.^{23 27} Each firearm policy considered in this study is currently law in at least some states.

Although setting appropriate standards for legal firearm ownership is important, it is equally important to make sure that databases used to screen gun purchasers and ascertain legal status for gun possession are up-to-date so that prohibited individuals can be identified. For example, juvenile convictions must be recorded in an accessible database so that they are picked up in background checks in order for prohibitions for serious offences committed as a juvenile to be useful in restricting the legal purchase and possession of firearms in this high-risk group.

Relatively few offenders purchased their guns directly from licensed firearms dealers. Only 3.9% of individuals disqualified based on current federal or state prohibitions and 3.8% who were <21-years-old at the time of their incarceration obtained their gun from a licensed firearms dealer. Presumably most, if not all, of these prohibited individuals purchased their firearm prior to becoming a prohibited person. Among individuals who appeared to be legally qualified to purchase firearms, only one in five (19.9%) obtained their firearm directly from a licensed firearm dealer, perhaps to avoid having their firearms transactions recorded and therefore traceable to the purchaser. Given offenders' preferences for new firearms,^{13 28} it is noteworthy how criminals avoid the regulated gun market of licensed sellers and prefer the largely unregulated market involving unlicensed sellers where new guns may be harder to obtain. The lack of regulation of firearm sales by unlicensed sellers is likely to

significantly limit the government's ability to keep firearms from prohibited individuals.²⁸ Requiring all gun sales to be subject to a background check, and holding sellers accountable for failure to do so, are policies that could address this problem.²⁹

To our knowledge, this is the first study to use data on gun offenders' age and criminal histories to examine the potential benefits of strengthening the criteria for legal firearm possession. Nonetheless, it is subject to several limitations. The data used in this analysis come from inmates' self-report. As such, they share the limitations inherent to all self-report data (eg, recall and social desirability bias). And although the data were drawn from a nationally-representative survey of state prison inmates, they are not necessarily representative of state prison populations. In addition, the 13 states in our sample may not have the same distribution of offenders as in all 50 states. For example, the five states with the most offenders in our sample may be more urban, on average, than the USA as a whole. We chose states for inclusion in the sample based on their laws in 2004, the year the SISCf survey took place. These laws may be different from the laws that were in effect at the time the offenders were convicted for their prior offences, though it is rare for laws prohibiting certain persons from owning guns, based on criminal history, to be repealed. Moreover, we were unable to determine whether the guns used in the current crimes were obtained in the state in which the crime was committed. This is particularly relevant for considering criteria for firearm purchase rather than possession.

The numbers of offenders with prior misdemeanour convictions are likely undercounted because we did not have status information about juveniles sentenced to probation nor did we have information about persons who were convicted but not sentenced to probation or incarceration (eg, those sentenced only to pay a fine). It is also possible (though unlikely) that some of the offenders with a prior felony had their gun rights reinstated. Finally, it is also important to remember that this is a prison population. As such, our findings may not generalise to offenders who avoid imprisonment.

However, our sample comes from a large national survey of state prison inmates and contains extensive information on their prior criminal history. In addition, we have focused on the population that is most likely to be affected by the policy changes we considered by including only offenders who used a firearm in their current offence.

What is already known on the subject

- ▶ Guns in the hands of high-risk individuals present a serious threat to public safety.
- ▶ Among high-income countries, the USA is unique in its extraordinarily high rate of firearm homicides.
- ▶ US federal law establishes minimum criteria for who may legally purchase and possess firearms; state laws vary widely in this regard.

What this study adds

- ▶ This study is the first to use data on incarcerated gun offenders' age and criminal histories to examine the potential benefits from strengthening the criteria for legal firearm possession.
- ▶ Nearly three of every 10 gun offenders in the 13 US states with the least stringent criteria for legal gun ownership would have been prohibited from purchasing or possessing a firearm when they committed their most recent offence if their states had more restrictive laws in place.
- ▶ Offenders for whom access to firearms was legal under current standards were five times more likely to have obtained their gun from a gun store or pawnshop than were offenders who were prohibited under current state or federal law.

Our findings indicate that stricter gun ownership laws in states with the lowest standards would have made firearm possession illegal for many who used a gun to commit a crime. We are uncertain about the degree to which stricter legal standards for firearm possession might deter criminal gun possession and use. But, adding barriers for the acquisition of guns by high-risk persons is an underused potential intervention.

Funding This study was funded by a grant from The Joyce Foundation. Grant no: 07-30160.

Competing interests None.

Ethics approval Ethics approval was provided by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement The study analyses data from a publically-available secondary database.

REFERENCES

1. **Centers for Disease Control and Prevention.** Web-based injury statistics Query and reporting System (WISQARS). National Center for Injury Prevention and Control, Centers for Disease Control and Prevention (producer), 2007. <http://www.cdc.gov/ncipc/wisqars> (accessed 10 Nov 2011).
2. **Richardson EG,** Hemenway D. Homicide, suicide, and unintentional firearm fatality: comparing the United States with other high-income countries, 2003. *J Trauma* 2011;**70**:238–43.
3. **18 U.S.C. §922(g).** 2011.
4. **Vernick JS,** Webster DW, Vitti KA. Law and policy approaches to keep guns away from high risk people. In: Culhane JG, ed. *Social Issues, Welfare Consequences, and Public Health Law.* New York: Cambridge University Press, 2010.
5. **Berk R,** Sherman L, Barnes G, et al. Forecasting murder within a population of probationers and parolees: a high stakes application of statistical learning. *J Roy Stat Soc* 2009;**172**:191–211.
6. **Cook PJ,** Ludwig J, Braga AA. Criminal records of homicide offenders. *JAMA* 2005;**294**:598–601.
7. **Huebner B,** Varano S, Barnes G, et al. Gangs, guns, and drugs: recidivism among serious young offenders. *Criminal Publ Pol* 2007;**6**:187–222.
8. **Lucker GW,** Holt VL, Kruzich DJ, et al. The prevalence of antisocial behavior among U.S. Army DWI offenders. *J Stud Alc* 1991;**52**:318–20.
9. **Wintemute GJ,** Drake CM, Beaumont JJ, et al. Prior misdemeanor convictions as a risk factor for later violent and firearm-related criminal activity among authorized purchasers of handguns. *JAMA* 1998;**280**:2083–7.
10. **18 U.S.C. §922(s).** 2011.
11. **Cook PJ,** Ludwig J, Venkatesh S, et al. Underground gun markets. *Econ J* 2007;**117**:F588–618.
12. **Wright JD,** Rossi PH. *Armed and Considered Dangerous. Armed and Considered Dangerous: A Survey of Felons and their Firearms.* New York: Aldine de Gruyter, 1994.
13. **Webster DW,** Freed LH, Frattaroli S, et al. How delinquent youth acquire guns: initial versus most recent gun acquisitions. *J Urban Health* 2002;**79**:60–9.
14. **U.S. Department of Justice.** Bureau of Justice Statistics, *Survey of Inmates in State and Federal Correctional Facilities, 2004.* Ann Arbor, MI: Inter-university Consortium for Political and Social Research [producer and distributor], 2007. doi:10.3886/ICPSR04572
15. **U.S. Department of Justice.** Bureau of Justice Statistics, *Survey of Inmates in State and Federal Correctional Facilities, 2004.* Codebook. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [producer and distributor]. <http://dx.doi.org/10.3886/ICPSR04572.v1>
16. **Glaze LE,** Maruschak LM. *Parents in prison and their Minor Children.* Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics, 2008. Report No.: NCJ 222984.
17. **Leigey ME,** Reed KL. A woman's life before serving life: examining the negative pre-incarceration life events of female life-sentenced inmates. *Women Crim Just* 2010;**20**:302–22.
18. **Noonan ME,** Mumola CJ. *Veterans in State and Federal Prisons, 2004. Special Report.* Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics, 2007. Report No.: NCJ 217199.
19. *Survey of State Procedures Related to Firearm Sales, Midyear 2004.* Washington, DC: National Institute of Justice, Bureau of Justice Statistics, 2005. Report No.: NCJ 209288.
20. **18 U.S.C. §922(d)(9).** 2011.
21. **18 U.S.C. §922(g)(9).** 2011.
22. **Vigdor ER,** Mercy JA. Do laws restricting access to firearms by domestic violence offenders prevent intimate partner homicide? *Eval Rev* 2006;**30**:313–46.
23. **Webster DW,** Vernick JS. Keeping firearms from drug and alcohol abusers. *Inj Prev* 2009;**15**:425–7.
24. **N.M. Stat Ann. §30-7-2.2.** 2004.
25. **Wis. Stat. §941.29.** 2004.
26. **Teret SP,** Webster DW, Vernick JS, et al. Support for new policies to regulate firearms: results of two national surveys. *N Engl J Med* 1998;**339**:813–18.
27. **Vernick JS,** Rutkow L, Webster DW, et al. Changing the constitutional landscape for firearms: the Supreme Court's recent Second Amendment decisions. *Am J Public Health* 2011;**101**:2021–6.
28. **Cook PJ,** Molliconi S, Cole TB. Regulating gun markets. *J Crim Law Criminol* 1995;**86**:59–92.
29. **Webster DW,** Vernick JS, Bulzacchelli MT. Effects of state-level firearm seller accountability policies on firearm trafficking. *J Urban Health* 2009;**86**:525–37.

GZJ ~~DKV~~'45"

Now we are back into a situation where we are considering not only that measure but S. 1 and other measures, on which as I mentioned earlier, we have had considerable testimony.

I might mention, if it isn't a violation of our meeting rules, that already this year I moved the Senator from Nebraska's bill out at a previous full Judiciary Committee meeting, and I was reminded at that time that this was an improper motion, that this subcommittee ought to have a chance to consider the legislation. Also I was reminded by the Senator from Nebraska that he hadn't placed his new bill in this year.

But I am always ready to move if need be the Senator from Nebraska's bill at any time. Hopefully we will be able, as I have mentioned previously, to report out S. 1, Amendment 90 which I strongly support, but as a last resort, the full committee might have to report the measure of the Senator from Nebraska so at least the Senate itself will have a chance to consider it.

Senator HRUSKA. So the record here will be complete, the Senator from Massachusetts well knows, and I know he would recite the fact if it occurred to him, the reason for my not introducing a bill sooner. Hearings were in progress in the House. Some of the gentlemen sitting here were testifying. Other witnesses were testifying.

It was thought well to allow those hearings to continue to a point where we could ascertain whether there would be any further need for modifying the bill in any way that I ultimately introduced. So it was not a dilatory tactic. It didn't hold us up one bit, and that I recite by way of having a full and complete record here so that there would not be any ground for suggesting maybe the Senator from Nebraska was dilatory.

Chairman DODD. Well, do you think that we can get on with the hearing?

Senator Hart, you might wish to say something.

Senator HART. Yes; I was tempted to. I think our problem is over these many months some of us have dug ourselves into positions. Politicians aren't supposed to admit that ever happens but it does. I take it that these hearings may provide an opportunity for all of us to test our own conception of these things.

Chairman DODD. Thank you very much.

Our first witness this morning is the Honorable Joseph W. Barr, accompanied by the Honorable Sheldon S. Cohen. Mr. Barr is the Under Secretary of the Treasury. Mr. Cohen is the U.S. Commissioner of Internal Revenue.

I take it that you both want to appear together.

**STATEMENT OF JOSEPH W. BARR, UNDER SECRETARY OF THE
TREASURY, ACCOMPANIED BY SHELDON S. COHEN, COMMIS-
SIONER OF INTERNAL REVENUE**

Mr. BARR. Yes, sir, Mr. Chairman.

Chairman DODD. I don't think either of these gentlemen need any introduction to the subcommittee. Mr. Barr was a former Member of Congress, Assistant to the Secretary of the Treasury, Chairman of the Federal Deposit Insurance Corporation, and has been Under Secretary of the Treasury since 1965.

Mr. Cohen is a distinguished lawyer, has practiced extensively in the District of Columbia, and before all of the courts, including the Supreme Court. He has been Commissioner of Internal Revenue since 1964.

Will you proceed with your presentation?

Mr. BARR. Thank you, Mr. Chairman.

Mr. Chairman, I might say in opening my remarks that I have listened with great interest to the colloquy which has taken place in this committee. I hope that the area of agreement that it seems to me is apparent will shine through and result in substantive action in this session of the Congress.

Mr. Chairman, I welcome the opportunity to appear before this subcommittee in support of the enactment of legislation placing additional Federal controls over the movement of firearms in interstate and foreign commerce.

Mr. Sheldon S. Cohen, the Commissioner of Internal Revenue is here with me. He will discuss in more detail the inadequacies of present interstate controls and how S. 1, Amendment No. 90, will overcome those inadequacies. He will also discuss the other bills being considered by this subcommittee. I shall cover the administration's proposal, S. 1, Amendment No. 90, in a general way.

Let me begin, if I may, Mr. Chairman, with a brief summary.

First, the main objective of this bill is to give the Federal Government control over firearms in the areas of interstate and foreign commerce where State governments have no powers. The bill is to be cited as the "State Firearms Control Assistance Act of 1967".

Second, we view this legislation as part of a joint Federal-State effort to bring about a needed improvement in the Nation's system of firearms regulation.

Third, the legislation we are proposing is in the spirit of creative federalism that pervades President Johnson's March 17 message to Congress on "The Quality of American Government," in which the President said:

Today the Federal system rests on an interlocking network of new relationships and new partnerships among all levels of government.

Administration of programs which are the joint responsibility of Federal, state, and local governments should be strengthened.

It is against that background, Mr. Chairman, that I offer the following observations:

The bill before you would repeal the Federal Firearms Act now codified as chapter 18 of title 15, United States Code, and would substitute a new and improved system of Federal regulation of interstate and foreign commerce in firearms under title 18, United States Code. The Treasury Department would retain the responsibility of administering these regulatory controls.

S. 1, Amendment No. 90, implements legislative recommendations which the President set forth in his message to the Congress of February 6, 1967. It would put substantially into effect the legislative program for Federal regulation of traffic in firearms strongly urged by the President's Commission on Law Enforcement and Administration of Justice in its February 1967 report titled "The Challenge of Crime in a Free Society."

This distinguished group of citizens, headed by Under Secretary of State Nicholas Katzenbach, our former Attorney General, included

among its members nationally recognized leaders in the judiciary and in the fields of law, law enforcement, penology, and local government.

The Commission's study found agreement among police administrators of major cities that easy accessibility of firearms is a serious law enforcement problem. The Commission found that State and local laws intended to control traffic in firearms tend to be nullified by the fact that firearms are too often available in neighboring jurisdictions under less restrictive legislation, or free from any regulation.

Accordingly, the Commission favored both the enactment by the States of laws prohibiting acquisition and possession of firearms by certain classes of persons who might be inclined to use them for criminal purposes, and the enactment of Federal legislation that would complement State and local laws and assist State and local governments in achieving their goals.

The administration's proposal before you for consideration is designed to reflect the Commission's recommendations. I should like now to state briefly my understanding of what it would do and, in order to eliminate misconceptions, what it would not do.

Among other things, S. 1, Amendment No. 90, would:

(1) Channel interstate and foreign commerce in firearms through federally licensed importers, manufacturers, and dealers—thereby prohibiting the commercial mail-order traffic in firearms—although licensees could ship interstate to nonlicensed persons rifles and shotguns lawfully purchased in person at the licensee's place of business and which the consignee could lawfully receive and possess at his place of residence;

(2) Prohibit sales of firearms by Federal licensees to persons under 21 years of age, except that sales of sporting rifles and shotguns could continue to be made to persons of at least 18 years of age;

(3) Permit a Federal licensee to sell a firearm—other than a rifle or shotgun—only to persons who are residents of the State where the licensee is doing business;

(4) Curb the flow into the United States of surplus military weapons and other firearms not suitable for sporting purposes;

(5) Bring under effective Federal control the importation and interstate shipment of large caliber weapons such as bazookas and antitank guns, and other destructive devices;

(6) Provide for a licensing system with meaningful standards and annual fees somewhat higher than those now applicable under the Federal Firearms Act, so as to assure that licenses will be issued only to responsible persons actually engaging in business as importers, manufacturers, and dealers. The dealer's first year annual fee, set at a figure higher than the standard fee, would be available to help defray the cost of applicant investigations;

(7) Prohibit a nonlicensee from transporting into or receiving in his State of residence a firearm—other than a shotgun or rifle—purchased outside that State, or a rifle or shotgun which it would be unlawful for him to purchase or possess in that State or political subdivision thereof;

(8) Provide for adequate recordkeeping by licensees—to include data identifying purchasers—and for authority to furnish record information to State and local law enforcement authorities; and

(9) Retain the penalties now provided in the Federal Firearms Act for interstate transportation of firearms to or by felons and the inter-

state transportation of firearms which have been stolen or had their identifying number removed; and in addition would punish interstate transportation of a firearm with intent to commit a felony therewith.

S. 1, Amendment No. 90, is not in any sense "antigun" legislation:

(1) The bill would not outlaw possession or use of firearms by law-abiding citizens.

(2) No requirement of this bill would be violative of the second amendment to the Constitution. Those opposed to firearms controls have created a misconception of this constitutional provision by referring only to the phrase that "the right of the people to keep and bear arms shall not be infringed."

However, the complete amendment must be considered to determine the right granted to whom. This amendment was not adopted with individual rights in mind but rather was considered a protection to the militia of the various States. The Attorney General submitted a memorandum on this point at hearings before Subcommittee No. 5 of the House Judiciary Committee on the anticrime program. H.R. 538, a bill identical to S. 1, Amendment No. 90, is a part of the program. He also submitted a memorandum on the point to this subcommittee on May 19, 1965, at your hearing on firearms legislation.

(3) The bill would not prohibit the acquisition of firearms for sporting purposes, or for any other legitimate use. Sportsmen will continue to be able to obtain firearms although under the bill they would need to procure them from local licensed dealers and manufacturers and thus be subject to the requirements of their respective State and local laws.

Indeed, they can travel to another State and purchase a rifle or shotgun from a licensed dealer there and bring it home with them without interference if the purchaser's State and local law does not forbid the purchase and possession of such a firearm.

Only two minor restraints are laid upon the sportsmen of this country. They will not be able to travel to another State and purchase a pistol or concealable weapon, and they will not be able to obtain a mail-order shipment from another State of a rifle or shotgun, unless they made the purchase in person and the purchase and possession is legal in their home State and locality.

Such minor inconveniences cannot be avoided if the legislation is to make it possible for the States to regulate effectively the acquisition and possession of firearms. Obviously, State authorities cannot control acquisition and possession of firearms if they have no way of knowing or ascertaining what firearms are coming into their States through the mails or, in the case of concealed weapons, by personally being carried across State lines.

(4) The bill would not interfere with interstate transportation of firearms by the ordinary citizen hunter, marksman, or householder. Neither would it preclude the interstate shipment of a gun to a licensee for adjustment or repairs, nor the return or replacement of such a gun by the licensee.

(5) The bill would not prohibit possession or use of firearms by those too young to purchase them. It is recognized that some parents may wish their minor children, who are sufficiently mature to be entrusted with them, to enjoy the use of firearms for recreational purposes.

(6) The restriction on imports would not preclude the importation of all surplus military rifles. Some of these weapons are suitable for or readily adaptable to use in hunting and could be brought in for that purpose.

(7) The bill would not interfere with activities of collectors of antique firearms. "Antique firearms," as defined in the bill, are not subject to the bill's controls since they are specifically excluded from the definition of "firearm."

As I have already indicated, the major purpose of the bill is to institute Federal controls in areas where the Federal Government can and should operate, and where the State governments cannot, the areas of interstate and foreign commerce. Under our Federal constitutional system, the responsibility for maintaining public health and safety is left to the State governments under their police powers.

Basically, it is the province of the State governments to determine the conditions under which their citizens may acquire and use firearms. I would emphasize that it is one of the important objectives of this legislation to strengthen and make more effective the exercise of the powers of the State—and local—governments to regulate the sale of firearms in the public interest.

I expect this Federal legislation to inspire more adequate State and local legislation—and to make that more adequate non-Federal regulation enforceable where it is now all too easy to evade and will always be easy to evade in the absence of such Federal regulatory controls as S. 1, Amendment No. 90, sets up.

The bill would correct serious weaknesses of the existing Federal Firearms Act concerned with licensing and recordkeeping. Under existing law, anyone other than a felon can, upon the mere allegation that he is a dealer, and open payment of a fee of \$1, obtain a license. Some 104,000 dealer licenses were outstanding as of January 1, 1967. Approximately 25 percent of these were held by people not actually engaged in business.

The reason is that licenses put these people in a position to obtain personal guns at wholesale or to avoid laws that prohibit mail shipment of concealable weapons and prohibit shipment into States that require purchase permits. This is a wide open situation in which licenses can be obtained by irresponsible elements, thus facilitating the acquisition of weapons by criminals and other undesirables.

The bill before you, by increasing license fees and imposing standards for obtaining licenses, will go a long way toward rectifying this situation. Commissioner Cohen, whose organization is responsible for the administration of the Federal Firearms Act, will discuss this aspect in more detail. He will also supply facts and figures illustrating the problems encountered in enforcing existing law because of incomplete or inaccurate licensee records, and the need for more effective record-keeping requirements.

This bill cannot, of itself, eliminate crime. However, let us not lose sight of the fact, stated by the President in his February 6 message to the Congress, that—

Any effective crime control program requires the enactment of firearms legislation . . . This legislation is no panacea for the danger of human irrationality and violence in our society. But it will help to keep lethal weapons out of the wrong hands.

Today, the people of the United States are living under the most nearly ideal conditions ever achieved by any society. Yet, their peace of mind and security is threatened by the spreading cancer of crime and juvenile delinquency. It is absolutely essential that steps such as those proposed in this bill be taken to bring under control one of the main elements in the spread of this cancer, the indiscriminate acquisition of the weapons most frequently utilized in crimes of violence.

Right now, any person can acquire firearms with ease. This includes criminals, juveniles without the knowledge or consent of their parents or guardians, narcotic addicts, mental defectives, armed groups who would supplant duly constituted public authorities, and others whose possession of firearms is similarly contrary to the public interest. This situation is clearly intolerable.

Mr. Chairman, I don't know if it has been brought to your attention, but here is one mail-order gun advertisement from the *Shotgun News*. The title says, "Long Hot Summer," and I would call to your attention that the first item listed is "available only from Agramonte, a .45-caliber, 30-shot, semiautomatic, completely legal gun."

Here it is. If that is for sporting purposes, this is not the sporting gun that I grew up with in southern Indiana as a farm boy, Mr. Chairman.

Senator KENNEDY. I ask that that be made part of the record.

Chairman DODD. Yes, without objection, that will be done.

(The document referred to was marked "Exhibit No. 7," and is as follows:)

LONG HOT SUMMER SPECIAL

AVAILABLE AGAIN! ONLY FROM AGRAMONTE

45 CAL.
30-Shot
Semi-
Automatic
Completely
Legal



Eagle Carbine

IMMEDIATE DELIVERY

\$99⁹⁵

DEALER INQUIRIES INVITED

**12 GAUGE
6 SHOT**

**MOSSBERG
RIOT GUN**

SPECIAL \$64.95

Attention Military Collectors!
DANISH MADSEN 30-06

BRAND NEW
Original Barrels Only \$4.00
Exclusive with Agramonte

UNFIRED
30/06 cal. Bolt Action, Built-In
Muzzle Brake, Recoil Pad!
\$54.00
With Columbian Crest \$59.00

ONLY 2000 MADE

**THE FABULOUS TEXAN
M II A**

**12 GAUGE
5 SHOT**

**HI STANDARD
RIOT GUN**

SPECIAL \$69.95

F.N. MODEL 1949 SEMI-AUTOMATIC RIFLES

Made in Belgium. Gas operated. NRA Gold
Star. American, National Rifle Co.
of Paris.

NRA Excellent

With the UN in Korea. The fastest shot near as semi-automatic. Multiple
fire - the first ever designed. In standard, semi, cyclic, 22. integrated, variable, 200
yards. 17.5" Original Barrels with telescopic sight. Original Weaver scope \$110

\$59.50

\$69.50

12 or 20 GAUGE

Complete Including Primer Feed
List ~~\$24.50~~

EXTRA SPECIAL

\$139⁵⁰

CONVERSION KIT

12 or 20, \$18.50

**U.S. ARMY
M1917!
Back Again!**

CAL. 30 '06

NRA
GOOD

ONLY \$27

Scarcely hard to find. The strongest
bullet in the world ever made.
Perfect for magnum or
wildcat conversions. NRA
VERY GOOD only \$3.00
more. Order yours today!
Leather sling \$1.00.

**GENUINE ORIGINAL
U.S. M1
CARBINES!**

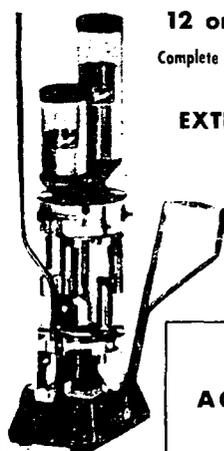
NRA
GOOD

ONLY \$56

Authentic GI production
—Original forged steel
receivers. Rigged ex-
pendability and light
weight. Additional 150
magazines only \$1.00.

ACCESSORIES INCLUDED FREE!

1. Leather sling, already made.
2. 100 rounds of .30 M1
ammunition. 3. Cleaning rod.



**ED
AGRAMONTE**

41 Riverdale
YONKERS, N.Y.

30/06 NC BALL --- \$49⁵⁰ per 1000

Mr. BARR. The Treasury Department's experience with the Federal Firearms Act has resulted in a feeling of frustration since the controls provided by it are so inadequate. The drafters of S. 1, Amendment No. 90, had in mind these inadequacies and have, I believe, designed a bill which, when enacted, will provide effective regulation while presenting a minimum of inconvenience to the law-abiding citizen in the acquisition, ownership, and use of firearms for legitimate purposes. These light restraints are surely a small price to be borne by sportsmen gun owners when weighed against the potential benefits to the citizenry generally.

There are indications that those opposed to additional firearms regulation will assert that the present Federal statutes controlling firearms are adequate, but that these statutes are not adequately enforced. Thus, it will be inferred that any present deficiencies in firearms controls result not from lack of statutory authority, but from lack of proper enforcement.

Let me remind you that the Attorney General has stated that existing Federal firearms laws are largely ineffective and inadequate. Within these recognized limitations, I can assure you that the Treasury Department has vigorously enforced the provisions of the present National Firearms Act and Federal Firearms Act. Commissioner Cohen will offer statistics covering some aspects of the firearms enforcement program.

This subcommittee also has under consideration another bill, S. 1853, introduced by Senator Hruska, which would amend the Federal Firearms Act. In addition, S. 1854, a bill to amend the National Firearms Act, is being considered. The Treasury Department expressed its views on S. 1853 and S. 1854 in letters to this committee from the General Counsel. Briefly, the Department expressed itself as favoring S. 1, Amendment No. 90. I again urge the enactment of that bill.

As the President so aptly stated :

To pass strict firearms control laws at every level of government is an act of simple prudence and a measure of a civilized society. Further delay is unconscionable.

I would like to echo those phrases, Mr. Chairman, and my final statement is to repeat the hope that I expressed at the beginning of my testimony, that this committee will see fit to bring to the floor of the Senate legislation embodying at least some of these principles.

Chairman DODD. Thank you. We all thank you very much, Mr. Barr, for a very, very informative statement. I suggest that we hear Commissioner Sheldon Cohen now, and we can question Mr. Barr after Mr. Cohen's statement.

Mr. COHEN. Thank you, Mr. Chairman. I am likewise grateful for this opportunity to express my views on the four gun control bills your subcommittee has under consideration. I have a direct interest in these proposals since the Internal Revenue Service administers the National Firearms Act and the Federal Firearms Act, both of which would be affected by the bills being considered by this subcommittee.

One of the bills, S. 1854, which I will discuss later, would amend the National Firearms Act. That act, now found in the Internal Revenue Code, was enacted in 1934 to provide strict controls over what were

known then as gangster-type weapons. Based on the Federal taxing power, that act imposes taxes on certain occupations and transactions involving these weapons.

In addition, it requires Federal registration of all weapons, such as machineguns and sawed-off shotguns, coming within the purview of the act. The principal effect of S. 1854 would be to bring large caliber military-type weapons and grenades, bombs, et cetera, under the coverage of the National Firearms Act.

The other bills before you are intended to effect improvements in existing controls over interstate and foreign commerce in firearms—another area where the need for additional legislation is generally recognized. These control measures are now found in the Federal Firearms Act which was originally enacted in 1938 and which is codified in title 15, United States Code.

S. 1 and S. 1853 would strengthen the Federal Firearms Act by amendment. S. 1—Amendment No. 90 would repeal the act and replace it with improved controls, over interstate and foreign commerce in firearms, in title 18, United States Code.

Mr. Chairman, I know that you and the members of your subcommittee are deeply concerned over the serious crime problem which confronts the Nation, particularly as it relates to young people. I am also sure you will agree that the easy availability of firearms to juvenile offenders, professional criminals, and to others who would use them unlawfully, is a significant factor in our increasing crime rate and that more effective controls over firearm transactions would help to check that alarming increase.

Even those who strongly oppose, as too restrictive, certain of the measures before you today admit that firearm controls more effective than those presently in force are desirable if not imperative. Indeed, I feel that it is generally recognized by all who have considered this problem, that additional Federal firearms control will strike a telling blow at one of the roots of crime.

There is disagreement only as to the extent to which controls should go and at what level of Government they should be imposed. Some say they favor controls which would reduce criminal use of firearms, but strongly oppose any restraint whatever which would be applicable to the law-abiding citizen. Such controls, I feel, are punitive rather preventive and, thus, would strike the branches of the criminal problem rather than the roots.

Some maintain that no additional Federal controls are necessary and that only State and local controls, as suitable to the indigenous population, should be employed.

Others recognize that any operable controls, to effectively reduce availability of firearms to persons inclined to misuse them, must inevitably result in occasional relatively minor inconvenience to responsible citizens acquiring guns for lawful purposes and consider this a small price to pay for the public benefit derived. They also realize that State and local controls cannot be fully effective in the absence of supplemental Federal controls.

The primary responsibility for gun controls rests with State and local governments in the exercise of their police powers. In general, they should determine, as suitable to their own jurisdictions, who is entitled to possess firearms, under what circumstances firearms may

be carried, where and for what purpose they may be used. Every one of the 50 States and the District of Columbia have laws imposing controls, in some degree, over firearms.

However, the wide disparity in controls adopted by the States is in itself a major problem of law enforcement in particular States. Strict controls over acquisition or possession adopted by one jurisdiction may be nullified if its citizens can frustrate control laws by purchase of firearms through the mail or by crossing State lines. Even the States with the most lenient controls are unable to enforce laws which would prevent criminals, minors, or mental defectives from obtaining guns, since these laws are without effect beyond their borders and since mail-order and out-of-State purchase sources are available to all.

Uniform State laws would go far toward solving these problems. I would heartily endorse a move in this direction. However, if there is one thing I have learned about firearms, it is that any legislation to control them will be resisted. We cannot wait for the millennium and agreement by 50 States on laws regulating firearms. It is a fact of life that crimes of violence involving firearms are increasing. It is also a fact that under existing laws, State and Federal, it is a simple matter for criminals, or others who might misuse them, to acquire firearms through ordinary retail sources.

It is my firm conviction that the support of the Federal Government should be available to all States and political subdivisions in the enforcement of their laws pertaining to firearms. This applies to the State or locality which has a minimum of control, as well as to the State or locality with strict controls, such as those requiring a license to possess a pistol or a revolver.

The Federal Government, and only the Federal Government, with its constitutional power to regulate interstate and foreign commerce, has the capability of filling in serious gaps which thwart the effectiveness of various State and local controls.

Since firearm controls imposed by State and local governments are relatively ineffective because they cannot reach interstate transactions and since, under the Constitution, only the Federal Government has jurisdiction over interstate and foreign commerce, the Federal Government is obligated to exercise its authority in this area to give adequate support to the State and local governments in their efforts to regulate traffic in firearms within their borders.

On the basis of past experience, we, in the Internal Revenue Service, do not believe that this can be done under existing law. At the time the Federal Firearms Act was enacted in 1938, it was designed primarily to curb traffic in firearms to and by the criminal element. There was no significant attempt made to directly assist State and local governments in enforcing their gun controls. The only provision directed toward this end is found at section 2(c).

Section 2(c) of the Federal Firearms Act makes it unlawful for a person licensed under the act to ship firearms in interstate commerce to a person, other than a licensee, in a State, the laws of which require a permit to purchase a firearm, unless such permit is exhibited to the selling licensee. This law has some benefit for those eight States which require permits to purchase certain types of firearms. It is of no aid whatever to local jurisdictions requiring a permit or to other States which may impose other restrictions on the purchase and possession of

firearms within their jurisdictional boundaries. Furthermore, it is of no effect with respect to purchases made over the counter in a neighboring State in contravention of the purchaser's home State laws.

Other control provisions of the Federal Firearms Act are based solely on interstate transportation and impose no duty with respect to the sales transactions. There is a general impression among some persons, who suggest that the present Federal Firearms Act supplies all needed statutory controls, that dealers licensed under the act are prohibited from selling firearms to convicted criminals.

This is not the case, as there is nothing in the act which definitely precludes a dealer in, say, Maryland, from selling a pistol to a convicted felon from New Jersey, who could then transport the weapon back to his home State.

It is true that the New Jersey felon would have violated the provision under section 2(e) which makes it unlawful for any person who has been convicted of a crime punishable by imprisonment for a term exceeding 1 year to transport a firearm in interstate commerce. However, unless the felon is apprehended in the act of so transporting or is subsequently found in New Jersey with the weapon in his possession, proof of the offense is extremely difficult even though the dealer's records show the Maryland sale to a New Jersey resident.

In this regard, I would call to your attention the fact that a provision in section 2(f) of the act which might have been helpful in proving transportation is no longer valid.

Section 2(f) of the Federal Firearms Act makes it unlawful for a convicted felon or a fugitive from justice to receive any firearm or ammunition which has been shipped or transported in interstate or foreign commerce. The law also provides that the possession of a firearm or ammunition by such a person shall be presumptive evidence that such firearm or ammunition was so shipped, transported, or received by such person.

The Supreme Court declared this presumption unconstitutional in a 1943 case, *Tot v. United States*, 319 U.S. 463. Consequently, in order to establish a violation of this statute, it is necessary to prove that a convicted felon found in possession of a firearm actually received it in the course of an interstate shipment.

The problem which has most thwarted the effectiveness of State and local controls is the interstate movement of firearms through mail-order purchase and over-the-counter purchase by out-of-State residents. The pivotal problem with regard to mail-order traffic as it exists today is that neither the State nor city into which the firearm is shipped has any practical way of exercising any effective control over the importer, manufacturer, or dealer who sells the firearm and ships it in from another State.

Further, in transactions of this nature, the record of disposition to the purchaser is not maintained in the State where the purchaser resides; but in the files at the seller's premises, which may be thousands of miles away. Thus, it is of very little value for State and local law enforcement purposes. In addition, such sales are accomplished with no effective determination of the identity of the unseen purchaser.

The other major loophole in State enforcement of firearms laws involves purchase across State lines. It is well known among law en-

forcement officers that the crossing of State lines to avoid State law in the acquisition of firearms is common practice.

During the first 9 months of the fiscal year 1967, our Alcohol and Tobacco Tax Division made 24,944 inspections of firearms dealers. From the records of these licensees, 21,137 sales to out-of-State purchasers, primarily of handguns, were selected for criminal record search. Criminal record checks were actually made on only 18,670 of these names, after eliminating those obviously unidentifiable on the basis of information available.

Of this number, it was positively established that 676 had criminal records. No doubt many others making out-of-State purchases were also felons, who did not identify themselves, or who gave fictitious names or addresses, as did a known 474 of those checked. The records do not show how many of these purchasers may have been juveniles, aliens, or mental incompetents who traveled to another jurisdiction to purchase, or were purchasers seeking to circumvent waiting periods and local police notification requirements.

It has been found by investigators that many Federal Firearms Act dealers, while apparently technically complying with existing requirements, record fictitious or incomplete names and addresses. Such misleading information is supplied by purchasers desirous of concealing a criminal record or a status making them ineligible under their own State or local law to buy a gun.

Special surveys undertaken by the Alcohol and Tobacco Tax Division clearly reveal the frustration of strict State gun laws by out-of-State purchase. The State of Massachusetts requires a permit to purchase a handgun. It was determined from police records in Massachusetts that over 86 percent of weapons used in murders and holdups had been purchased in the States of Maine and New Hampshire, and particularly in those counties that are a short driving distance from Massachusetts. Maine and New Hampshire have no permit requirement.

Missouri State law also requires a permit to purchase a concealable weapon. It was found that during the period February 1966 to February 1967 approximately 5,000 persons who gave a residence address in the city or county of St. Louis, Mo., purchased firearms—primarily handguns—in the neighboring State of Illinois which has no permit requirement. Approximately 200 of these purchasers were determined to have records of felony convictions.

During the year ending with February 1967, residents of New York, which has stringent gun controls, received 1,110 firearms from out of State. In the Reno, Nev., area, where controls are lax, it was found that 760 firearms were purchased there by residents from other States during the 6 months ended December 31, 1966. Of the purchasers, 46 resided in California; 35 of the 46 had felony records.

Detroit, Mich., also has a serious problem enforcing its rather strict firearms laws. Dealers in nearby Toledo, Ohio, brazenly advertise "No Permit Required" to buy guns and some estimate that 90 percent of their customers are from Michigan, principally Detroit.

An Ohio-Michigan Gun Committee, established by border counties most concerned with this gun traffic, is attempting to take corrective steps. They have expressed an urgent need for more complete and accurate information with respect to these interstate purchasers. Pro-

visions, such as those in S. 1 and S. 1, Amendment No. 90, which contemplate that licensees will identify purchasers and accurately record pertinent information, would provide the type of assistance sought.

Even though our Alcohol and Tobacco Tax Division applies a significant portion of its manpower to inspect Federal Firearms Act licensees and investigate alleged offenses under the two Firearms Acts, little can be done to curb transactions which may involve infractions of State and local firearms laws.

By laborious checking of dealer records and referral to criminal identification files, information indicating possible violations of the act may be found. We do refer cases to the U.S. attorney for prosecution where there is sufficient evidence to prove all elements of an offense under the act and we do provide information to State and local law-enforcement authorities on offenses of interest to them—some 10,000 last year, I might say. However, without Federal laws which are especially designed to stop firearms traffic which circumvents State and local law, we can do little of a preventive nature in their support.

The truth of the matter is that the present Federal Firearms Act is not designed to support State and local controls. While it may be helpful in some limited areas, it could never supply effective support regardless of the manpower devoted to its enforcement. For this reason, we do not favor the piecemeal approach of S. 1853, which offers some improving changes to the Federal Firearms Act but which retains its major faults—such faults as failure to provide licensing standards, inadequate provision for records to be kept by licensees, lack of import controls, and failure to include controls over essentially military-type weapons.

The most significant breakthrough offered by S. 1853, which would provide some assistance in State and local enforcement of gun laws, is its proposal to institute an affidavit and notice procedure with respect to sale, to nonresidents of the seller's State, of handguns either by mail order or over the counter.

This provision, intended to curb irresponsible sale of handguns to juveniles and persons ineligible to buy or possess such guns in their home State, is commendable in purpose. It is somewhat cumbersome, however, imposing burdens on both buyer and seller.

Furthermore, since it is applicable only to handguns, it is of no help to States and cities which may prohibit possession of machineguns by ordinary citizens or sale of rifles or shotguns to or possession of such guns by mental incompetents, drunkards, young people, or aliens. Such laws also deserve Federal implementation.

In contrast to the relatively ineffective device of the Federal Firearms Act and S. 1853, basing controls directly on shipment or transportation, S. 1 and S. 1, Amendment No. 90, adopts a new approach for their major controls. Since the persons being federally licensed in the firearms business are engaging in interstate and foreign commerce, their firearms business activities may be federally regulated.

By imposing requirements on firearms dealers with respect to the retail sale of firearms, preventive effects are achieved more directly and effectively.

These bills would provide that licensees may not sell guns to persons who are of immature years, to persons precluded by State and local

law from receiving or possession of firearms, and to convicted felons or fugitives from justice. In addition, these licensees may not sell to persons who are not residents of the seller's State—except that special provision is made for sale of rifles or shotguns to nonresidents.

S. 1, Amendment No. 90, by prohibiting interstate commercial transportation of firearms, other than between licensees, also effectively curbs retail mail-order traffic in firearms. S. 1 adopts the same approach with respect to all but long guns and provides an affidavit and notice procedure with respect to these. These provisions would not prevent private individuals from transporting their personal weapons and an exception is made in S. 1, Amendment No. 90, with respect to the interstate shipment by licensees to nonlicensees of rifles or shotguns where the consignee is not precluded by his State or local laws from receiving or possessing a rifle or shotgun.

These S. 1 and S. 1, Amendment No. 90 controls achievement all of the intended effect of the affidavit and notice procedure of S. 1853 plus much more. They support State and local law by curbing interstate mail-order traffic and by restricting sales to out-of-State residents.

These controls, we feel, could be effectively administered, without significant increase in personnel allocated to firearms law enforcement. Such controls would give the State and local authorities assurance that felons, mental defectives, juveniles, and others disqualified from purchasing or possessing firearms at home may not obtain such weapons by mail order or by crossing State lines to purchase.

In order to assure the effectiveness of the dealer requirements on out-of-State sales, S. 1, Amendment No. 90, also imposes restrictions with respect to interstate private sales or purchases. These requirements prohibit the sale by a nonlicensee of a firearm—other than a shotgun or rifle—outside the seller's State of residence. They also prohibit a purchaser from transporting into or receiving in his State of residence a firearm—other than a shotgun or rifle—purchased outside that State, or a rifle or a shotgun which it would be unlawful for him to purchase or possess in his home State, county, or city.

These restrictions are necessary in order to give full support to the State and local authorities in the implementation of their own control measures. Any minor inconvenience to private individuals would be more than offset by the benefits to their communities. It should also be pointed out that the private transactions described could be consummated through licensed dealers, subject only to the standard requirements with respect to dealer transactions. There is much to be said for the channeling of all interstate transactions through Federal licensees in order to provide maximum assistance for State and local enforcement of firearms laws.

As previously suggested, S. 1953 would preserve a major fault of existing law by failing to prescribe standards for issuing required licenses. Dealers licensed under the Federal Firearms Act pay an annual fee of only \$1 and, because of the failure of the law to set any meaningful standards, many persons not actually engaged in business obtain dealer licenses. The lack of such standards would be a particularly significant problem if S. 1853 were enacted since, under the bill, some of its major controls provide exemptions for licensees—for example, the affidavit requirement.

The law now provides that upon payment of the prescribed fee, the Secretary shall issue a license to the applicant which shall entitle the licensee to transport, ship, or receive firearms or ammunition in interstate or foreign commerce. There are no stated conditions to the issuing of the license, except the provisions for the payment of the prescribed fee, and no discretion to withhold issuance is granted under the language of the law. All the applicant need do is to allege that he is engaged, or intends to engage, in the firearms business and pay the prescribed fee.

On the basis of dealer inspections made, we estimate that 25 percent of the 104,087 Federal Firearms Act licenses issued during 1966 went to persons not actually engaging in the licensed activity. Some misrepresented themselves to buy personal guns at dealer prices. Others sought to avoid the prohibition, in section 2(c) of the act, against interstate shipment to a buyer not exhibiting a purchase permit where one is required by State law, or to circumvent the provision in section 1715 of title 18, United States Code, which prohibits the mailing of concealable firearms.

In this regard, our investigators have discovered that some mail-orders return prospective purchase orders for hand-guns with the suggestion that the purchaser obtain a Federal Firearms Act license. They point out that if the buyer qualifies as a dealer, at a cost of \$1, the gun can be forwarded more conveniently, and economically, by mail.

Any additional controls over the interstate movement of firearms would make a license even more attractive if the licensee is exempt from such controls.

We have, under existing law, refused to issue licenses to felons, persons under indictment for a felony, and fugitives from justice. We have done this on the ground that the issuance of a license to such persons would serve no purpose, since by reason of section 2 of the act it would be unlawful for them to ship or receive firearms in interstate commerce. Ordinarily, there is no other basis for denying a license even though it may seem obvious that the applicant is not a proper person to be dealing in firearms.

The customary practice is to provide standards for the issuance of licenses or permits or at least to grant some discretion to the person who has the responsibility for acting on the application. A proper and reasonable standard for the issuance of a license is the standard as to whether the applicant would be likely to conduct his operations in compliance with law. This standard, which has been adopted in S. 1 and S. 1, Amendment No. 90, has been successfully used in connection with permits issued in the liquor and tobacco tax area.

I strongly recommend that you impose meaningful conditions which applicants must comply with so that this Federal licensing system will afford realistic controls. As further encouragement to limit licensing to persons actually engaging in the firearms business and to provide funds for administration of the program, I also urge increase in license fees as proposed in S. 1853, S. 1 and S. 1, Amendment No. 90.

At this point, I would like to observe that S. 1 and S. 1, Amendment No. 90 would adequately protect applicants from any arbitrary or unreasonable denials. A specific provision would afford applicants the right to a hearing in the event adverse action was contemplated.

Another problem area which existing law and S. 1853 ignore, is that concerned with the mass importation of firearms from foreign countries. This problem can be met only at the Federal level.

It is not true, as some people suggest, that adequate control over firearms imports can be effected under the Mutual Security Act of 1954. That law is concerned with importation and exportation of firearms from the viewpoint of international relations. As the National Crime Commission stated in its February 1967 report:

The limited statutory framework within which the State Department must operate prevents any effective control over the importation of firearms. If the import in question does not involve machine guns, sawed-off shotguns, or the other weapons covered by the 1934 National Firearms Act, each transaction is approved routinely, as long as the dealer is a bona fide businessman engaged in a bona fide business transaction.

S. 1 and S. 1, Amendment No. 90 are designed to curb this importation of military surplus weapons and other firearms not particularly suitable for target shooting, hunting, or any other lawful purpose. These bills would not, however, preclude the importation of military surplus rifles or shotguns which were suitable or adaptable to use for sporting purposes.

We are particularly concerned with the influx of relatively inexpensive .22-caliber pistols and revolvers which have plagued the law enforcement officers of our metropolitan areas. Many of these imports are of poor quality and are as dangerous to the user as they may be to the person who is often threatened or assaulted with them. This view is shared by officials of the National Rifle Association, as indicated by remarks of Mr. Orth, executive vice president of that association, in his statement before your subcommittee on May 21, 1965.

I would like to make it clear that the provisions of S. 1 and S. 1 Amendment No. 90, relating to the importation of firearms, are intended to exclude surplus military firearms—other than rifles or shotguns—and other firearms which are not suitable for lawful sporting purposes. The bills would not, and I emphasize “would not,” preclude the importation of good quality sporting-type firearms or of military surplus rifles or shotguns particularly suitable for or adaptable to sporting use.

Another major problem in firearms control concerns the interstate shipment and disposition of highly destructive, large-caliber weapons, such as bazookas and antitank guns, and destructive devices such as grenades, bombs, missiles, and rockets. The lack of controls over the traffic in these highly destructive weapons is a matter of great concern to law enforcement officers.

I would also like to observe that the National Rifle Association has recognized the need for action in this area and that in their April 3, 1965, statement at the annual meeting, the National Rifle Association declared:

That it would support properly drawn legislation to outlaw dangerous devices such as bazookas, bombs, antitank guns, and other military-type weapons that have found their way into trade channels across America.

The administration's bill would place strict controls over the importation, interstate shipment, and disposition of these highly destructive weapons and of ammunition for use in destructive devices.

The sponsors of S. 1853 have suggested that these “destructive devices,” being inherently dangerous and serving no valid civilian pur-

pose, should not be classed with guns commonly used in recreational activities. They would place these "devices" under the strict controls of the National Firearms Act—now applicable to machineguns and sawed-off shotguns—but relieve them from the interstate and foreign commerce controls of the Federal Firearms Act.

This attitude seems to reflect a misunderstanding as to the purpose and operating effect of these two major Federal firearms control measures. It is true that the national act is designed to provide strict controls over the more vicious types of firearms, generally unsuitable for lawful civilian use. These controls are not exclusive, however, and any weapon—including national act weapons—coming within the definition of "firearm" as provided in the Federal Firearms Act is also subject to all pertinent controls of that act.

We can see no reason why a "social stigma" dividing line should be drawn and would strongly oppose any attempt to relieve National Firearms Act weapons from the operation of controls based on interstate and foreign commerce. The National Firearms Act relies on the power of the Federal Government to tax. Without the present Federal Firearms Act or similar controls, a racketeer who paid the \$200 transfer tax could acquire a machinegun or sawed-off shotgun and could receive and transport it interstate without violating Federal law. We need the controls of both acts over these present national act weapons and over the "destructive devices" which S. 1854 would bring under that act's control.

Illustrative of this point is the case of a west coast resident and his wife who were arrested in April 1967 on warrants charging violations of both the National Firearms Act and the Federal Firearms Act. Various seizures made at that time and in connection with subsequent arrests of the wife have included some 45 National Firearms Act weapons, of which 29 were machineguns—19 in working condition—and five or six were silencers.

The 50 other weapons seized included nine cannons. In addition, approximately 40 tons of ammunition were found at their home and at other locations of temporary storage. The husband refers to himself as a collector. He does have a criminal record, however, and the machineguns he possessed without benefit of registration under the National Firearms Act had been received or shipped by him in interstate commerce in violation of section 2 (e) and (f) of the Federal Firearms Act.

Another factor which has contributed to the ineffectiveness of the Federal Firearms Act, and which S. 1853 fails to correct is the lack of adequate recordkeeping standards applicable to licensees. Accurate dealer records are absolutely essential if full potential benefit to the States is to be realized. They are also needed to assure compliance with the law itself. If a name is to be checked through criminal files or if there is a question of possible interstate transportation, it is imperative that the purchaser be identified and that his correct name, age, and address be recorded.

S. 1 and S. 1, Amendment No. 90 recognize the importance of accurately identifying information on purchasers and make dealers directly responsible for obtaining and recording such information. These bills would also specifically authorize the Secretary of the Treasury to make information on purchasers and on firearms purchased available

to State and local governments. These proposals could be of particular significance as a factor in aiding those who must deal with the current unrest that exists in many cities where there is a potential for outbursts of violence.

As we all know, the use of firearms in civil disturbances is becoming more common. Law enforcement officials in major cities tell our alcohol and tobacco tax investigators that there is a directly related and significant increase in firearms sales by dealers in the vicinity whenever tension develops in these metropolitan areas. They feel that adequate identification of purchasers and proper recording of sales would do much to discourage the purchase of firearms by individuals who use them in times of civil disorder to harass public safety officials in the performance of their duties.

I have discussed in some detail various weaknesses of the present Federal Firearms Act and have indicated that S. 1853 would do nothing to correct many of them. You should not infer from this, however, that I am unfavorably disposed toward S. 1853 in its entirety. I recognize that the proposed affidavit and notice procedure with respect to transactions in handguns represents a significant advance in Federal firearms control.

I also favor most of the other additional controls which S. 1853 would include in the act. I do feel, however, that all of the benefits to be derived from S. 1853, and more, are incorporated in S. 1 and S.1, Amendment No. 90. In addition, the latter bills correct significant faults in the present controls over interstate and foreign commerce in firearms.

I would now call to your attention one feature of S. 1853 which the Treasury Department regards as objectionable. I refer to the reversion to the crime-of-violence standard with respect to controls over transactions involving convicted criminals and persons under indictment. Since 1961, these controls under the Federal Firearms Act have been applied on the basis of "crimes punishable by imprisonment for a term exceeding 1 year."

This proposed change would seriously reduce the effectiveness of the pertinent controls and would put the Government in the questionable position of having to place confidence, through required licensing, in certain convicted felons, including those convicted of violations of this proposed act or of the National Firearms Act and persons convicted of racketeer-type crimes, such as those related to narcotics and gambling.

These controls would revert to their status prior to the 1961 amendments of the Federal Firearms Act made by Public Law 87-342, although prior to 1961 there were provisions in that act placing restrictions on the issuance of licenses to convicted violators of the act. Even this limited restriction would not be applicable should S. 1853 be enacted in its present form.

In my comments to this point, I have generally named S. 1 and S. 1, Amendment No. 90, together as though they were substantially the same. The bills differ significantly and, as you know, S. 1, Amendment No. 90, represents the administration's proposal for revision of laws designed to regulate interstate and foreign commerce in firearms. S. 1 is a good bill and, in the 89th Congress as S. 1592, was favored by the Department. However, we prefer the somewhat stricter

approach taken in S. 1, Amendment No. 90 with respect to controls over private transactions in firearms and with respect to controls over long guns.

I have previously commented only incidentally on S. 1854, which would amend the National Firearms Act. The principal feature of that bill is the provision making certain highly destructive devices subject to the act's controls. There is a generally recognized need to bring these essentially military weapons under strict control so far as civilian transactions are concerned.

S. 1854 was discussed in detail in a recent letter from our general counsel to the chairman of the Judiciary Committee expressing the views of the Treasury Department on the proposed legislation. As was indicated in that letter, the Department finds the major objectives of the bill acceptable.

Several amendments to the bill were suggested and it was indicated that, as so amended, the Department would not object to enactment of S. 1854. However, since S. 1854 overlooks provisions of the act which also need amendment, including those prescribing the amount of tax to be paid with respect to the taxed transactions and occupations, it was stated that the Department would favor a more comprehensive modernization revision of the National Firearms Act than that proposed in S. 1854.

Summarizing my views with respect to the other three bills before you, I am convinced that the Federal Firearms Act, as now written, does not provide the statutory controls needed to regulate interstate and foreign commerce in firearms in meaningful support of State and local efforts to control gun traffic within their jurisdictions. I base this conclusion on the experience of the Internal Revenue Service in administering the provisions of the act and on the day-to-day relations of our investigators with State and local law enforcement officers.

I do not believe that S. 1853 goes far enough toward correcting the deficiencies of the Federal Firearms Act. S. 1 offers a better revision of the act. However, S. 1, Amendment No. 90, in my judgment, provides controls over interstate and foreign commerce in firearms best suited to the enhancing of State and local controls and most susceptible of efficient administration.

I favor enactment of S. 1, Amendment No. 90, and urge that it be reported to the Senate at an early date.

Thank you, Mr. Chairman.

Chairman DODD. Thank you very much, Commissioner Cohen, for a thorough, well prepared and very informative statement, in my judgment. I only have a few questions. I assume members of the committee have more.

There have been many criticisms made of S. 1, Amendment 90, and S. 1 itself. For example, it has been said that additional controls, such as contained in S. 1, Amendment 90 would be similar to requiring the registration of firearms. Sometimes it is put another way by the critics who say it would be just another step toward the elimination of private ownership of such weapons in the United States.

Perhaps you are aware of these criticisms, but we have heard them now over a period of about 4 years. I would like to know for the record what your view is.

Mr. COHEN. There is no attempt by these proposed measures to in any way license or register firearms at our Federal level. The people who have made these charges have said "Well, if there were ever an invasion of the United States, it would provide a list of weapons which the invader could seize." I would suggest that the best list of weapons, and those who possess them, available today, would be the membership rolls of the National Rifle Association, which are easily available, with names, addresses, and other pertinent data.

The attempt here is merely to provide, if need be, for local officials, proper identification of those people purchasing guns. There is no local registration, there is no local licensing involved here.

We are just asking the dealer to record the proper name and the proper address of the purchaser to take reasonable safeguards to insure that he has satisfied himself they are correct. No more than he would ask if he were cashing a check for the purchaser, to see a driver's license or some other valid type of identification.

Chairman DODD. Thank you very much. I think that answer is correct, but I wanted to get it on the record.

Senator HRUSKA. Mr. Chairman, if you are going to leave that point, could we ask Mr. Barr his thoughts on that same subject?

Chairman DODD. Yes, Mr. Barr, do you have anything to say on that?

Mr. BARR. Senator Hruska, the objective of this bill, I think, is plain. I emphasized it probably more specifically in my testimony than Commissioner Cohen.

The objective of this bill is to enable the State and local governments, who, under our system of government, have the responsibility for maintaining peace, welfare, and the safety of the citizen. It is to enable them to do their job better. There is nothing in this bill that I know would imply a Federal intent to restrict the lawful use of firearms in the United States.

Senator HRUSKA. Nor to lead to the registration of firearms?

Mr. BARR. No, sir.

Senator HRUSKA. By Federal law.

Mr. BARR. No, sir.

Senator HRUSKA. Let me ask then, the significance of your statement at page 3 when you say, Amendment No. 90—

Would put substantially into effect the legislative program for Federal regulation of the traffic in firearms strongly urged by the President's Commission on Law Enforcement and Administration of Justice in its February, 1967 report titled "Challenge of Crime in a Free Society."

Is it not true that one of the recommendations of that Commission calls for the registration of all firearms, shotguns, pistols and rifles in the country? The Commission also recommends that where States have not enacted a firearms registration law within 5 years the Federal Government shall do so. And further, is there not a bill now pending pertaining to the District of Columbia embodying these principles?

Now, considering your statement that the thrust of this bill is to accomplish the program of the President's Crime Commission, which includes registration, would you like to comment as to whether there is any inconsistency in your two statements?

Mr. BARR. I would be delighted to, Senator. This legislation, essentially this same legislation was proposed by the administration at

least 2 years before the Crime Commission ever reported. At that time, Senator, we made our objectives clear and we have never deviated. What we are trying to do is to enable the States to act, to give the States information which they today cannot obtain because of the constitutional separation of powers.

Unless we act in this narrow area, which we are recommending to you today, Senator Hruska, I don't know how the States can discharge their obligations. Now, if the States or the local governments want to move ahead to the registration of firearms, that is another subject. That is another subject indeed.

We are not here recommending that today. We are recommending only one thing, that the State and local governments who are charged with protection and the safety of the people of this country be given the information that they need to carry out the responsibility. I am not willing to leave State and local jurisdictions helpless to protect the people of the United States.

Senator HRUSKA. Neither am I, but I come back to your language.

Mr. BARR. Yes, sir.

Senator HRUSKA. "It would put substantially into effect the legislative program for Federal regulation of traffic in firearms, strongly urged by the President's Commission," and among those things which are urged by the Commission, Mr. Barr, are registration of all firearms, including shotguns, rifles, and pistol. The Commission also urges that States not legislating a firearms registration law within 5 years, there will be a Federal law. Is that included in the thrust of the bill?

Mr. BARR. That is not, sir.

Senator HRUSKA. You support the Commission in your statement, or do you want to modify that part of the statement?

Mr. BARR. I see no reason to modify my statement, sir.

Senator HRUSKA. Very well.

Mr. BARR. The Crime Commission report was submitted to the President. All its recommendations were not accepted nor are they embodied in legislation before this committee.

The Crime Commission formed a basis for a series of recommendations that the Congress will consider. I would like to repeat, Senator Hruska, however, that before they ever reported, we addressed ourselves to this narrow question of enabling the States to take care of themselves, the States and local governments. That is what we are here to do today.

Senator HRUSKA. Be that as it may the record with your statement and the recommendations of the Commission will facilitate our own individual judgments and appraisals of that language notwithstanding your disavowal. You see no reason to modify that portion of your statement?

Mr. BARR. No, sir.

Senator HRUSKA. And that is all right with me, but the words do stand and they also stand in the recommendations of the President's Crime Commission.

Chairman DODD. Do any other members of the committee wish to address any questions on that point? I am trying to limit it to just that question which I asked Mr. Cohen and Mr. Barr.

Senator KENNEDY. Nothing on that.

Chairman DODD. I only have two or three more questions. It has been argued here and elsewhere that the reason we have a firearms problem

is that the Federal laws are not adequately enforced or sufficiently enforced, and that if they were, there wouldn't be any need for new legislation. Do you have anything to say to that?

Mr. COHEN. Well, sir, I would say that we are enforcing the present law as it was intended to be enforced. There are many things, as I commented in my statement, which were not intended to be covered by the present law, which in the light of today's circumstances we certainly would recommend should be covered by Federal legislation.

The present law was not designed to be a law that would enhance the controls that State and local governments put in. It was designed to be sufficient unto itself in a very narrow area really of the racketeer-type weapons.

The greatest growth of crime today is in the area of young people, juveniles and young adults. The easy availability of weapons makes their tendency toward wild, and sometimes irrational behavior that much more violent, that much more deadly, and all responsible law-enforcement officials, and indeed the very esteemed Director of the Federal Bureau of Investigation has recommended that legislation of this character be enacted.

I cited statistics before, showing the great numbers of investigations that our people have run, to trace down weapons. We have had last year about, I think it was 9,700 or 9,800 violations—possible violations of law reported to State and local officials, so that they might follow up.

Senator HRUSKA. What was that number, please?

Mr. COHEN. 9,700 or 9,800, sir, almost 10,000. These things show that our officers are doing the best job manageable under present circumstances.

We have about a thousand frontline investigators in the area who spend a substantial portion of their time, they are engaged in both alcohol-tobacco tax and the gun law enforcement, and they spend a substantial amount of their time as need be in their given locale.

We have a number of our investigators working with municipal law enforcement officials in the juvenile gang area, to try to bring some sense and semblance of order into the area, and working with State and local officials. The cooperation with local law enforcement officers is generally in this country very good. We have found very good cooperation both ways. They are referring cases to us which come within our area, and we have been referring cases to them, which are in their area.

Chairman DODD. It has frequently been argued that there is too much discretionary power placed in the Treasury Department under S. 1, Amendment 90. I think we have heard that in almost every hearing in one form or another. What is your answer to that?

Mr. COHEN. I have found, in reviewing the act, very little in the way of discretionary authority. It does present a rather anomalous situation, where a Federal official, myself acting for the Secretary, must license people to perform acts which are very responsible acts, selling of a deadly weapon, and I cannot even inquire as to their character.

There is very little I can do, and particularly one might say when one is flooded, for the price of \$1 you receive a flood of applications that such a low fee would bring in, again it inhibits the proper use of manpower.

If we can restrict the kinds of people who would apply to those who are engaged in the business, and who appear to be the type of people who will lawfully engage in the business, the restrictions do not appear to be onerous, and the checking could be as thorough as needed by the individual circumstances.

The discretion is not very broad, and I am sure that the chairman recognizes that the courts of the United States have never allowed an administrator's discretion to go unfettered. This bill provides for adequate hearing, should the discretion call for the declination of the license, and in the event that the hearing is adverse in any respect, there is an appeal to the courts, which has always proved adequate in every other area that we administer.

Mr. BARR. Mr. Chairman, may I add in that regard, sir, that in addition to the courts, there is always the Congress of the United States. I have noticed that when we make a mistake or step a little bit too far in a regulation, that somebody gets to it in the Congress, and rather quickly.

I will cite you our experience with the expense accounts. I remember in 1962 we had expense accounts tightened up to the place where I thought we were going to eliminate expense account living. At that point I guess maybe we went a little bit too far, because there was recourse to the Congress, not to the courts, and the regulation was changed, and changed promptly. I would just like to reinforce what I am sure all you Senators know, that where there is a public hearing in an area that is closely watched, no administrator has an inordinate amount of discretion.

Senator HRUSKA. Did you say public hearings?

Mr. BARR. Yes, sir.

Senator HRUSKA. If the Senator will yield, public hearings provided for license applications?

Mr. COHEN. Not in the matter of application.

Mr. BARR. Any area of regulation.

Senator HRUSKA. So they are the powers that are virtually—

Mr. COHEN. No, sir; in that case if there were a declination there would be an administrative hearing by an independent hearing officer as provided by the Administrative Procedure Act.

Senator HRUSKA. Where is that provided?

Mr. COHEN. That is subject to judicial review in that case, sir.

Senator HRUSKA. But no other appeal besides that?

Mr. COHEN. This is the normal—he has a right to go to a judicial hearing.

Senator HRUSKA. If there is any evidence that would support the finding of the Treasury Department that the license should not be granted, regardless of what the preponderance of the evidence might be, your position is sustained, isn't that the size of it?

Mr. COHEN. I wouldn't like to put it that way.

Senator HRUSKA. Under the Administrative Procedures Act, isn't that the essence of the appeal?

Mr. COHEN. No; the appeal is whether we have made a proper determination.

Senator HRUSKA. And it is improper if there is no evidence whatsoever.

Mr. COHEN. No, sir; I don't believe—

Senator HRUSKA. To sustain your ruling.

Mr. COHEN. No, sir. I believe we would have the normal procedure. The potential licensee would have the burden of proving that he is entitled to the license. Should he establish prima facie that he is, we would have then the burden of overcoming that. This is the normal rule in a court proceeding.

Senator HRUSKA. Very well.

Chairman DODD. I am trying to get on the record the criticisms that were made of this legislation, Mr. Commissioner, and Secretary Barr. It has been commonly said the trouble with S. 1, amendment No. 90 is that it doesn't punish the criminal use of the firearm, but rather places unjustified restrictions on the law-abiding citizen.

Mr. COHEN. That is a common statement. I have discussed this with people with long experience in penology, criminology. Severe punishment is not enough to deter crime. We must take preventive action, and the preventive action that we are trying to take here is the preventing of firearms, of these very destructive devices, falling into the hands of people that the local jurisdictions decide are not capable of handling them.

A juvenile, a 16-year-old, doesn't worry about a potential 5-year or 10-year criminal sentence. He really doesn't have the wherewithal to take that all into account. He should not have the weapon in the first place. We won't have to worry about whether we sentence him to 5 or 10 years.

Chairman DODD. It has been said over and over again, too, that the cost of administering and enforcing this law, if it is adopted with its additional controls, would be exorbitant. I think that the critics have even said that it would be prohibitive.

Mr. COHEN. I have consulted very carefully with the Director of our Alcohol and Tobacco Tax Division, Mr. Serr, and he says that the administration of the present Act is so inefficient because of the cumbersomeness of the act that he believes that he could enforce the Act, S. 1, Amendment No. 90, with about the same manpower he has today.

He certainly said at least for the first year he would like to try, without any increase in manpower, except that we would temporarily assign several of his people who are now assigned to other duties in the original licensing, since the original licensing would be a one-time operation, rather than go out and hire temporary people.

We would make a temporary reassignment of some of our other investigative people to that function, but that the ongoing function, once the original investigation process is over, would require about the same number of men, about a thousand frontline investigators, putting about the same number of hours into this activity.

Chairman DODD. Perhaps the most frequent criticism, certainly within the last 2 years, was that this bill, if it is adopted into law, would be a violation of the second amendment to the Constitution. I know that was touched on here in Secretary Barr's testimony. This is the last question I have, and I would like to get both of you, Mr. Commissioner, and the Secretary to speak on this.

Mr. COHEN. The Secretary has covered that.

Chairman DODD. It is important to get this on the record. I get a lot of mail on this.

Mr. COHEN. The former Attorney General, Mr. Katzenbach, submitted a memorandum, I understand, from the present Attorney General, Mr. Clark, that he will submit a similar memorandum to the committee, and I think that they both think that the argument is rather preposterous.

Chairman DODD. Very well. There are a lot of other questions. I don't want to take up any more time.

Senator HRUSKA, do you have any questions?

Senator HRUSKA. Yes; I have some. Mr. Chairman, reference was made to that portion of the President's Crime Commission report recommending State gun registration legislation and by way of other legislation by the Federal Government, if the States did not enact such laws. I ask unanimous consent that that portion with those recommendations be set forth at that point in the record so we have them available for consideration.

Also, Mr. Cohen, inasmuch as we are dealing with enforcement of this act, I presume a lot of this enforcement has for its basis, rules and regulations of your Department?

Is that correct?

Mr. COHEN. Yes, sir.

Senator HRUSKA. Is that correct?

Mr. COHEN. Yes, sir.

Senator HRUSKA. I ask unanimous consent that copies of these regulations, both for the National Act and the Federal Act be incorporated in the record at this point.

Chairman DODD. Without objection.

(The documents referred to were marked "Exhibits Nos. 8 and 9" and are as follow:)

EXHIBIT No. 8

THE PRESIDENT'S COMMISSION ON LAW ENFORCEMENT
AND ADMINISTRATION OF JUSTICE,
EXECUTIVE OFFICE OF THE PRESIDENT,
Washington, February 19, 1967.

I am enclosing a copy of "The Challenge of Crime in a Free Society," a report to President Johnson and the Nation by his Commission on Law Enforcement and Administration of Justice.

Because of his concern about crime, the President appointed the Commission eighteen months ago, as part of his program to develop a National Strategy against crime. The broad new legislative program which the President proposed to Congress earlier this month should help put this strategy into action.

The Commission's mandate was to examine all aspects of crime and to recommend ways in which America might meet its challenge. This report makes more than 200 specific recommendations for preventing crime, for improving the operations of the police, the courts and the correctional agencies and for mobilizing government and private support for these tasks.

The report embodies the findings of a Commission composed of distinguished men and women from many professional backgrounds and many parts of the country. It reflects the work of an outstanding staff and hundreds of expert consultants from all relevant fields. I hope you will give it your close attention.

Sincerely yours,

NICHOLAS DEB. KATZENBACH, *Chairman.*

THE PRESIDENT'S COMMISSION ON LAW ENFORCEMENT AND ADMINISTRATION OF JUSTICE

Nicholas DeB. Katzenbach, Chairman; Washington, D.C.; Under Secretary of State; Attorney General of the United States 1965-1966
Genevieve Blatt, Harrisburg, Pa.; Assistant Director, Office of Economic Opportunity

Charles D. Breitell, New York, N.Y.; Associate Judge, Court of Appeals of the State of New York
 Kingman Brewster, Jr., New Haven, Conn.; President, Yale University
 Garrett H. Byrne, Boston, Mass.; attorney
 Thomas J. Cahill, San Francisco, Calif.; Chief of Police, San Francisco
 Otis Chandler, San Marino, Calif.; Publisher, Los Angeles Times
 Leon Jaworski, Houston, Texas; attorney, senior partner, Fullbright, Crooker, Freeman, Bates & Jaworski
 Thomas C. Lynch, San Francisco, Calif.; Attorney General, State of California
 Ross L. Malone, Roswell, New Mexico; attorney, partner, Atwood & Malone
 James Benton Parsons, Chicago, Ill.; Judge, U.S. District Court, Northern District of Illinois
 Lewis Franklin Powell, Jr., Richmond, Va.; attorney, partner, Hunton, Williams, Gay, Powell & Gibson
 William Pierce Rogers, Bethesda, Md.; attorney, partner, Roynall, Koegel, Rogers & Wells (New York and Washington)
 Robert Gerald Storey, Dallas, Texas; attorney, partner, Storey, Armstrong & Steger
 Julia Davis Stuart, Spokane, Wash.; President, League of Women Voters of the United States
 Robert F. Wagner, New York, N.Y.; Mayor, New York City, 1954-1966
 Herbert Wechsler, New York, N.Y.; Harlan Fisk Stone Professor of Constitutional Law, Columbia Law School
 Whitney Moore Young, Jr., New Rochelle, N.Y.; Executive Director, National Urban League
 Luther W. Youngdahl, Washington, D.C.; Senior Judge, U.S. District Court, District of Columbia

CHAPTER 10*—CONTROL OF FIREARMS

The assassination of President John F. Kennedy with a mail-order rifle offered a grim and tragic illustration of what can result when firearms are easily available to anyone in the United States. The Commission strongly believes that the increasing violence in every section of the Nation compels an effort to control possession and sale of the many kinds of firearms that contribute to that violence.

During 1963, 4,760 persons were murdered by firearms. During 1965, 5,600 murders, 34,700 aggravated assaults and the vast majority of the 68,400 armed robberies were committed by means of firearms. All but 10 of the 278 law enforcement officers murdered during the period 1960-65 were killed with firearms. And statistics, of course, cannot even indicate the personal tragedy each of these offenses caused.

The issue of firearms control has been debated heatedly throughout the country in the past few years. Many millions of the estimated 50 million privately owned guns in the United States belong to hunters, gun collectors, and other sportsmen. Their representative organizations resist controls over the present easy accessibility of rifles and shotguns. Many other millions of firearms—pistols, revolvers, rifles, and shotguns—are owned by citizens determined to protect their families from criminal attack and their property from loss to burglars. In a nationwide sampling conducted for the Commission by the National Opinion Research Center, 37 percent of the persons interviewed said that they kept firearms in the household to protect themselves. Some citizens who fear assault and robbery in the streets of our cities carry firearms about for self-protection. Many of these firearms owners contend that control over the purchase and possession of firearms conflicts with the need and right to defend themselves, their families, and their property.

Although the Commission believes that controls at all levels of government must be strengthened in order to reduce the probability that potential criminal offenders will acquire firearms, it agrees that the interests of persons desiring such weapons for legitimate purposes must be preserved as much as possible. No system of control, of course, can guarantee that society will be safe from the misuse of firearms, but the Commission is convinced that a strengthened system can make an important contribution to reducing the danger of crime in the United States.

*From *The Challenge of Crime in a Free Society*, a report by the President's Commission on Law Enforcement and Administration of Justice.

EXISTING FIREARMS CONTROL LAWS

Regulation of firearms in the United States is based upon three Federal laws, various kinds of State legislation, and a large number of local ordinances.

The first of the Federal laws, the National Firearms Act of 1934, applies to machine guns, short-barreled and sawed-off rifles and shotguns, mufflers and silencers and concealable firearms—not including pistols. The 1934 act requires that possessors register all of these weapons and devices with the Treasury Department, and it imposes annual taxes on firearms manufacturers, importers, and dealers. Taxes ranging from \$5 to \$200 are also imposed on the transfer of registered weapons and other equipment.

The Federal Firearms Act of 1938 requires the licensing of all manufacturers and dealers who use the facilities of interstate or foreign commerce. It prohibits the knowing transportation of firearms in interstate commerce to, or receipt by, any person who has been convicted of a felony, or who is a fugitive from justice. The law requires that most kinds of firearms imported into or manufactured in the United States bear serial numbers, and it prohibits the interstate transportation of stolen firearms, or those with mutilated serial numbers. The 1938 law also prohibits the licensed manufacturers and dealers from transporting firearms into States in violation of State laws requiring a permit to purchase firearms.

The third Federal law regulating firearms is the Mutual Security Act of 1954, which authorizes the President to regulate the export and import of firearms. Administration of the act has been delegated to the Department of State.

The Department of Defense, which formerly disposed of its surplus firearms through commercial and other private channels, suspended all such sales several months ago. It is now considering the advisability of destroying surplus or obsolete weapons in the future.

There is a wide diversity in the purpose and scope of State gun control laws:

Twenty-five States require a license to sell handguns at retail, 8 require a permit (or the equivalent) to purchase a handgun, 11 require a waiting period between purchase and delivery of a handgun, 1 requires a license to possess a handgun, 29 require a license to carry a handgun, 19 prohibit the carrying of a concealed handgun, 18 require a license to carry a handgun in a vehicle, 22 prohibit the carrying of a loaded firearm in a vehicle, and 4 States require the registration of firearms.

New York State's Sullivan law is the most stringent firearms control regulation in the United States. The laws of several States require that anyone carrying concealable firearms have a license, but the Sullivan law prohibits anyone from keeping a pistol or revolver in his home or place of business without a license. Further, no one may even purchase a pistol or revolver until he has obtained either a license to possess or a license to carry such a weapon. The New York law does not require a license to possess or carry rifles and shotguns, but does state that they cannot be carried in an automobile or a public place when loaded.

In addition to the State laws, there are many county, city, town, and village ordinances that require licenses for the possession or purchase of firearms.

LIMITED EFFECTIVENESS OF PRESENT LAWS

At first glance, the combined regulatory machinery established by these firearms laws may appear to provide sufficient control. This appearance is misleading. A 1966 Federal Bureau of Investigation survey of the chief administrators of police departments in 10 large cities discloses that all but one believe that the easy accessibility of firearms is a serious law enforcement problem.

On the Federal level, the statutes do little to control the retail and mail-order sale of handguns, rifles, and shotguns. The provision of the Federal Firearms Act of 1938 prohibiting Federal licensees from transporting firearms into States in violation of State laws requiring a permit to purchase firearms has an extremely limited effect. Only eight States have enacted permit laws. If there are local ordinances within a State, but no State law, the Federal provision does not apply. The prohibition against transport of firearms to, or receipt by, felons or fugitives applies only to direct interstate shipment and does not prevent such persons from buying firearms locally after they have been transported from another State. Despite the Federal laws, therefore, practically anyone—the convicted criminal, the mental incompetent, or the habitual drunkard—can purchase firearms simply by ordering them in those States that have few controls.

Strict controls by one State or city are nullified when a potential criminal can secure a firearm merely by going into a neighboring jurisdiction with lax con-

trols, or none at all. While information is sparse, there are strong indications that mail-order houses and other out-of-State sources provide a substantial number of guns to those who commit crimes. One study by the Massachusetts State Police showed that 87 percent of concealable firearms used during the commission of crimes in Massachusetts in a recent year were obtained from sources outside the State.

In order to prevent criminal use of firearms, the police must have some way of following weapons into the hands of the ultimate consumer. But only in four States do police agencies have a method of determining who owns firearms and where they are located. The requirement that each person register firearms—a tool available to law enforcement in almost every industrial nation in the world—has been compared with the State control of automobiles and drivers. At a time when there were very few automobiles, registration was not thought necessary. When automobiles became so numerous that they posed a serious physical threat to society, comprehensive registration was felt to be essential.

A final failing in the present system of control is the ease with which extremely low-priced, and therefore widely available, surplus weapons are brought into the United States from foreign countries. At the present time it is estimated that at least 1 million such weapons are reaching the civilian market each year. During the recent hearings of the Senate Subcommittee on Juvenile Delinquency, law enforcement officials testified that foreign imports accounted for a significant percentage of the total number of firearms coming into their possession as a result of having been used in the commission of crimes. The figures ranged from a low of 18 percent in Washington, D.C., to a high of 80 percent in Atlanta, Ga.

The limited statutory framework within which the State Department must operate prevents any effective control over the importation of firearms. If the import in question does not involve machineguns, sawed-off shotguns, or the other weapons covered by the 1934 National Firearms Act, each transaction is approved routinely, as long as the dealer is a bona fide businessman engaged in a bona fide business transaction.

PUBLIC OPINION ABOUT FIREARMS CONTROL

Public opinion on the subject of firearms control has been sampled several times in the last few years by the Gallup Poll. According to the 1966 poll, a substantial majority of persons interviewed—67 percent—said they favored “a law which would require a person to obtain a police permit before he or she could buy a gun.” Even when the same question was put to firearms owners, a majority—56 percent—indicated that they favored police permits to purchase guns.

A second question asked by the Gallup Poll was directed to the problem of guns and juveniles. “Which of these three plans would you prefer for the use of guns by persons under the age of 18—forbid their use completely; put strict regulations on their use; or continue as at present with few regulations?” In response, 27 percent of those questioned and 17 percent of firearms owners said they favored completely forbidding the use of guns by persons under 18; 53 percent of all persons and 59 percent of gun owners said they favored strict regulation; and 15 percent of all persons and 22 percent of the gun owners wanted to continue as at present.

On the question of outlawing all handguns except for police use (a question last asked in 1959) 59 percent of the sample were in favor and 35 percent were opposed.

THE CONTROVERSY ABOUT FIREARMS CONTROL

While the majority of the public favors reasonable firearms control, the National Rifle Association and other citizen groups have provided an effective legislative lobby to represent those hunters, gun collectors, and other persons who oppose additional regulation. Many arguments are offered by this opposition.

The most emotional position—one this Commission must reject outright—is that licensing and registration provisions for handguns, rifles, and shotguns would disarm the public and thus render it easy prey for violent criminals, or an invading or subversive enemy. In fact, all proposals for regulation would permit householders and shopkeepers to continue to possess firearms. Licensing and registration for the legitimate firearms owner would merely add a small measure of inconvenience to the presently largely unregulated mail-order and over-the-counter sales of firearms. It is this inconvenience that appears to be the underlying reason for the opposition to more firearms control. Opponents suggest that laws calling for registration would penalize the law-abiding citizen, who would

comply—while not touching criminals who would not comply. They thus conclude that such laws do not address themselves to the real problem of firearms misuse.

Those supporting stricter control of firearms agree that many potential criminal offenders will obtain firearms even with additional laws. But they point to the conclusion of the Senate Subcommittee on Juvenile Delinquency, which found that criminals, for the most part, purchase their firearms through the mails or in retail stores, rather than stealing them. One police chief from a large western city told an FBI survey that, after permissive State legislation had preempted local controls, there were "several instances of homicide committed within 30 minutes of the time a short firearm was purchased by a person who would not have been granted a permit to purchase one under the former legislation."

During the first year's operation of a Philadelphia ordinance requiring a permit to obtain a firearm, 73 convicted persons were prohibited from purchasing firearms in the city. Federal Bureau of Investigation statistics demonstrate that a higher proportion of homicides are committed with firearms in those areas where firearms regulations are lax, than in those areas where there are more stringent controls. In Dallas, Tex., and Phoenix, Ariz., firearms regulations are fairly weak. In Dallas in 1963, 72 percent of homicides were committed with firearms; in Phoenix 65.9 percent were committed with firearms. In Chicago, where regulations are more strict, 46.4 percent of the homicides were committed with firearms. In New York City, with the most stringent gun controls of any major city in the United States, only about 25 percent of the homicides are committed with firearms.

Opponents of additional controls contend that firearms are dangerous only if misused and that the appropriate legal remedy is to punish illegal use of firearms—not to hamper ownership. Supporters of control argue that it is not enough to rely on the deterrent effect of punishing the wrongdoer after the act to prevent others from misusing guns. They maintain that firearms should be kept out of the hands of those who intend to use them wrongfully.

Opponents of firearms control legislation also rely upon the Second Amendment's guarantee of "the right to bear arms." The Second Amendment, in its entirety, states:

"A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed."

The U.S. Supreme Court and lower Federal courts have consistently interpreted this Amendment only as a prohibition against Federal interference with State militia and not as a guarantee of an individual's right to keep or carry firearms. The argument that the Second Amendment prohibits State or Federal regulation of citizen ownership of firearms has no validity whatsoever.

COMMISSION RECOMMENDATIONS

Since laws, as they now stand, do not accomplish the purposes of firearms control, the Commission believes that all States and the Federal Government should act to strengthen them. Any legislative scheme should maximize the possibility of keeping firearms out of the hands of potential criminal offenders, while at the same time affording citizens ample opportunity to purchase such weapons for legitimate purposes.

It is appropriate to ban absolutely the sale of those weapons no citizen has a justifiable reason for owning.

The Commission recommends: Federal and State Governments should enact legislation outlawing transportation and private possession of military-type firearms such as bazookas, machine guns, mortars, and antitank guns.

In addition, dangerous or potentially dangerous persons should be prohibited from purchasing firearms.

The Commission recommends: States should enact laws prohibiting certain categories of persons, such as habitual drunkards, drug addicts, mental incompetents, persons with a history of mental disturbance, and persons convicted of certain offenses, from buying, owning, or possessing firearms.

Prevention of crime and apprehension of criminals would be enhanced if each firearm were registered with a governmental jurisdiction. A record of ownership would aid the police in tracing and locating those who have committed or who threaten to commit violent crime. Law enforcement officers should know where each gun is and who owns it.

The Commission recommends: Each State should require the registration of all handguns, rifles, and shotguns. If, after 5 years, some States still have not enacted

such laws, Congress should pass a Federal firearms registration act applicable to those States.

Government regulation to prevent those with criminal purposes from purchasing firearms cannot be effective as long as mail-order sales and retail sales to persons living outside the seller's State are not controlled. It is essential, also, to reduce and to regulate the importation into the United States of large numbers of cheap firearms. Since sporting weapons such as rifles and shotguns apparently present less danger of criminal use than do handguns, control over the latter should be more stringent. A truly effective system of regulation requires a meshing of State and Federal action.

The Commission recommends: Each State should require a person to obtain a permit before he can either possess or carry a handgun. Through licensing provisions, Federal law should prohibit mail-order and other interstate sales of handguns and should regulate such sales of rifles and shotguns.

Federal legislation to implement these goals should prohibit the interstate shipment of handguns except between federally licensed importers, manufacturers, and dealers. A Federal licensee should also be prohibited from selling handguns to an individual not living in the State of the seller. The interstate shipment of shotguns and rifles should be delayed a sufficient time for law enforcement authorities in the buyer's hometown to examine his sworn statement concerning age and other factors affecting his eligibility to purchase such a weapon, and the consent of these authorities should be required before the weapon may be shipped. Antique dealers could continue to operate under reasonable regulations. States may also want to prohibit firearms sales to persons under a certain age, such as 18 or 21, or require parental approval for firearms registration in a minor's name.

EXHIBIT No. 9

[Publication No. 364 (Rev. 3-64)]

NATIONAL FIREARMS ACT AND FEDERAL FIREARMS ACT

(U.S. TREASURY DEPARTMENT, Internal Revenue Service)

INTERNAL REVENUE SERVICE,
ALCOHOL AND TOBACCO TAX DIVISION, ENFORCEMENT BRANCH.

The National Firearms Act and the Federal Firearms Act are administered by the Enforcement Branch of this operational division of your Internal Revenue Service. Uniform enforcement of these laws is in the best public interest, contributing to the suppression of crime by the process of regulating traffic in firearms and ammunition and providing the basis for prosecution of willful violators. The laws which govern the scope of the firearms program are reprinted herein for distribution as a public service.

Your cooperation and support in our effort to effectively administer the firearms program are solicited in the interest of better law enforcement.

DWIGHT E. AVIS, *Director.*

NATIONAL FIREARMS ACT

Law: United States Code, Title 26, Chapter 53.

Regulations: Part 179 of Title 26 (1954), Code of Federal Regulations.

Weapons coming within the purview of the National Firearms Act may be legally acquired and lawfully possessed subject to regulatory requirements. However, any such weapon is contraband unless properly registered, and unlawful possession thereof is subject to statutory penalties.

SPECIAL (OCCUPATIONAL) TAXES

Section 5801. Tax. (a) *Rate.*—On first engaging in business, and thereafter on or before the first day of July of each year, every importer, manufacturer, and dealer in firearms shall pay a special tax at the following rates:

- (1) *Importers or manufacturers.*—Importers or manufacturers, \$500 a year or fraction thereof;
- (2) *Dealers other than pawnbrokers.*—Dealers, other than pawnbrokers, \$200 a year or fraction thereof;
- (3) *Pawnbrokers.*—Pawnbrokers, \$300 a year or fraction thereof:

Provided, That manufacturers and dealers in guns with combination shotgun and rifle barrels, 12 inches or more but less than 18 inches in length, from which only a single discharge can be made from either barrel without manual reloading, and manufacturers and dealers in guns classified as "any other weapon" under section 5848(5), shall pay the following taxes: Manufacturers, \$25 a year or fraction thereof; dealers, \$10 a year or fraction thereof.

(b) *Cross Reference*.—For license to transport, ship, or receive firearms or ammunition under the Federal Firearms Act, see section 3 of the Act of June 30, 1938 (52 Stat. 1251; 15 U.S.C. 903).

Section 5802. *Registration. Importers, Manufacturers, and Dealers*.—On first engaging in business, and thereafter on or before the first day of July of each year, every importer, manufacturer, and dealer in firearms shall register with the Secretary or his delegate in each internal revenue district in which such business is to be carried on his name or style, principal place of business, and places of business in such district.

Section 5803. *Exemptions*. For provisions exempting certain transfers, see section 5812.

TRANSFER TAX

Section 5811. *Tax*. (a) *Rate*.—There shall be levied, collected, and paid on firearms transferred in the United States a tax at the rate of \$200 for each firearm: *Provided*, That the transfer tax on any gun with combination shotgun and rifle barrels, 12 inches or more but less than 18 inches in length, from which only a single discharge can be made from either barrel without manual reloading, and on any gun classified as "any other weapon" under section 5848(5), shall be at the rate of \$5. The tax imposed by this section shall be in addition to any import duty imposed on such firearm.

(b) *By Whom Paid*.—Such tax shall be paid by the transfer: *Provided*, That if a firearm is transferred without payment of such tax the transferor and transferee shall become jointly and severally liable for such tax.

(c) *How Paid*.—

(1) *Stamps*.—Payment of the tax herein provided shall be represented by appropriate stamps to be provided by the Secretary or his delegate.

(d) *Cross Reference*.—

(1) For assessment in case of omitted taxes payable by stamps, see sections 6155(a), 6201(a)(2)(A), 6601(c)(4), and 6201(a).

(2) For requirements as to registration and special tax, see sections 5801 and 5802.

(3) For excise tax on pistols, revolvers, and firearms, see section 4181.

Section 5812. *Exemptions*. (a) *Transfers Exempt*.—This chapter shall not apply to the transfer of firearms—

(1) to the United States Government, any State, Territory, or possession of the United States, or to any political subdivision thereof, or to the District of Columbia;

(2) to any peace officer or any Federal officer designated by regulations of the Secretary or his delegate;

(3) to the transfer of any firearm which is unserviceable and which is transferred as a curiosity or ornament.

(b) *Notice of Exemption*.—If the transfer of a firearm is exempted as provided in subsection (a), the person transferring such firearm shall notify the Secretary or his delegate of the name and address of the applicant, the number or other mark identifying such firearm, and the date of its transfer, and shall file with the Secretary or his delegate such documents in proof thereof as the Secretary or his delegate may by regulations prescribe.

(c) *Exemption From Other Taxes*.—For exemption from excise tax on pistols, revolvers, and firearms, see section 4182(a).

Section 5813. *Stamps*. (a) *Affixing*.—The stamps provided for in section 5811 (c)(1) shall be affixed to the order for such firearm, provided for in section 5814.

(b) *Other Laws Applicable*.—For provisions relating to the engraving, issuance, sale, accountability, cancellation, and distribution of taxpaid stamps, see section 5846.

Section 5814. *Order Forms*. (a) *General Requirements*.—It shall be unlawful for any person to transfer a firearm except in pursuance of a written order from the person seeking to obtain such article, on an application form issued in blank in duplicate for that purpose by the Secretary or his delegate. Such order shall identify the applicant by such means of identification as may be prescribed by

regulations under this chapter: *Provided*, That, if the applicant is an individual such identification shall include fingerprints and a photograph thereof.

(b) *Contents of Order Form.*—Every person so transferring a firearm shall set forth in each copy of such order the manufacturer's number or other mark identifying such firearm, and shall forward a copy of such order to the Secretary or his delegate. The original thereof, with stamp affixed, shall be returned to the applicant.

(c) *Exemption in Case of Registered Importers, Manufacturers, and Dealers.*—Importers, manufacturers, and dealers who have registered and paid the tax as provided for in this chapter shall not be required to conform to the provisions of this section with respect to transactions in firearms with dealers or manufacturers if such dealers or manufacturers have registered and have paid such tax, but shall keep such records and make such reports regarding such transactions as may be prescribed by regulations under this chapter.

(d) *Supply.*—The Secretary or his delegate shall cause suitable forms to be prepared for the purposes of subsection (a), and shall cause the same to be distributed to officers designated by him.

TAX ON MAKING FIREARMS

Section 5821. *Rate. Exceptions, etc.* (a) *Rate.*—There shall be levied, collected, and paid upon the making in the United States of any firearm (whether by manufacture, putting together, alteration, any combination thereof, or otherwise) a tax at the rate of \$200 for each firearm so made.

(b) *Exceptions.*—The tax imposed by subsection (a) shall not apply to the making of a firearm—

(1) by any person who is engaged within the United States in the business of manufacturing firearms;

(2) from another firearm with respect to which a tax has been paid, prior to such making, under subsection (a) of this section; or

(3) for the use of—

(A) the United States Government, any State, Territory, or possession of the United States, any political subdivision thereof, or the District of Columbia, or

(B) any peace officer or any Federal officer designated by regulations of the Secretary or his delegate.

Any person who makes a firearm in respect of which the tax imposed by subsection (a) does not apply by reason of the preceding sentence shall make such report in respect thereof as the Secretary or his delegate may by regulations prescribe.

(c) *By Whom Paid; When Paid.*—The tax imposed by subsection (a) shall be paid by the person making the firearm. Such tax shall be paid in advance of the making of the firearm.

(d) *How Paid.*—Payment of the tax imposed by subsection (a) shall be represented by appropriate stamps to be provided by the Secretary or his delegate.

(e) *Declaration.*—It shall be unlawful for any person subject to the tax imposed by subsection (a) to make a firearm unless, prior to such making, he has declared in writing his intention to make a firearm, has affixed the stamp described in subsection (d) to the original of such declaration, and has filed such original and a copy thereof. The declaration required by the preceding sentence shall be filed at such place, and shall be in such form and contain such information, as the Secretary or his delegate may by regulations prescribe. The original of the declaration, with the stamp affixed, shall be returned to the person making the declaration. If the person making the declaration is an individual, there shall be included as part of the declaration the fingerprints and a photograph of such individual.

OTHER TAXES

Section 5831. *Cross Reference.*—For excise tax on pistols, revolvers, and firearms, see section 4181.

GENERAL PROVISIONS

Section 5841. *Registration of Persons in General.* Every person possessing a firearm shall register, with the Secretary or his delegate, the number or other mark identifying such firearm, together with his name, address, place where such firearm is usually kept, and place of business or employment, and, if such person is other than a natural person, the name and home address of an executive officer thereof. No person shall be required to register under this section with respect to a

firearm which such person acquired by transfer or importation or which such person made, if provisions of this chapter applied to such transfer, importation, or making, as the case may be, and if the provisions which applied thereto were complied with.

Section 5842. Books, Records and Returns. Importers, manufacturers, and dealers shall keep such books and records and render such returns in relation to the transactions in firearms specified in this chapter as the Secretary or his delegate may by regulations require.

Section 5843. Identification of Firearms. Each manufacturer and importer of a firearm shall identify it with a number and other identification marks approved by the Secretary or his delegate, such number and marks to be stamped or otherwise placed thereon in a manner approved by the Secretary or his delegate.

Section 5844. Exportation. Under such regulations as the Secretary or his delegate may prescribe, and upon proof of the exportation of any firearm to any foreign country (whether exported as part of another article or not) with respect to which the transfer tax under section 5811 has been paid by the manufacturer, the Secretary or his delegate shall refund to the manufacturer the amount of the tax so paid, or, if the manufacturer waives all claim for the amount to be refunded, the refund shall be made to the exporter.

Section 5845. Importation. No firearm shall be imported or brought into the United States or any territory under its control or jurisdiction, except that, under regulations prescribed by the Secretary or his delegate, any firearm may be so imported or brought in when—

- (1) the purpose thereof is shown to be lawful and
- (2) such firearm is unique or of a type which cannot be obtained within the United States or such territory.

Section 5846. Other Laws Applicable. All provisions of law (including those relating to special taxes, to the assessment, collection, remission, and refund of internal revenue taxes, to the engraving, issuance, sale, accountability, cancellation, and distribution of taxpaid stamps provided for in the internal revenue laws, and to penalties) applicable with respect to the taxes imposed by sections 4701 and 4721, and all other provisions of the internal revenue laws shall, insofar as not inconsistent with the provisions of this chapter, be applicable with respect to the taxes imposed by sections 5811(a), 5821(a) and 5801.

Section 5847. Regulations. The Secretary or his delegate shall prescribe such regulations as may be necessary for carrying the provisions of this chapter into effect.

Section 5848. Definitions. For purposes of this chapter—

(1) *Firearm*.—The term “firearm” means a shotgun having a barrel or barrels of less than 18 inches in length, or a rifle having a barrel or barrels of less than 16 inches in length, or any weapon made from a rifle or shotgun (whether by alteration, modification, or otherwise) if such weapon as modified has an overall length of less than 26 inches, or any other weapon, except a pistol or revolver, from which a shot is discharged by an explosive if such weapon is capable of being concealed on the person, or a machine gun, and includes a muffler or silencer for any firearm whether or not such firearm is included within the foregoing definition.

(2) *Machine gun*.—The term “machine gun” means any weapon which shoots, or is designed to shoot, automatically or semiautomatically, more than one shot, without manual reloading, by a single function of the trigger.

(3) *Rifle*.—The term “rifle” means a weapon designed or redesigned, made or remade, and intended to be fired from the shoulder and designed or redesigned and made or remade to use the energy of the explosive in a fixed metallic cartridge to fire only a single projectile through a rifled bore for each single pull of the trigger.

(4) *Shotgun*.—The term “shotgun” means a weapon designed or redesigned, made or remade, and intended to be fired from the shoulder and designed or redesigned and made or remade to use the energy of the explosive in a fixed shotgun shell to fire through a smooth bore either a number of ball shot or a single projectile for each single pull of the trigger.

(5) *Any other weapon*.—The term “any other weapon” means any weapon or device capable of being concealed on the person from which a shot can be discharged through the energy of an explosive, but such term shall not include pistols or revolvers or weapons designed, made or intended to be fired from the shoulder and not capable of being fired with fixed ammunition.

(6) *Importer*.—The term “importer” means any person who imports or brings firearms into the United States for sale.

(7) *Manufacturer*.—The term “manufacturer” means any person who is engaged within the United States in the business of manufacturing firearms, or who otherwise produces therein any firearm for sale or disposition.

(8) *Dealer*.—The term “dealer” means any person not a manufacturer or importer, engaged within the United States in the business of selling firearms. The term “dealer” shall include wholesalers, pawnbrokers, and dealers in used firearms.

(9) *Interstate commerce*.—The term “interstate commerce” means transportation from any State or Territory or District, or any insular possession of the United States, to any other State or to the District of Columbia.

(10) *To transfer or transferred*.—The term “to transfer” or “transferred” shall include to sell, assign, pledge, lease, loan, give away, or otherwise dispose of.

(11) *Person*.—The term “person” includes a partnership, company, association, or corporation, as well as a natural person.

Section 5849. Citation of Chapter. This chapter may be cited as the “National Firearms Act” and any reference in any other provision of law to the “National Firearms Act” shall be held to refer to the provisions of this chapter.

UNLAWFUL ACTS

Section 5851. Possessing Firearms Illegally. It shall be unlawful for any person to receive or possess any firearm which has at any time been transferred in violation of sections 5811, 5812(b), 5813, 5814, 5844, or 5846, or which has at any time been made in violation of section 5821, or to possess any firearm which has not been registered as required by section 5841. Whenever on trial for a violation of this section the defendant is shown to have or to have had possession of such firearm, such possession shall be deemed sufficient evidence to authorize conviction, unless the defendant explains such possession to the satisfaction of the jury.

Section 5852. Removing or Changing Identification Marks. It shall be unlawful for anyone to obliterate, remove, change, or alter the number or other identification mark required by section 5843. Whenever on trial for a violation of this section the defendant is shown to have or to have had possession of any firearm upon which such number or mark shall have been obliterated, removed, changed, or altered, such possession shall be deemed sufficient evidence to authorize conviction, unless the defendant explains such possession to the satisfaction of the jury.

Section 5853. Importing Firearms Illegally. It shall be unlawful—

(1) fraudulently or knowingly to import or bring any firearm into the United States or any territory under its control or jurisdiction, in violation of the provisions of this chapter; or

(2) knowingly to assist in so doing; or

(3) to receive, conceal, buy, sell, or in any manner facilitate the transportation, concealment, or sale of any such firearm after being imported or brought in knowing the same to have been imported or brought in contrary to law.

Whenever on trial for a violation of this section the defendant is shown to have or to have had possession of such firearm, such possession shall be deemed sufficient evidence to authorize conviction, unless the defendant explains such possession to the satisfaction of the jury.

Section 5854. Failure To Register and Pay Special Tax. It shall be unlawful for any person required to register under the provisions of section 5802 to import, manufacture, or deal in firearms without having registered and paid the tax imposed by section 5801.

Section 5855. Unlawful Transportation in Interstate Commerce. It shall be unlawful for any person who is required to register as provided in section 5841 and who shall not have so registered, or any other person who has not in his possession a stamp-affixed order as provided in section 5814 or a stamp-affixed declaration as provided in section 5821, to ship, carry, or deliver any firearm in interstate commerce.

PENALTIES AND FORFEITURES

Section 5861. Penalties. Any person who violates or fails to comply with any of the requirements of this chapter shall, upon conviction, be fined not more than \$2,000, or be imprisoned for not more than 5 years, or both, in the discretion of the court.

Section 5862. Forfeitures. (a) *Laws Applicable*.—Any firearm involved in any violation of the provisions of this chapter or any regulation promulgated

thereunder shall be subject to seizure and forfeiture, and (except as provided in subsection (b) all the provisions of internal revenue laws relating to searches, seizures, and forfeiture of unstamped articles are extended to and made to apply to the articles taxed under this chapter, and the persons to whom this chapter applies.

(b) *Disposal*.—In the case of the forfeiture of any firearm by reason of a violation of this chapter: No notice of public sale shall be required; no such firearm shall be sold at public sale; if such firearm is forfeited for a violation of this chapter and there is no remission or mitigation of forfeiture thereof, it shall be delivered by the Secretary or his delegate to the Administrator of General Services, General Services Administration, who may order such firearm destroyed or may sell it to any State, Territory, or possession, or political subdivision thereof, or the District of Columbia, or at the request of the Secretary or his delegate may authorize its retention for official use of the Treasury Department, or may transfer it without charge to any executive department or independent establishment of the Government for use by it.

FEDERAL FIREARMS ACT

Law: United States Code, Title 15, Chapter 18.

Regulations: Part 177 of Title 26 (1954), Code of Federal Regulations.

All firearms (including parts thereof), silencers, and pistol or revolver ammunition come within the purview of this Act, and commercial (interstate) traffic therein is subject to licensing requirements. This Act is designed primarily to deny the criminal lawful access to such items, but violations of the law arise from the operations of the licensee and/or the criminal status of the person involved rather than the mere possession of a weapon.

Section 901. Definitions. As used in this chapter:

(1) The term "person" includes an individual, partnership, association, or corporation.

(2) The term "interstate or foreign commerce" means commerce between any State, Territory or possession (not including the Canal Zone), or the District of Columbia, and any place outside thereof; or between points within the same State, Territory, or possession (not including the Canal Zone), or the District of Columbia but through any place outside thereof; or within any Territory or possession or the District of Columbia.

(3) The term "firearm" means any weapon, by whatever name known, which is designed to expel a projectile or projectiles by the action of an explosive and a firearm muffler or firearm silencer, or any part or parts of such weapon.

(4) The term "manufacturer" means any person engaged in the manufacture or importation of firearms, or ammunition or cartridge cases, primers, bullets, or propellant powder for purposes of sale or distribution; and the term "licensed manufacturer" means any such person licensed under the provisions of this chapter.

(5) The term "dealer" means any person engaged in the business of selling firearms or ammunition or cartridge cases, primers, bullets or propellant powder, at wholesale or retail, or any person engaged in the business of repairing such firearms or of manufacturing or fitting special barrels, stocks, trigger mechanisms, or breech mechanisms to firearms, and the term "licensed dealer" means any such person licensed under the provisions of this chapter.

(6) The term "fugitive from justice" means any person who has fled from any State, Territory, the District of Columbia, or possession of the United States to avoid prosecution for a crime punishable by imprisonment for a term exceeding one year or to avoid giving testimony in any criminal proceeding.

(7) The term "ammunition" shall include only pistol or revolver ammunition. It shall not include shotgun shells, metallic ammunition suitable for use only in rifles, or any .22 caliber rimfire ammunition.

Section 902. Transporting, Shipping, or Receiving Firearms or Ammunition in Interstate or Foreign Commerce Acts Prohibited. (a) It shall be unlawful for any manufacturer or dealer, except a manufacturer or dealer having a license issued under the provisions of this chapter, to transport, ship, or receive any firearm or ammunition in interstate or foreign commerce.

(b) It shall be unlawful for any person to receive any firearm or ammunition transported or shipped in interstate or foreign commerce in violation of

subdivision (a) of this section, knowing or having reasonable cause to believe such firearms or ammunition to have been transported or shipped in violation of subdivision (a) of this section.

(c) It shall be unlawful for any licensed manufacturer or dealer to transport or ship any firearm in interstate or foreign commerce to any person other than a licensed manufacturer or dealer in any State the laws of which require that a license be obtained for the purchase of such firearm, unless such license is exhibited to such manufacturer or dealer by the prospective purchaser.

(d) It shall be unlawful for any person to ship, transport, or cause to be shipped or transported in interstate or foreign commerce any firearm or ammunition to any person knowing or having reasonable cause to believe that such person is under indictment or has been convicted in any court of the United States, the several States, Territories, possessions or the District of Columbia of a crime punishable by imprisonment for a term exceeding one year or is a fugitive from justice.

(e) It shall be unlawful for any person who is under indictment or who has been convicted of a crime punishable by imprisonment for a term exceeding one year or who is a fugitive from justice to ship, transport, or cause to be shipped or transported in interstate or foreign commerce any firearm or ammunition.

(f) It shall be unlawful for any person who has been convicted of a crime punishable by imprisonment for a term exceeding one year or is a fugitive from justice to receive any firearm or ammunition which has been shipped or transported in interstate or foreign commerce, and the possession of a firearm or ammunition by any such person shall be presumptive evidence that such firearm or ammunition was shipped or transported or received, as the case may be by such person in violation of this chapter.

(g) It shall be unlawful for any person to transport or ship or cause to be transported or shipped in interstate or foreign commerce any stolen firearm or ammunition, knowing, or having reasonable cause to believe, same to have been stolen.

(h) It shall be unlawful for any person to receive, conceal, store, barter, sell, or dispose of any firearm or ammunition or to pledge or accept as security for a loan any firearm or ammunition moving in or which is a part of interstate or foreign commerce, and which while so moving or constituting such part has been stolen, knowing, or having reasonable cause to believe the same to have been stolen.

(i) It shall be unlawful for any person to transport, ship, or knowing receive in interstate or foreign commerce any firearm from which the manufacturer's serial number has been removed, obliterated, or altered, and the possession of any such firearm shall be presumptive evidence that such firearm was transported, shipped, or received, as the case may be, by the possessor in violation of this chapter.

Section 903. License To Transport, Ship, or Receive Firearms or Ammunition. (a) Any manufacturer or dealer desiring a license to transport, ship, or receive firearms or ammunition in interstate or foreign commerce shall make application to the Secretary of the Treasury, who shall prescribe by rules and regulations the information to be contained in such application. The applicant shall, if a manufacturer, pay a fee of \$25 per annum and, if a dealer, shall pay a fee of \$1 per annum.

(b) Upon payment of the prescribed fee, the Secretary of the Treasury shall issue to such applicant a license which shall entitle the licensee to transport, ship, and receive firearms and ammunition in interstate and foreign commerce unless and until the license is suspended or revoked in accordance with the provisions of this chapter: *Provided*, That no license shall be issued to any applicant within two years after the revocation of a previous license.

(c) Whenever any licensee is convicted of a violation of any of the provisions of this chapter, it shall be the duty of the clerk of the court to notify the Secretary of the Treasury within forty-eight hours after such conviction and said Secretary shall revoke such license: *Provided*, That in the case of appeal from such conviction the licensee may furnish a bond in the amount of \$1,000, and upon receipt of such bond acceptable to the Secretary of the Treasury he may permit the licensee to continue business during the period of the appeal, or should the licensee refuse or neglect to furnish such bond, the Secretary of the Treasury shall suspend such license until he is notified by the clerk of the court of last appeal as to the final disposition of the case.

(d) Licensed dealers shall maintain such permanent records of importation, shipment, and other disposal of firearms and ammunition as the Secretary of the Treasury shall prescribe.

Section 904. Excepted Persons. The provisions of this chapter shall not apply with respect to the transportation, shipment, receipt, or importation of any, firearm, or ammunition, sold or shipped to, or issued for the use of, (1) the United States or any department, independent establishment, or agency thereof; (2) any State, Territory, or possession, or the District of Columbia, or any department, independent establishment, agency, or any political subdivision thereof; (3) any duly commissioned officer or agent of the United States, a State, Territory, or possession, or the District of Columbia, or any political subdivision thereof; (4) or to any bank, public carrier, express, or armored-truck company organized and operating in good faith for the transportation of money and valuables; (5) or to any research laboratory designated by the Secretary of the Treasury: *Provided*, That such bank, public carriers, express, and armored-truck companies are granted exemption by the Secretary of the Treasury; nor to the transportation, shipment, or receipt of any antique or unserviceable firearms, or ammunition, possessed and held as curios or museum pieces: *Provided*, That nothing contained in this section shall be construed to prevent shipments of firearms and ammunition to institutions, organizations, or persons to whom such firearms and ammunition may be lawfully delivered by the Secretary of War, nor to prevent the transportation of such firearms and ammunition so delivered by their lawful possessors while they are engaged in military training or in competitions.

Section 905. Penalties. (a) Any person violating any of the provisions of this chapter or any rules and regulations promulgated hereunder, or who makes any statement in applying for the license or exemption provided for in this chapter, knowing such statement to be false, shall, upon conviction thereof, be fined not more than \$2,000, or imprisoned for not more than five years, or both.

(b) Any firearm or ammunition involved in any violation of the provisions of this chapter or any rules or regulations promulgated thereunder shall be subject to seizure and forfeiture, and all provisions of Title 26 relating to the seizure, forfeiture, and disposition of firearms as defined in section 2733¹ of Title 26 shall, so far as applicable, extend to seizures and forfeitures incurred under the provisions of this chapter.

Section 906. Effective Date of Chapter. This chapter shall take effect thirty days after June 30, 1938.

Section 907. Rules and Regulations. The Secretary of the Treasury may prescribe such rules and regulations as he deems necessary to carry out the provisions of this chapter.

Section 908. Separability Clause. Should any section or subsection of this chapter be declared unconstitutional, the remaining portion of the chapter shall remain in full force and effect.

Section 909. Short Title. This chapter may be cited as the Federal Firearms Act.

Information regarding the firearms laws may be obtained at any regional or branch office of the Alcohol and Tobacco Tax. For the exact location of the office in your vicinity, it is suggested you consult the Government listings in your local telephone directory.

U. S. TREASURY DEPARTMENT, INTERNAL REVENUE SERVICE

ASSISTANT REGIONAL COMMISSIONER—ALCOHOL AND TOBACCO TAX

Located at:

Address and Telephone

Atlanta, Georgia--- (522-4121), 275 Peachtree Street NE., Atlanta, Ga., 30303.
 Boston, Massachusetts--- (523-8600), 55 Tremont Street, Boston, Mass., 02108.
 Chicago, Illinois----- (222-8468). 35 East Wacker Drive, Chicago, Ill., 60601.
 Cincinnati, Ohio----- (381-2200). 5th and Main Streets, Cincinnati, Ohio, 45201.
 Dallas, Texas----- (748-5611), Santa Fe Building, 1114 Commerce Street.
 Dallas, Tex., 75202.
 New York, New York--- (732-9100), 90 Church Street, New York, N. Y., 10007.
 Philadelphia, Pennsylvania--- (923-2400), Third Floor, 2 Penn Center Plaza,
 Philadelphia, Pa., 19102
 San Francisco, California---- (986-3500), Flood Building, 870 Market Street,
 San Francisco, Calif., 94102.

¹ Sec. 5848, Internal Revenue Code of 1954.

Senator HRUSKA. Mr. Cohen, you mentioned that there are a thousand men in your department engaged in frontline efforts. Does that cover all of the enforcement requirements of your particular Alcohol and Tobacco Unit?

Mr. COHEN. Yes, sir; these are the frontline criminal investigative officers. They are not the entire Alcohol and Tobacco Tax Unit. They are the criminal law enforcement element of the Alcohol and Tobacco Tax Unit.

Senator HRUSKA. How many of those are engaged in enforcing gun legislation?

Mr. COHEN. They all are to some extent. What we do is we assign our manpower on the basis of the demands of the locale, and we have, let's say, in a given city, five officers. Now, they may spend a portion of their time on enforcement in the alcohol area, and they may spend a portion of their time as the demands of the locale are concerned in the enforcement of the gun laws, so that all of those field operating officers are engaged in enforcement of the gun laws.

Now, someone misquoted me one time as saying we had only seven full-time people engaged in the enforcement of gun laws, and that was true insofar as it was seven in the national office who managed the enforcement on a nationwide basis; but the frontline investigator out in New York City or in Chicago or in Memphis, Tenn., or in Omaha, Nebr., who is an alcohol and tobacco tax investigator has been trained in not only the alcohol work but in the firearms work; and if the firearms need is there, he spends his time on firearms.

Senator HRUSKA. Of course all of us are subject to misquotation. We usually don't misquote ourselves, however, do we? In 1965 you indicated, in testimony before the House Ways and Means Committee, that there were the equivalent of 52 man-years devoted to enforcement of the National and Federal Firearms Act. Now this year you indicated that there were or would be 113 man-years devoted to that purpose. Are those figures correct?

Mr. COHEN. That is about right.

Senator HRUSKA. Are they identifiable in your mind?

Mr. COHEN. Yes, sir.

Senator HRUSKA. Why this increase all of a sudden?

Mr. COHEN. I think we have been having more problems with firearms over the last few years than we have ever had before.

I think we have had more violence in the streets, we have had more riots, we have had more para-military activity. I feel, and so does my Director of my Alcohol and Tobacco Tax Division, as I indicated to you, sir, the investigators spend the time in enforcing the laws where the violations are occurring. Now, we don't create violations and we don't create the need for our manpower. When we find it, we apply it.

Senator HRUSKA. What are the results of this stepped up activity? You have recited 9,700 violations of State and Federal laws. How many of those were Federal violations?

Mr. COHEN. Those were 9,700 referrals to local officials.

Senator HRUSKA. How many Federal violations did you uncover?

Mr. COHEN. It will take me a few minutes to find that for you sir.

My Alcohol and Tobacco Tax Division conducts a program under which the records of some of the manufacturers and dealers are checked. The program is designated as the firearms record inspection

program. Under the program, monthly reports are made. Among the information obtained and reported as a result of these record checks, is the number of sales—primarily of handguns—the licensees make to out-of-State purchasers. Through March of last fiscal year, it was determined that some 21,000 people went outside of their State of residence to purchase a firearm. Under the program, criminal record checks are made on many of the out-of-State purchasers. Through March of last fiscal year, some 18,000 criminal record checks were made on these purchases. As a result of those criminal checks, we found that 676 of the out-of-State purchasers had criminal records. This does not mean that we could establish that each of these 676 persons transported, shipped, or received a firearm in interstate or foreign commerce. Under the program, 640 criminal investigations were initiated through March of 1967. During that period 92 cases arising from the program were referred for criminal prosecution.

Senator HRUSKA. Ninety-two out of how many?

Mr. COHEN. Ninety-two cases arising from the firearms record inspection program through March of the last fiscal year. In addition, 405 other cases under the National and Federal acts arising from other sources were referred to the Department of Justice during that period. Thus, 497 cases were referred to the Department of Justice during the first 9 months of the last fiscal year. During that same period, there were 9,700 other cases arising under the firearms record inspection program referred to local officials. These cases did not involve Federal violations and were referred to local authorities for whatever action they deemed appropriate.

We don't keep statistics on convictions in cases referred to the Department of Justice. However, the Attorney General has stated that his Department for fiscal 1966 has statistics showing that 244 cases were filed for violations of both the Federal act and the National act—183 defendants guilty; 117 defendants not guilty.

Senator HRUSKA. What is the significance of this 18,670 names with criminal records that were disclosed in the first 9 months of the fiscal year inspection of firearm dealers?

Mr. COHEN. No; I said criminal record checks were made of that many names. That doesn't mean we found that many violations.

Senator HRUSKA. 676 had criminal records.

Mr. COHEN. Yes, sir.

Senator HRUSKA. I see.

Mr. COHEN. Of which we investigated some 600 cases.

Senator HRUSKA. And you keep records of the activities of your enforcement agents, do you?

Mr. COHEN. Yes.

Senator HRUSKA. Which reflect these figures.

Mr. COHEN. Yes, sir.

Senator HRUSKA. What would the figures have been for the year 1965?

Mr. COHEN. I would have to get those for you, sir.

Senator HRUSKA. Would you please?

Mr. COHEN. Certainly.

Senator HRUSKA. Would you get them for the last 5 years?

Mr. COHEN. Yes, sir.

Senator HRUSKA. An estimate of the man-years that were devoted, the equivalent man-years that were devoted in each of these years.

Mr. COHEN. Yes, sir.

Senator HRUSKA. On this subject.

Mr. COHEN. As I indicated to you, we acknowledge that we put an increased effort here, but even with our increased effort, and we are putting as much effort as we can, we can't get results under the present law which just doesn't have the tools.

(The document referred to was marked "Exhibit No. 10" and is as follows:)

EXHIBIT No. 10

[U.S. Government memorandum, Aug. 11, 1967]

To: Commissioner.

From: Director, Alcohol and Tobacco Tax Division.

Subject: Request of Senator Hruska for information on firearms enforcement activities for past 5 years.

The following information from our records is furnished for inclusion with your July 10 testimony before the Juvenile Delinquency Subcommittee of the Senate Judiciary Committee:

UTILIZATION OF INVESTIGATIVE PERSONNEL ON FIREARMS ENFORCEMENT AND CASES PREPARED FOR PROSECUTION

Fiscal year	Average employment investigators	Man-years on firearms enforcement	Criminal cases prepared			Total
			National Firearms Act	Federal Firearms Act	Combination (both acts)	
1963.....	1,003	35	293	55	10	358
1964.....	983	52	306	53	14	373
1965.....	943	57	321	60	17	398
1966.....	937	101	346	100	19	465
1967.....	964	189	515	184	21	720

All of the investigators are trained in firearms work and spend the amount of time required in that area. The man-year calculation shown above is arrived at by applying the cumulative amount of time spent by each investigator on matters relating to the firearm enforcement activity.

Prior to October 1965, no statistics were maintained with respect to inspection of the premises of persons licensed under the Federal Firearms Act. The following figures reflect results of that portion of our firearms enforcement activity devoted to licensee inspections from October 1965 to June 30, 1967:

LICENSEE INSPECTIONS AS PART OF FIREARMS ENFORCEMENT

Period	Inspections	Out-of-State purchases found	Criminal cases prepared
October 1965 to June 30, 1966.....	13,783	21,202	40
July 1, 1966, to June 30, 1967.....	36,050	27,162	130

HAROLD A. SERR.

Senator HRUSKA. I think that would be a fair statement, providing it could show some substitute or something in S. 1-Amendment 90 that would enable you to better enforce the law under the new bill rather than the laws we have now.

Let me call your attention to a section that is very familiar to you, section 902 of the Federal Firearms Act which reads:

It shall be unlawful for any licensed manufacturer or dealer to transport or ship any firearms in interstate or foreign commerce to any person other than

a licensed manufacturer or dealer in any state the laws of which require that a license be obtained for the purchase of such firearm, unless such license is exhibited to such manufacturer or dealer by the prospective purchaser.

Now, have you had any prosecutions under section 902(c) which I just read?

Mr. COHEN. That section applies to only eight States, sir. I don't recall whether we have had any specific prosecutions under that law or not. I would have to check it.

Senator HRUSKA. My question is how many prosecutions have you had under that section of the law?

Mr. COHEN. We can supply that information.

Senator HRUSKA. You have referred in your statement to—

Mr. COHEN. We have two prosecutions pending now, Mr. Shaw informs me.

Senator HRUSKA. On page 11, for example:

It was found during the period February, 1966 to 1967 approximately 5,000 persons who gave a residence address in the city or county of St. Louis, Missouri, purchased firearms, primarily handguns, in the neighboring state of Illinois, which has no permit requirement.

Presumably there have been shipments.

Mr. COHEN. No, sir. As I indicated to you, because of the *Tot* case, we cannot presume that they crossed the line with that gun, and, therefore, the mere purchase of that gun in Illinois is not a violation. We have to prove that the felon bought the gun in Illinois and carried it across that line.

Senator HRUSKA. Well, to prosecute successfully under 902(c) that involves shipment. That doesn't involve personal carriage, does it?

Mr. COHEN. 2(c) does not apply to personal carriage.

Senator HRUSKA. It applies to shipment. My question was in the light of that and this great volume of personal violence, it is to be presumed, is it not, that there were a great many shipments into Missouri by licensed dealers.

Mr. COHEN. No, sir. They are going over the counter to purchasers.

Senator HRUSKA. Well, these 5,000 were. Do you want to say to us that it is your opinion that there were no shipments made into Missouri from other—

Mr. COHEN. Well, we get the same thing, Senator, in Senator Kennedy's home State. The people up in the Boston area who want a firearm don't write to Maine to ask for the shipment; they go to Maine or they go to New Hampshire.

Senator HRUSKA. I understand, but that is not my question. I understand that and I so said, I hope you act by differentiating between personal purchases of guns and those which are shipped.

My question is: To your knowledge or from or in your records, is there anything to show that there are shipments from States like Illinois into a State having a gun law like Missouri?

Mr. COHEN. As I indicated, we have at least two cases pending at the moment. I don't know what our statistics might be for a longer period.

Senator HRUSKA. In the 1965 hearings before this subcommittee, Chief Brostron of St. Louis testified that numerous citizens of his city had obtained firearms through the mail from out-of-State dealers.

Now, in order to avoid violation of the section 902(c), those dealers should be able to prove that they had exhibited to them the Missouri license which such purchaser had before he would be qualified to buy the gun; is that not true?

Chairman DODD. Will the Senator yield?

Senator HRUSKA. Surely.

Chairman DODD. Just to clarify the record, is the Senator referring to mail order purchases?

Senator HRUSKA. I am referring to mail order; yes. Mail order would result in shipment.

Mr. COHEN. That is correct.

Senator HRUSKA. And it is shipment which is proscribed by 902(c).

Mr. COHEN. That is correct.

Senator HRUSKA. And that is what Chief Brostron is talking about. He said "numerous." Now, you have only two cases that you know of that have violated—

Mr. COHEN. They are pending at the moment. I don't know how many others there might be, sir.

Senator HRUSKA. Have you or any of you, your front line agents or your back line agents, gone in there and gone through the books and asked that licensed dealer for proof of exhibition to him of a required Missouri license?

Mr. COHEN. I would have to get that for you, sir. I don't know.

Senator HRUSKA. I would think that would be quite important. I would like to have the time to check it, because that is pretty important. The same provision will carry forward into this new bill, whether it is S. 1 or Amendment 90 or S. 1853, will it not?

Mr. COHEN. No, sir. The handgun situation, there would be no shipment at all.

Senator HRUSKA. But shipment of longarms would be allowed under S. 1853. Before shipment could be made, there would have to be a compliance with the law and an exhibition of either a State permit or license; isn't that true?

Mr. COHEN. It is true. It is the same requirement, the exhibition of license.

Senator HRUSKA. The same requirement. One of the witnesses before the House Ways and Means Committee, was a man, the attorney general, I believe, from New Jersey.

Mr. COHEN. I have just been handed a copy of the criminal records check. When we do check those files of the shipments, they are checked out as to the method of delivery and the description of the firearm and whether the name was properly recorded and whether there was proper authorization for receipt of the firearm.

Senator HRUSKA. Does that include some record of the number of the license that the buyer had given him the legal right to purchase that gun?

Mr. COHEN. If it was in the State that required it; yes, sir.

Senator HRUSKA. Talk about Missouri or New Jersey. They both have such laws, and so does New York, and so does Massachusetts. Is that included in the routine check that you make?

Mr. COHEN. Yes, sir.

Senator HRUSKA. And were any violations found?

Mr. COHEN. I don't have the statistics.

Senator HRUSKA. You don't have the statistics. You do have them on file, don't you?

Mr. COHEN. Yes, sir.

Senator HRUSKA. You keep such statistics?

Mr. COHEN. Yes, sir.

Senator HRUSKA. May I request that you furnish these statistics for the record of figures extending over the last 5 years or so and covering violations under section 902(c)?

Mr. COHEN. We will get you what we can; yes, sir.

(The information supplied for the record by Mr. Cohen was marked "Exhibit No. 11" and is as follows:)

EXHIBIT No. 11

[U.S. Government memorandum, Aug. 11, 1967]

To: Commissioner.

From: Director, Alcohol and Tobacco Tax Division.

Subject: Criminal cases arising from violations of section 2(c) of Federal Firearms Act (15 U.S.C. 902(c)).

It is understood that you have been asked to furnish information relative to section 2(c) violations for inclusion with your July 10 testimony before the Juvenile Delinquency Subcommittee of the Senate Judiciary Committee.

This Division does not categorize firearms cases by statutory sections in compiling violation statistics. Consequently, it is not possible to furnish data on the number of Federal Firearms Act Cases involving violations of section 2(c) which were prepared during the last five years.

It has been our experience that section 2(c) does not readily lend itself to the development of successful criminal cases. There are two basic reasons why this is true. In the first place, it has a very limited application. The prohibition on dealer shipment of guns to out-of-state buyers without state permits is applicable only if the buyer's state law requires a permit to purchase a gun. Only nine of the fifty states have such laws and only one of these nine requires permits for the purchase of rifles or shotguns.

Even as to the nine states where permits are required, our experience has demonstrated that section 2(c) is not likely to be violated. There are two ways by which its provisions may be easily avoided.

First, section 2(c) is most commonly circumvented by the simple expedient of going into another state, purchasing the weapon, and taking it home with you. There is no provision in the present law which precludes such a practice. The section 2(c) requirement imposes sanctions with respect to *shipment*, but does not preclude sale and delivery *over-the-counter* to a purchaser who will take the gun back with him into his home state, even though he could not buy it there without a permit.

Secondly, as you know, persons who hold Federal Firearms Act licenses are exempt from the state purchase-permit requirement of section 2(c). Many mail-order dealers seeking to avoid the section 2(c) provisions advertise that they sell handguns only to holders of Federal Firearms Act licenses. Others request customers to furnish their dealer license number. Influenced by these practices, many buyers obtain the \$1.00 license in order to have guns shipped to them even though they are not actually engaged in the firearms business.

HAROLD A. SERR.

Senator KENNEDY. May I ask a question on that point?

Senator HRUSKA. Surely. I will be happy to yield.

Senator KENNEDY. Wouldn't it be very difficult to ascertain really how many violations there had really been of 902(c), because it is very difficult as I understand it, even under the present law, for the dealers to know who is sending in the various requests or applications for mail orders?

Mr. COHEN. That is correct, sir, and of course many of the dealers even suggest that the purchaser acquire a license so they avoid the whole requirement of the statute that the Senator quoted.

Senator KENNEDY. So even under the kind of survey that might be done, or even under effective enforcement procedures, unless you really, unless there was some means of arresting these people, perhaps for some other crime, you would have a very difficult time in ascertaining really if there has been such a violation?

Mr. COHEN. That is correct. For \$1 a person can avoid, obviate the whole problem that Senator Hruska has raised here. If I have a license which I can get for \$1 almost automatically, I can receive a gun through the mail without regard to the permit requirement.

Senator KENNEDY (continuing). That go through that procedure.

Mr. COHEN. It is obviated, sir.

Senator KENNEDY (continuing). That go through that procedure.

Mr. COHEN. Well, we figure that there are at least 25,000 people in the United States who have those licenses solely for the purpose of their own convenience.

Senator KENNEDY. But the point that I was reaching is even under the most effective kind of enforcement by your people, that it would seem to me extremely difficult for them, unless there was going to be some kind of at least arrest for some other crime, to really make a determination, an accurate determination of how much abuse there is, particularly under the respect given it of even the eight States—

Mr. COHEN. As you recognize, it is a most laborious process to try and determine crime this way, to go at it from this voluminous file, this tremendous record, to try to sift through 25,000, 50,000, whatever number of transactions there might be for the few criminal transactions that are within them. A law enforcement officer has got to have infinite patience to be able to go through this kind of thing.

Senator KENNEDY. As I understand it, you feel that with the consideration of the other, of someone, with modifications of the other amendments, that procedure would be vastly simplified?

Mr. COHEN. That would. Now, it is true that S. 1853 procedure here is better, is much better than we presently have. There is a clear identification, and there is a clear notification to local authorities that Mr. Doakes is the fellow who is buying this gun from out of State, and there is some method of identifying Mr. Doakes, and whether he is the type of person who is qualified, of age and so forth, in this State, so that any one of these bills, in this regard, is superior to present law.

Senator KENNEDY. I thank the Senator.

Chairman DODD. May I ask one question?

Senator HRUSKA. Surely.

Chairman DODD. Senator Kennedy has pointed out the difficulties are very great in this area, but in the area where an individual goes across the State line and buys a weapon in a neighboring State and then carries it back to his own State, there is almost no way of knowing, unless a crime is committed or something takes place.

Mr. COHEN. Likewise, Senator, the point is well taken in that there is no requirement today that when he goes across that State line, that

he identify himself in any particular way. When the seller asks him "your name" I could say my name is Joseph W. Barr, and the seller need not ask me for anything further. If I say it in a convincing fashion, that is good enough under today's law.

Senator HRUSKA. Under the pending bill, would that be sufficient to say that he had no reasonable cause to believe that you are not Joe Barr or Joe Doakes or anybody else?

Mr. COHEN. We would contemplate that under the pending bill that at least he would undergo those items that I mentioned before, that he would go through if he were cashing a check for Joseph W. Barr. He would want to see a driver's license or some other type; if he were a military person, a military I.D. card, some valid type of identification.

Senator HRUSKA. Of course there is a little diversionary tactic in asking about the conviction of crime. My line of questioning had to do with a very simple easily detectable offense. Missouri requires a permit. There are dealer records which under present law the dealer has to keep, and if he doesn't he should get hauled into the courts and disciplined for that. You could segregate the orders that were shipped into Missouri. You could ask the dealer where are the permit numbers. It is a very simple thing. You couldn't find anything more simple than section 902(c) of the present Act, even the very highly meritorious Hruska act. I don't think you could find anything more simple. That is what I am asking about, not this nebulous thing of whether he had a conviction or whether he is a hoodlum or not. This is what I had in mind. You suggested it would be a very voluminous and laborious thing. That would hamper enforcement, wouldn't it?

Mr. COHEN. There is no requirement under present law that the dealer keep records as to how he ships guns. We don't know necessarily whether Mr. Joseph W. Barr or Mr. Joe Doakes got the weapon by mail, necessarily, unless the dealer happens to keep those records. The law does not require it.

Senator HRUSKA. There is no requirement for the keeping of any records?

Mr. COHEN. Not for the keeping of that specific record.

Senator HRUSKA. Is there anything to stop you in your regulations from asking for it? Do you ask for it in your regulations?

Mr. COHEN. I don't believe we do now, Senator.

Senator HRUSKA. Why not? Why not? It is so simple. He should have evidence that he complied with the law, and you could ask for it.

Mr. COHEN. A number of years ago I understand a regulations project of that nature was gotten up, and there was a great hue and cry from a number of people that this was leading to all of the horrors that many people say these bills will lead to.

Chairman DODD. Will the Senator yield?

Senator HRUSKA. Surely.

Chairman DODD. I missed the first part of your statement. Didn't your department ask for such a regulation in 1958?

Mr. COHEN. A number of years ago it was proposed. It was long before I arrived on the scene, sir.

Chairman DODD. And the people who are opposing Amendment 90 objected then and said this would be a terrible thing to do?

Mr. COHEN. That is right, sir.

Chairman DODD. And I think that is why you didn't get it.

Mr. COHEN. This is why we are asking for statutory confirmation of our authority to do these things.

Chairman DODD. I think that is the record, Senator Hruska.

Senator HRUSKA. It may be. Maybe they didn't protest enough.

Chairman DODD. Perhaps the others protested too much.

Senator HRUSKA. Maybe the other side protested too much, Mr. Chairman. Presumably, then, in the future we will have compounded many items like this. Because in either of the bills that are before us, there will be many more requirements for the dealer to comply with and to prove to your department that he has complied. If there is complaint now about the volume of this work in connection with this simple thing, how much will your complaint be, if you have many, many, many more requirements for the dealer to follow?

Mr. COHEN. Senator, we now require that a physician who prescribes narcotic drugs must keep valid records. He keeps them both for us and for the Department of Health, Education, and Welfare. We have little problem with physicians keeping those records. We have little problem with the disposition of the drugs insofar as the physician is concerned. This is not an unusual or an unnecessarily burdensome task. We are merely trying to provide for proper controls over potentially dangerous devices.

Every automobile in the United States is subject to some kind of licensing, a form of recordkeeping requirement, so we are not asking for anything that is inordinate or unusual. We are asking only the reasonable amount of controls that we think are necessary.

Now, you have every right, of course, to believe that we are asking for stringent controls that are beyond that which are necessary, and as I indicated, your bill is better than present law. My personal view is that the administration bill, as introduced by the chairman, is somewhat better, but I think we need something more definitive, where the rules are more spelled out than under a law enacted in 1938 which was not designed to cover society as it exists today.

Senator HRUSKA. Let's compare the two then. Comparisons are odious but maybe we can get into them. We almost have to. The Administration bill prohibits, makes it unlawful, let us say, for any dealer, to sell any firearm to an individual whom the dealer knows or has reasonable cause to believe does not have certain qualifications, either age or residence or the matter of whether or not he is a felon, and so on.

Now, tell us what is the dealer's way of showing under Amendment 90, that he has no reasonable cause to believe that the prospective buyer is not disqualified under that statute.

Mr. COHEN. He would fill out the prescribed information that would be required, and he would have identified the individual.

Senator HRUSKA. That would satisfy the Department?

Mr. COHEN. If he is a reputable dealer, and we will only have reputable dealers under the proper standards, then that is sufficient. Now, he is going to make a mistake.

Senator HRUSKA. I do not question the dealers and after you get through inspecting them and making them toe the mark and weed out those that are not dealers, I think they will be even better dealers than they have been heretofore, but not all of their buyers are reputable people, are they?

Mr. COHEN. No. It will be an offense for the purchaser to misrepresent to the dealer.

Senator HRUSKA. Oh, of course it will, and that will be great stuff, won't it. A man comes into Omaha from Alliance, Nebr.; he says he is from Alliance, Nebr., which is as far away from Omaha as Chicago is from Omaha. He will fill out the required forms and say "I am over 21; I live in Alliance, I am not a felon; I am a good guy and therefore I want to buy a gun."

Now, if this law applies to intrastate sales, and the dealer behind the counter would say "I believe you, mister."

Mr. COHEN. And he sees his driver's license and other identification?

Senator HRUSKA. Even so, he may be deceived. We cannot help it. We live in a world where we cannot design absolute controls, or fool-proof systems.

Contrasted with that, we have a bill which says that the purchaser must file an application. He must fill in all these details, and he must send that application to the seller, who must send a copy of that application to the chief of police in the locality in which the prospective buyer lives. Now, then, I am a little mystified about your statement in the course of your testimony that this is a piecemeal thing.

Mr. COHEN. No, sir.

Senator HRUSKA. Whereas Amendment 90 is a much more complete and thorough thing.

Mr. COHEN. Excuse me. I applaud that aspect of your bill, sir. I think that is a fine—

Senator HRUSKA. Of course, you praised it faintly and then you damned it most viciously by saying it is piecemeal.

Mr. COHEN. No, sir. If you will permit me, I said that this aspect of it was affirmative and good. The part that disturbs me is that there are many provisions in your bill otherwise that are not—

Senator HRUSKA. I see.

Mr. COHEN. But on this provision, fine. I think that that system might be unduly burdensome on some people, but I am willing, I think it is a perfectly fine way to control this thing. It may be as good, it may be better. This is a question of judgment. That aspect of your bill I have no quarrel with at all, sir.

Senator KENNEDY. Could I ask, Senator Hruska, of course as I understand if it is an intrastate transaction, the Hruska provisions would not apply.

Senator HRUSKA. No.

Senator KENNEDY. Isn't that correct?

Senator HRUSKA. For the purpose of this question it was an interstate proposition. I will come to the intrastate after a while.

Mr. COHEN. It does apply to the extent that, under the Hruska provision, an Omaha dealer selling a handgun should satisfy himself that the buyer lives in Nebraska or he should get the required affidavit.

Senator HRUSKA. I think there is a little inconsistency on the part of these witnesses, at least a conflict.

Chairman DODD. Would it be satisfactory to the Senator from Nebraska if he wishes to go to another subject that the Senator from Massachusetts ask questions?

Senator HRUSKA. By all means. I haven't quite finished with that. The suggestion was made that this procedure of filing an affidavit in S. 1853 is burdensome. On whom is it burdensome?

Mr. COHEN. It is not burdensome on us, sir. We have no quarrel with it.

Senator HRUSKA. On whom would it be burdensome.

Mr. COHEN. The dealers or purchasers may find it somewhat more burdensome.

Senator HRUSKA. And the chief of police maybe.

Mr. COHEN. I have no idea whether—

Senator HRUSKA. He would have to enforce the law, wouldn't he? He would have to get out of his office and search the records or call up somebody that knows the buyer and say, "Do you know this guy and is he actually the guy?" He would have to enforce the law. He would be given a chance to apply and enforce the law that is either in a city ordinance or a State law, wouldn't he?

Mr. COHEN. As I say, we have no problem with that aspect of this bill at all.

Senator HRUSKA. I was hoping you would go just a little further and say this is superior to the proposition of pulling out a wornout driver's license and saying "I am all right, please sell me a gun." But I won't ask you that question.

Chairman DODD. Senator Kennedy?

Senator KENNEDY. Mr. Cohen, I first of all want to commend you and Mr. Barr on your statements. During the course of the time that I have been involved in the deliberations on this legislation, there have been a number of difficult questions that have been raised repeatedly. I think that your testimony, and certainly your responses to date, have been effective, and have been thoughtful, and have been extremely pertinent to the areas which I think there has been a good deal of confusion about, and I want to say how much I appreciate the responses which you have given, and the way that you have approached this problem, and the fact that your testimony has really directed itself to the principal areas of confusion. It has done a great deal, I believe, to eliminate some confusion.

I would like to just ask you a few questions in one area, because I know Senator Hruska has further questions, and then I would like to come back to some additional areas. The one area that I am concerned about now is on the question of importation of weapons and firearms and other devices.

I understand that you have a relationship, sort of a joint responsibility, with the Department of State, in that an importer makes application to the State Department, and the import license is granted to the applicant by State. Then after the weapons are introduced into this country, the Treasury assumes the responsibility.

I am just wondering whether, in the course of these events, the Treasury reviews the considerations for the importation of weapons?

Mr. COHEN. The licensing operation of the State Department is one which involves only our foreign affairs. They are not concerned with the domestic situation, so that their concern is merely what are our relationships in the foreign field with the country of import or export.

Senator KENNEDY. At some time do they not register this application with the Treasury?

Mr. COHEN. We may get a copy I believe, sir, if the importation is also subject to National Firearms Act controls.

Senator KENNEDY. You get a copy.

Mr. COHEN. All of the National Act weapons you see, such as a machinegun, a sawed-off shotgun, any of the sort of exotic types require Treasury permission to import, and we would coordinate with the Department of State on the importation.

Senator KENNEDY. Since the State Department is not charged with the responsibility as far as the internal workings or considerations in this country, what standards if any do you establish?

Mr. COHEN. On the importation?

Senator KENNEDY. On the importation.

Mr. COHEN. There are no standards set up in the Federal Firearms Act, and therefore, we can apply none, and as I indicated in my testimony, other than the National Act firearms of course, but if you are talking about these cheap little starter pistols that I mentioned that may be just as dangerous to the user as the victim, we have no way of restricting the influx of weapons of that nature.

Senator KENNEDY. Do you have any control over the person who is going to receive them in this country?

Mr. COHEN. He will usually be a licensee.

Senator KENNEDY. He will be a licensee. And does the Treasury investigate the background of the licensee?

Mr. COHEN. Yes, sir, to a very limited extent.

Senator KENNEDY. You do?

Mr. COHEN. To the extent the law justifies it. As I indicated, the 104,000 Federal Act licenses are issued pretty much on request, but our regulations provide that the District Director may make inquiry to establish the bona fides of the application. No formal investigation is made.

Senator KENNEDY. Once they come into the United States, they are out of the control of the State Department, is that correct?

Mr. COHEN. That is correct, sir.

Senator KENNEDY. And then you assume the prime responsibility, is that right, while these weapons are in this country?

Mr. COHEN. That is correct to the extent that the Federal Firearms Act is applicable.

Senator KENNEDY. To the extent that you do have a mandate. Now, these licensees have to indicate, as I understand it, on their application that the weapons are going to be used for particular purposes. They outline the kinds of purposes for which these imported weapons will be used, is that your understanding?

Mr. COHEN. Yes, sir. That is, I believe the importer indicates if the guns are for personal use or for resale in commercial channels.

Senator KENNEDY. Now, I would like to know whether you follow up to find out whether the weapons that are imported are actually used for those purposes?

Mr. COHEN. Well, we follow the same procedures we would follow on a weapon manufactured in the United States, that is we periodically

make inspections of the licensed importers as well as the manufacturers to make sure they are keeping the proper types of records. Their general assertion would be that these are sporting or target-type weapons, and that is the purposes generally for which they advertise them, so there is no violation inherent in that kind of activity.

Senator KENNEDY. I wrote the Secretary of State and asked him about these importations of weapons. I received a letter back on April 14 from Mr. Kitchen, and he gave me some information, comprehensive information. We have, for example, the International Armament Corp., of Alexandria, Va., which received a license in 1965. The purpose was the wholesale and retail distribution on the American civilian commercial market. In this order which was license No. 9231, they imported 150,000 long and short rifles with bayonets, and that is caliber 7.92—they imported 175,000 long and short rifles with bayonets, caliber 7. They imported 35,000 bayonets. They imported 98,000 steel helmets and 12,000 sabres.

I am just wondering—there are a good many other things they imported under that particular license. They say that the purpose is for the wholesale and retail distribution on the American civilian commercial market. What sort of investigative procedures do you follow to make a determination whether those and the 45,000 pistols that they imported are actually being used in these civilian markets and where these weapons are going?

Mr. COHEN. During our firearms inspection of those importers, they would determine that they are selling these, and this is the general practice that I am sure this company as well as many others by orders or shipment to other mail-order houses, this is the general disposition of that kind of weapon. They are of course sold to local dealers for local distribution, but most of those surplus military-type weapons are inexpensive and are disposed of in the mail-order trade.

As much as we might find it objectionable to our taste or to our feeling of what the law ought to be, there is nothing that we can do as long as they are directing it in the wholesale and retail trade in the United States.

Senator KENNEDY. This is only a part of the total rifles that have been imported between 1962 and 1966. The figures that were given me was 1,638,552 rifles, 600,000 pistols imported during that period of time, and 513,000 revolvers. I am just wondering from your own experience how effective, under the present legislation, how effective can the policing of these weapons be? Do we know where they go, how they are distributed in this country, whether they are actually used for sporting use or others? Can it be determined under the present legislation, and what you feel would be the effect under the legislation S. 1.

Mr. COHEN. Under the present legislation of course, there is virtually no control over this kind of weapon. Whether it ought to be imported is a question that is completely beyond the scope, whether it is of sufficient quality or character to even be used for sporting purposes is now completely beyond the scope of any inquiry that we can make.

Under the bills as proposed, the surplus military handgun would be prohibited. There is little or no use for these kinds of weapons in normal civilian purposes. The sporting kind of gun, the sporting gun

that is adaptable, that is designed or adaptable to sporting purposes is permissible and would be treated as if it were any other kind of gun manufactured in the United States subject to the same kind of restrictions and controls as S. 1 or S. 1, Amendment No. 90 which might have for domestically manufactured arms. Essentially the long guns would be distributable with a minimum of restrictions.

Senator KENNEDY. I suppose that the case is made that these weapons are used for targeting practice. I am not sure how familiar you are with these weapons. This is another license, No. 8361 assigned to the St. Hubert Co., in Waseca, Minn. They imported 1,700, 3.57 caliber revolvers, 1,600, 6.01 caliber, 1,700, 44 caliber revolvers. I understand that the missile that comes out is almost a half inch across.

Mr. COHEN. Those will blow a hole. Those are really not target shooting kinds of weapons, not unless you want to tear the target apart.

Senator KENNEDY. I am not going to trespass on the time of the committee. I would like to introduce copies of the various licenses that I have here, Mr. Chairman, and a copy of the letter from Mr. Kitchen at this point in the record.

Chairman DODD. Yes. I think that will be very helpful.

(The material referred to by Senator Kennedy was marked "Exhibit No. 12" and is as follows:)

EXHIBIT No. 12

DEPARTMENT OF STATE,
Washington, April 14, 1967.

HON. EDWARD M. KENNEDY,
U.S. Senate,
Washington, D.C.

DEAR SENATOR KENNEDY: In response to your request for information during our meeting on April 12, I am forwarding herewith as enclosure 1 certain statistical data concerning numbers of pistols, revolvers, and rifles imported into the United States during the years 1962 through 1966.

Enclosure 2 outlines firearms import license data on the five largest import transactions for each of the calendar years 1963 through 1966.

We have telegraphically asked our Embassies at Brussels, Bonn, Madrid, London, Rome, and Rio de Janeiro to provide information on the import regulations obtaining in their countries. We are also examining the question of whether under Section 414 of the Mutual Security Act the Department of State could exercise stricter controls over firearms imports. We will provide information on these two matters as soon as possible.

Sincerely yours,

JEFFREY C. KITCHEN,
Deputy Assistant Secretary for Politico-Military Affairs.

Enclosures: (1) Statistical Data (1963-1966). (2) Import License Data (1963-1966).

[Enclosure 1]

APRIL 14, 1967.

RIFLES, PISTOLS, AND REVOLVERS IMPORTED TO THE UNITED STATES (1962-66)

The data compiled on the attached pages was collected from original import licenses returned to the Department of State by the Collectors of Customs. Such returns are made when the licenses expire or importation is completed, whichever occurs first. (A license is valid for a period of six months.) The back of each license is endorsed by the Collector of Customs to reflect importations made against the license.

FEDERAL FIREARMS ACT

The information reported for 1966 is subject to the qualification that there are some licenses issued in 1966 whose period of validity has not yet expired. Thus shipments could still be made against these licenses.

Rifles imported during 1962.....	183, 636
Pistols imported during 1962.....	202, 770
Revolvers imported during 1962.....	35, 158
Rifles imported during 1963.....	424, 085
Pistols imported during 1963.....	142, 159
Revolvers imported during 1963.....	74, 452
Rifles imported during 1964.....	191, 187
Pistols imported during 1964.....	128, 660
Revolvers imported during 1964.....	45, 981
Rifles imported during 1965.....	729, 392
Pistols imported during 1965.....	258, 876
Revolvers imported during 1965.....	103, 057
Rifles imported during 1966.....	110, 252
Pistols imported during 1966.....	168, 239
Revolvers imported during 1966.....	254, 938
Total rifles imported 1962-66.....	1, 638, 552
Total pistols imported 1962-66.....	900, 704
Total revolvers imported 1962-66.....	513, 586

[Enclosure 2]

DEPARTMENT OF STATE,
Washington, D.C.

Subject: Major individual arms importations, 1963 licenses.

1. *Origin.*—Ministry of Defense, Rome, Italy.

Consignee.—Adam Consolidated Industries Inc., New York, N.Y.

License #6261 for:

Rifles Models 91 and 33—Cal. 6.6.....	149, 409
Rifles Model 41—Cal. 6.5.....	69, 478
Rifles Model 33—Cal. 7.33.....	18, 090
Muskets Model 33—Cal. 7.35.....	12, 415
Muskets Model 33—Cal. 6.5.....	7, 000

Purpose.—For resale as sporting rifles.

2. *Origin.*—Interarmco Industries, S. A., Geneva, Switzerland and Panama, R. P.

Consignee.—International Armament Corporation, Alexandria, Va.

License #6052 for:

German Walther P-38 Pistols, Cal. 9 mm.....	1, 000
German Mauser Pistols, Cal. 7.65 mm (.32).....	1, 000
American rifles, M1903, Cal. 7.62 mm (.30).....	30, 000
American rifles, M1917, Cal. 7.62 mm (.30).....	87, 000

Purpose.—For resale to approved commercial and individual buyers.

3. *Origin.*—Oy Sako Ab, Riihimaki, Finland & Fabrique Nationale d'Armes de Guerre, Herstal-lex-Liege, Belgium.

Consignee.—Browning Industries, Inc., St. Louis, Missouri.

License #6757 for:

.222 Cal. Bolt Action Rifle.....	1, 100
.222 Cal. Bolt Action Rifle.....	500
.22/250 Cal. Bolt Action Rifle.....	250
.243 Cal. Bolt Action Rifle.....	1, 400
.308 Cal. Bolt Action Rifle.....	650

Purpose.—For sale to retail sporting goods dealers.

4. *Origin.*—J. P. Sauer & Sohn, Echernforde, Germany.

Consignee.—Magnum Import Company, South Gate, California.

License #5639 for 2,500 Weatherby Mark V Rifles.

5. *Origin.*—Oy Sako Ab, Riihimarki, Finland.

Consignee.—Firearms International Corporation, Washington, D.C.

License #6041 for:

Sako Cal. 243 Rifles.....	430
Sako Cal. 222 Mag. Rifles.....	55
Sako Cal. 308 Rifles.....	52
Sako Cal. 338 Rifles.....	36
Sako Cal. 30/06 Rifles.....	160
Sako Cal. 300 Rifles.....	16
Sako Cal. 264 Rifles.....	23
Sako Cal. 222 Rifles.....	120

Purpose.—For resale to Sporting Goods Dealers.

Subject: Major individual arms importations, 1964 licenses.

1. *Origin.*—Fabrique National d'Armes de Guerre, Herstal-lex-Liege, Belgium.

Consignee.—Browning Industries, Inc., St. Louis, Missouri.

License #7649 for:

.243 cal. Mausers.....	91
.308 cal. Mausers.....	78
.270 cal. Mausers.....	455
.30-06 cal. Mausers.....	1, 375
.264 cal. Mausers.....	905
7mm cal. Mausers.....	1, 021
.300 H & H cal. Mausers.....	140
.338 cal. Mausers.....	245
.375 cal. Mausers.....	58
.458 cal. Mausers.....	65
.300 W. Mag. cal. Mausers.....	548
.308 Norma cal. Mausers.....	56

Purpose.—For sale through Browning Arms Company to retail sporting goods dealers located throughout the US.

2. *Origin.*—Transalpina, S.A., Madrid, Spain.

Consignee.—International Armament Corp., Alexandria, Va.

License #8658 for 100,000 7.92mm cal. Mausers.

Purpose.—For sale within the U.S.

3. *Origin.*—Parker-Hale Limited, Bisley Works, Golden Hillock Road, Sparkbrook, Birmingham 11, England.

Consignee.—Pasadena Firearms Company, Inc., Pasadena, Calif.

License #7279 for 35,000 English SMLE No. 4 and No. 1 MK III Rifles, Caliber .303 British.

Purpose.—For sale to dealers and gunsmiths and for conversion to sporting rifles and subsequent sale to dealers.

4. *Origin.*—Interarmco Industries, S.A., Geneva, Switzerland, and Panama, R. P.

Consignee.—International Armament Corp., Alexandria, Va.

License #8185 for:

American rifles, M1903, cal. 7.62mm (.30).....	4, 918
American rifles, M1917, cal. 7.62mm (.30).....	5, 036

Purpose.—For resale within the US.

5. *Origin.*—J. P. Sauer & Sohn Gegrundet 1751 In Suml, Koln-Niehi, Nesselrodestrabe 20, Western Germany.

Consignee.—Saint Hubert Company, Waseca, Minnesota.

License #8361 for:

.357 cal. revolvers.....	1, 700
.401 cal. revolvers.....	1, 600
.44 cal revolvers.....	1, 700

Purpose. - For resale to sporting goods stores and dealers.

FEDERAL FIREARMS ACT

Subject: Major individual arms importations, 1965 licenses.

1. *Origin*.—Spanish Army, Madrid, Spain.
Consignee.—International Armament Corporation, Alexandria, Va.
 License #9231 for:

Long & Short Rifles w/bayonets, cal. 7.92mm-----	150,000
Long & Short Rifles w/bayonets, cal. 7mm-----	175,000
Pistols-----	45,331
Long & Short Rifles & Carbines, cal. 6.5mm-----	100,418
Bayonets-----	35,000
Steel Helmets-----	98,030
Sabres-----	12,694
Cartridges, cal. 7mm-----	23,391,000
Cartridges, cal. 6.5mm-----	1,750,000
Cartridges, cal. 9mm-----	40,000,000

Purpose.—Wholesale and retail distribution on the American Civilian commercial market.

2. *Origin*.—Fabrique Nationale d'Armes de Guerre, Herstal-lex-Liege, Belgium.
Consignee.—Browning Industries, Inc., St. Louis, Missouri.
 License #00708 for:

.25 cal. Automatic Pistol (6.35mm)-----	15,000
.380 cal. Automatic Pistol (9mm short)-----	5,000
9mm cal. Automatic Pistol (9mm Parabellum)-----	5,000
.243 cal. Bolt Action Mauser-----	50
.308 cal. Bolt Action Mauser-----	20
.308 Norma cal. Bolt Action Mauser-----	100

Purpose.—For resale to sporting goods dealers.

3. *Origin*.—Interarmco Industries, S.A. Panama City, Republic of Panama.
Consignee.—International Armament Corporation, Alexandria, Virginia.
 License #01865 for:

Mauser type rifles, cal. 7.92mm-----	50,000
Rifles/carbines, cal. 6.5mm & 7.35mm-----	10,000
Mannlicher type rifles/carbines, cal. 8mm-----	10,000
Pistols of various types & calibers-----	200
Rounds of small arms ammunition, various calibers-----	5,000,000

Purpose.—For sale on the American commercial market.

4. *Origin*.—Pietro Beretta, Gardone, Val Trompia, Italy.
Consignee.—Berben Corporation, New York, New York.
 License #01722 for:

25 cal. Jetfire automatic pistols-----	2,000
22 cal. Minx M2 automatic pistols-----	1,000
22 cal. Minx M4 automatic pistols-----	400
22 LR cal. Jaguar 3½" automatic pistols-----	300
22 LR cal. Jaguar 6" automatic pistols-----	200
32 Cal. Puma automatic pistols-----	600
380 cal. Cougar automatic pistols-----	1,000
9MM cal. Brigadier automatic pistols-----	50

Purpose.—Distribution to sporting goods dealers.

5. *Origin*.—Roehm Gmbh, Sontheim/Brenz, Germany.
Consignee.—Eig Cutlery, Inc., Miami, Florida.
 License # 01655 for:

	<i>Pieces</i>
RG 10 Revolver Frame, Cal. .22 Short-----	25,000
RG 10 Cylinders, Cal. .22 Short-----	25,000
RG 10 Hammer-----	25,000
RG 10 Hammer Screw-----	25,000

Purpose.—Resale to Federal Licensed Dealers.

Subject: Major individual arms importations, 1966 licenses.

1. *Origin.* Fabrique Nationale d'Armes de Guerre, Herstal-lex-Liege, Belgium.

Consignee. Browning Arms Company, St. Louis, Missouri.

License #05360 for:

.243 cal. Mausers-----	100
.308 cal. Mausers-----	150
.22 cal. rifles-----	53,000
.25 cal. automatic pistols-----	30,000
.380 cal. automatic pistols-----	6,000
9mm cal. automatic pistols-----	9,000
.32 cal. automatic pistols-----	300
.22 cal. automatic pistols-----	15,000

Purpose.—For sale through Browning Arms Company to retail sporting goods dealers located throughout the U.S.

2. *Origin.*—Ministerio de la Defensa, Caracas, Venezuela.

Consignee.—Century Arms Company, St. Albans, Vermont.

License #03275 for:

7mm cal. rifles, semiautomatic-----	7,074
7mm cal. rifles-----	30,614
7mm cal. carbine-----	12,455
11.05mm cal. Mausers-----	2,070
6 million plus rounds of ammunition—7, 9 & 11.05mm.	

Purpose.—For hunting and sporting purposes.

3. *Origin.*—Star, Sonifacio Echeverria, Eibar, Spain.

Consignee.—Firearms International Corp., Washington, D.C.

License #03416 for:

.22 cal. pistols-----	10,000
.32 cal. pistols-----	1,000
.380 cal. pistols-----	1,000
9mm cal. pistols-----	500
.45 cal. pistols-----	700
.380 cal. pistols (Starfire)-----	2,000
.25 cal. pistols-----	1,000
.22 cal. pistols (Lancer)-----	1,000

Purpose.—For resale to sporting goods dealers.

4. *Origin.*—Luthy, Neuchatel, Switzerland.

Consignee.—International Armament Corp., Alexandria, Va.

License #05146 for:

7.5mm Swiss Army rifles-----	35,000
7.5mm Swiss Army carbines-----	80,000
Bayonets-----	35,000

Purpose.—Sporting and collecting resale within the U.S.

5. *Origin.*—Gabilondo Y Cia., Vitoria, Spain.

Consignee.—Stoeger Arms Corp., South Hackensack, New Jersey.

License #05169 for:

.38 cal. revolvers-----	60
.22 cal. automatic pistols-----	4,500
.380 cal. automatic pistols-----	1,000
.32 cal. revolvers-----	125
.380 cal. pistols C III A-----	345
.380 cal. pistols CE III A-----	175

Purpose.—For resale in the U.S.

Senator HRUSKA. Would the Senator yield on the point which he is now concerned with?

Senator KENNEDY. Yes.

Senator HRUSKA. You indicated, Mr. Cohen, that the destination or the actual use of these imports is unknown, and you have no way of tracking them?

Mr. COHEN. No, I didn't mean to imply that sir. I said that once they entered the United States, they are treated as if they were domestic manufacture, and the same kinds of records would be kept for these weapons as would be kept for domestically manufactured weapons.

Senator HRUSKA. Of course, we can get the guns of larger caliber out of the way right away, can't we?

Mr. COHEN. Yes.

Senator HRUSKA. No license for destructive devices has been granted for at least 2 years and maybe more they are not imported and that was accomplished under the authority of the Mutual Security Act. Doesn't the President have the power, if he feels that these or other guns should not be imported, to say they shall not be imported, period; isn't that true?

Mr. COHEN. I am not an expert on that act, but I have been informed—

Senator HRUSKA. Well, I understand that.

Mr. COHEN. I have been informed by the Attorney General that he feels there is not sufficient authority under that act to forbid all that should be forbidden.

Senator KENNEDY. Could I just on that point—would you support such a recommendation yourself?

Mr. COHEN. The restriction?

Senator KENNEDY. Yes, on these kinds of weapons that could not be clearly used for sporting weapons.

Mr. COHEN. Oh, we feel—

Chairman DODD. Bazookas.

Mr. COHEN. I personally feel very strongly when once we get beyond bazookas we get to the surplus military weapon, really, that is a travesty. People are trying to pass off junk on American citizens that is dangerous to user and potential victim, and it is just unconscionable.

Chairman DODD. Let me make an observation.

Mr. COHEN. I am talking about pistols now, not the long guns, some of which are adaptable to proper use.

Chairman DODD. We do have a witness from the Office of Munitions Control of the State Department who will probably be more helpful than we would expect you to be on this particular subject.

Senator HRUSKA. On the matter of being able to trace them and determine what is being done with them, there is no difference in that regard between pistols, revolvers, rifles and shotguns of domestic manufacture.

Mr. COHEN. No, I didn't indicate—

Senator HRUSKA. So the attribute of being an imported article in and of itself is another factor?

Mr. COHEN. Except for the quality.

Senator HRUSKA. Except for the quality?

Mr. COHEN. That is right.

Senator HRUSKA. Of course, some of these starter pistols are bad, but suppose a starter pistol was made in this country and was bad, would you go after them?

Mr. COHEN. I would hope that we would have some kind of authority. We have not had, to date we have not had that kind of experience.

Senator HRUSKA. A strange thing you know, on June 1, the *Shotgun News*, published in my native State, at Columbus, Nebr., we find advertisements for starter revolvers. Here is one that sells for \$21.93, and here is another one which sells for \$12.95 in blue, and if you want chrome it is \$13.95. The second one which is cheaper is described as "Not an import. Built in Texas." Now I imagine that if we are going to get so awfully angry at imports because they are bad, we ought to get mad at domestic manufacturers because they are bad.

Mr. COHEN. Well, not all of the starter pistols, in fact most of the pistols and these go to fairly inexpensive ones manufactured in the United States are of sufficient expense, that they are usually of reasonably decent quality. I won't say they are first-rate quality always, but they are usually much better than these \$2.94 or \$3.95 things that are being imported, or \$4.95.

Senator HRUSKA. Here is an import selling for \$21.95 and this domestic job \$12.95. Now, which is junk?

Mr. COHEN. I am not saying every one is of equal character. I am not an excellent judge of weapons. I turn you over to Mr. Barr who is my expert.

Chairman DODD. Have you finished on the question of imports?

Senator KENNEDY. Yes.

Chairman DODD. It has just been called to my attention that in 1965 I received a memorandum from the Department of Justice concerning the import provisions of what was then S. 1592. The memorandum says "The authority and responsibility to control the importation of implements of war under the Mutual Security Act which the President has delegated to the Secretary of State is dependent upon the furtherance of world peace and the security and foreign policies of the United States." It does not extend to the broad protection of the general welfare. However, the import provisions in S. 1592 are the same as in S. 1, Amendment 90, and do extend this broad protection. Thus they are necessary and do not represent a duplication of authority or responsibility as conferred by the Mutual Security Act.

I think that is important.

Mr. COHEN. That answers the Senator's question. Thank you very much, sir.

Chairman DODD. The President couldn't stop these imports as has been suggested under the Mutual Security Act, and unless we get this language into the new legislation, he still won't be able to do so; am I right about that?

Mr. COHEN. That is right, sir. That is my recollection.

Senator HRUSKA. Mr. Cohen, in your statement you have said among other things that "since the persons being federally licensed in the firearms business are engaging in interstate and foreign commerce, their firearms business activities may be federally registered."

I don't think too many people would quarrel with that. Now, what about the intrastate sales by these Federal licensees. Are they contemplated for coverage under Amendment 90, the administration bill?

Mr. COHEN. The licensee is bound by the Federal requirements. I believe there is a memorandum on file with the House committee from the General Counsel which indicates that once the Congress has determined that the control of interstate commerce in weapons is essential to the welfare of the citizens of the United States, then it follows that the Congress has the right to—it was filed also with this committee—

Senator HRUSKA. I am not talking about the right of Congress but whether this bill is intended to, and does provide for the controlling, and regulation of intrastate sales. For instance, a sale by Sears, Roebuck in Chicago, going to Alton, Ill. Is that controlled? Is that within the purview of that act?

Mr. COHEN. Yes, sir. There are differences. However, for example, Sears Roebuck, in Chicago, Ill., can receive an order from a resident of Springfield, Ill., for a weapon and can mail it to him. That is intrastate. There is no problem in mailing that weapon, or a resident of your State can write to a large commercial establishment in Omaha and receive the weapon by mail. It cannot cross State lines but it can within the jurisdiction.

Senator HRUSKA. Have you any difference or opinion with that, Mr. Barr?

Mr. COHEN. No, sir, Senator.

Senator HRUSKA. It is a pretty big loophole, isn't it?

Mr. BARR. No, sir.

Mr. COHEN. No, sir.

Mr. BARR. If you stop to consider the objective that we have here, and I keep getting back to it, we are not trying to clean up this whole area, sir, because as I have said, I think this is the third time, our objective is quite simple. It is to enable the States to perform the responsibility which has been given to them by the Constitution to protect their citizens. I don't think that is a loophole, sir. The States can take care of that themselves.

Senator HRUSKA. I see. Why can't they take care of these other aspects themselves?

Mr. BARR. Because the other aspects, sir, that we are addressing ourselves to are the interstate operations, where they cannot control them.

Senator HRUSKA. Precisely, precisely.

Mr. BARR. Yes.

Senator HRUSKA. Under S. 1853 we have a presale notification procedure, this is sent to the dealer in advance, and he must send a copy to the chief of police. You have praised that concept highly in the matter of the National Firearms Act and said it might be burdensome, "but this is where the responsibility clearly lies." I am reading from page 550 of your testimony in the House.

It is not a Federal responsibility but a local responsibility. It is rightly or wrongly we in this country have determined that police powers and the protection of the citizen in the main reside with state and local officers. That is the clear thrust of this bill. It might be burdensome on the local officer, but if a determination is to be made, it should be made on the local level.

Now, what I cannot get into my head is why is this good as a concept and philosophy in the case of the National Firearms Act, but no good for the purpose of controlling interstate sales by mail of handguns?

Mr. BARR. Senator, this administration would not object, and I think Mr. Cohen has made this clear, to the philosophy and the concept that you have expressed in the case of handguns. We believe that our concept is preferable, but Mr. Cohen has said, and I echo the statement, that your concept is a vast step forward and the administration would not object if the Congress saw fit to adopt it.

Senator HRUSKA. Well, getting back again to "reasonable cause," it is unlawful for a person who is under indictment or who has been convicted in any court of a felony, to buy a gun?

Mr. BARR. Yes, sir.

Senator HRUSKA. Now, how in the world can a purchaser satisfy the seller, over the counter, that he is free and clear from any felony conviction simply by showing his driver's license?

Mr. BARR. In that respect your proposal, in its limited area of applicability, may have some advantages over the administration's proposal. There is no question about it.

Senator HRUSKA. Would the seller under those circumstances have no reasonable cause, just the display of a driver's license, would he have then no reasonable cause to believe that the applicant was not a felon?

Mr. BARR. No, sir.

Senator HRUSKA. If that is all he did, and he later turned out to be a felon, could the dealer be prosecuted under S. 1, Amendment 90 if enacted into law?

Mr. BARR. Are you speaking now, sir, of the seller, the licensee?

Senator HRUSKA. Yes.

Mr. COHEN. If he took reasonable steps.

Mr. BARR. If he took reasonable steps.

Senator HRUSKA. Then it would be a reasonable and satisfactory step for a seller, in order to determine whether or not the applicant, the prospective buyer, is a felon or not, to ask to see his driver's license and that is all?

Mr. COHEN. He should take reasonable measures to keep informed.

Senator HRUSKA. All right. Now, what else can a dealer do?

Chairman DODD. Will the Senator yield?

Senator HRUSKA. Let me pursue this just a minute because they stop now with a driver's license. Do you want to add something more?

Mr. COHEN. No. I think that anyone in this business is in a position to keep informed on the local crime situation within his jurisdiction, and if he has, he will be aware of some of the people in this area.

Senator HRUSKA. Oh, Mr. Cohen, California is a thousand miles up and down. Redwood or Shasta is about a thousand miles from San Diego. How is he going to keep abreast of the crime situation under those circumstances? What else should he do?

Mr. COHEN. The local police likewise have access in their jurisdiction to the statement that he has made, and they can look at it and they can check out these people the same as they would if they had the affidavit.

Senator HRUSKA. Then you are adding something, aren't you, information from the police station?

Mr. COHEN. Well, the police, that is right. No, I didn't say he had to do that. I said that this is the job of the local police.

Senator HRUSKA. How would the local police in Shasta, Calif., a thousand miles from San Diego, handle this? Here we have a man in San Diego trying to buy a gun. He says, "I am a resident of Redlands. Here is my driver's license." Previously you said that is all the seller would be required to prove good faith and establish reasonable cause to believe he is qualified.

Mr. COHEN. That is what I said.

Senator HRUSKA. Now, what else?

Mr. COHEN. That is all. The rest is up to the local officials to coordinate the information which local police will get from observing the records of these—

Senator HRUSKA. How would the local officials know about him?

Mr. COHEN. If your purchase is being made in Redlands, the local police officers or the State police in Redlands have easy access to the records of Mr. Brown, the local gunsmith, and they can look at them and report to the other places in the State.

Senator HRUSKA. I know, they do, but here is a man buying a gun. Now, how does the local police learn about him? Is there an obligation by the storekeeper, in order to show that there is no reasonable cause for him to believe that the man is a felon. Is there a duty on the part of the storekeeper to call up the local police and say, "Will you get a hold of the chief of police in San Diego and tell me whether Joe Doakes is really living here and that he is really not a felon and that he is not a fugitive from justice," and so on? Does that duty rest upon him?

Mr. COHEN. Only if the potential purchaser was acting in such a way that it could cause a reasonable man to make that inquiry.

Senator HRUSKA. You mean with a furtive look in his eye maybe? How would he judge? One storekeeper might have great suspicion of me. Another might have great suspicion of you just because Mother Nature probably wasn't very kind at least to me in physiognomy, but how would he know. The furtive look in his eye, by his shiftiness, and then the guy who was the best actor, he would escape free?

Mr. COHEN. Senator, you are not going to get me to quarrel with you. I like your provision as far as it goes. I would like it better if it were applicable also to long guns, not just handguns?

Senator HRUSKA. You are advocating the administration bill and I want to know what it means. What does it take for a storekeeper to get away from the stigma, the burden of having reasonable cause in his determination that the purchaser is not a felon so that he can discharge the attaching responsibility? This is something you are advocating. Tell me how does it work?

Mr. BARR. Senator, may I ask a question at this juncture, sir?

Senator HRUSKA. Surely.

Mr. BARR. As I understand it, your bill does not go to sales within a State; is that correct, sir?

Senator HRUSKA. That is true.

Mr. BARR. That is true?

Senator HRUSKA. That is true.

Mr. BARR. Your bill goes only to interstate sales?

Senator HRUSKA. That is right.

Mr. BARR. So the issue between us here is which is the preferable method of approaching the problem of interstate sales. It is not the

issue—I have been a bit confused in this colloquy here—as to a sale in Redlands, Calif., to a resident of San Diego, Calif. That is not the issue; is it? Am I correct, sir?

Senator HRUSKA. I use that example. We could say Las Vegas to Redlands, Calif. Then it is in focus, isn't it?

Mr. BARR. Then it is in focus. I was confused by the intra and inter-state.

Chairman DODD. That was the point I wished to make.

Senator KENNEDY. Of course, it is of interest in California you don't do it anyway because there is a 72-hour waiting period.

Mr. BARR. Right. Right. I was not aware of that.

Senator HRUSKA. Well, that is fine. And what do they do during that waiting period, just sit around and stare at the application or what do they do?

Mr. COHEN. I am not familiar with California law, sir. I happen to be a District of Columbia lawyer.

Senator HRUSKA. That would be up to the proponents of this bill to tell us what a seller must do under these circumstances.

Mr. COHEN. In most States where there is a waiting period there is a State requirement, either a daily requirement for inspection or a daily requirement for reports.

Senator HRUSKA. Texas has no waiting period?

Mr. COHEN. That is right, sir.

Senator HRUSKA. Most States do not have waiting periods.

Senator KENNEDY. Can I ask just on this point here?

Senator HRUSKA. I haven't quite finished but go ahead. The Senator always sheds a lot of light by his questions and I know he will do it now.

Senator KENNEDY. As I understand it both from what you have mentioned here and what Mr. Barr has said, this area has been left particularly open so that you invite the States to establish what regulations they want to establish, and what procedures will be followed by the local personnel. Isn't that one of the reasons? And rather than to set firm procedures or standards by Federal legislation, it is my understanding that you are encouraging the States to make the kinds of requirements they want whether there be a time period to wait or procedures that will be met on the particular licensees?

Mr. COHEN. That is correct.

Senator KENNEDY. You are inviting them to work in partnership with this Federal legislation here, and you would expect under the provisions mentioned here that they would pursue a reasonable standard and a reasonable course of conduct, and as I am constantly reminded, reasonableness appears, I think, 1,032 times in Federal statutes and has been readily interpreted in the various courts?

Senator HRUSKA. Let me remind my good colleague that in criminal statutes a reasonable criteria and standard is not enough. A citizen is entitled to know what specific things he can do. What specific things he is barred from doing. And it is in this that the efficiency of any criminal law, in fact the constitutional requirements lie. That is the essence of it. If you are going to say well, under certain circumstances you have no reasonable cause to believe that this shifty character here a felon since he showed you this driver's license. He might have been a dope addict. He might have just been paroled from some prison. I am

surprised at the laxness with which S. 1—Amendment 90 this bill, Administration bill, is drawn in this connection. No effort to look up what Mr. Barr has referred to as being the real public policy in this country; namely, that the local authorities should be the one to enforce their laws. Under this procedure in the Administration bill, they get no chance at it. They have no notice that a gun is being sold to the prospective buyer. None. None, isn't that true?

Mr. COHEN. They have, as Mr. Barr pointed out—and I think Senator Kennedy ably pointed out—they have whatever requirements they wish to impose on their own residents. Likewise the Federal statute is primarily concerned with the transaction which crosses a State line.

Now, in the situation that you gave before, we can have that today with no possibility of convicting anyone today under the statute at least. We would have a clear violation of S. 1 or Amendment No. 90 by the purchaser in misrepresenting to the—

Senator HRUSKA. Yes; but in the meantime the gun is sold and the crime rate goes up again. According to the record almost every buyer that we talk about here seems to be one who goes out and shoots somebody. I hope that is not the idea in most people's minds because that is not true. But we still have this question. What does it take for a seller to escape the criminal penalty of \$5,000 and a year or more in jail by selling a shotgun to a guy who comes to his shop. He must put himself in a position where he has no reasonable cause to believe that that man is a felon; and that he has reasonable cause to believe that he is a resident; that he is over 21, and all the other qualifications that that act requires of a gun buyer and they are tough ones.

Mr. COHEN. I think this is a standard that they are probably all living by, by their local requirements right now, sir.

Senator KENNEDY. Would it be possible to establish regulations under this legislation that would outline so that the license—

Mr. COHEN. I think we would have to outline these steps we would expect everyone to take.

Senator KENNEDY. You could actually do this, outline in regulations the course of conduct that would be expected.

Mr. COHEN. That is right. These dealers, do not deal in an isolated area. They deal every day with the police and they keep informed of local crime situations.

Senator KENNEDY. And we would expect you to do so; is that correct?

Senator HRUSKA. Is it being suggested that we would have Federal regulations with criminal sanctions for their violation? One of the greatest parts that Congress plays, any legislature, the legislature describes what a crime is and does not delegate that part to an executive or administrative agency. Almost anybody, any lawyer has access to a set of statutes. Not every lawyer has the current regulations of the numerous public bodies that range over the width and breadth of this land.

Mr. COHEN. You introduced yourself earlier in the day, sir, the copies of the regulations presently enforced.

Senator HRUSKA. Yes.

Mr. COHEN. Under the National and Federal acts.

Senator HRUSKA. Yes.

Mr. COHEN. There would be similar regulations which would spell out and define all of the terms in accordance with the intent of the Congress as expressed in either reports and legislative history. If the Congress chooses to define their terms very carefully, so much the better, and the administrator has that many fewer terms to worry about defining. But this is done every day in every kind of legislation imaginable.

Senator HRUSKA. It might be, but if I were a storekeeper and were selling guns, I would clamp down severely on sales. If I do, and if that is done by tens of thousands of dealers, all over America, and particularly in the sparsely settled places, people won't be able to buy shotguns and rifles the way they should be able to buy them. This goes beyond the realm of inconvenience or hardship. It would totally disqualify them and make it impossible for them to deal with that facility that the present conditions in America call for regarding the ownership and use of guns.

Mr. BARR. Senator, here again aren't we going to the interstate operations of business?

Senator HRUSKA. Interstate operations, yes.

Mr. BARR. That is correct. It would not affect the local hardware dealer who was selling to the farmer down the road.

Mr. COHEN. He knows the farmer down the road anyway, knows him very well.

Mr. BARR. That is correct, so as I say, I want to make it very clear that the difference between us here is which is the more efficacious. We are not going to debate that your proposal does not have merit, because it certainly does. The point I am making here is that we are dealing on an interstate issue, and I do not think we should exaggerate the importance of this issue in the local sale of shotguns and rifles.

Senator HRUSKA. Very well.

Mr. BARR. If I may be a bit personal, sir, I have hunted in your State, the State of the Senator from South Carolina, the State of the gentleman from Michigan who has just left. I have never bought a gun mail order in my life. I usually like to go down and look at them and pick them up and feel them. I hope to hunt and——

Senator HRUSKA. May I say that that comment simply says Mr. Barr is denying a great big undeniable American fact of life that has existed for 100 years. The mail order business extends all the way from mattresses to shingles and back again and goes into the millions of dollars worth of business. Now Mr. Barr has his own inclinations and preferences, but at the same time the mail order business is a big business, and firearms are legitimate articles of use.

Mr. BARR. We agree it is legitimate business.

Senator HRUSKA. One's personal preference doesn't apply here. Besides you do not live in Sundance, Wyo., or in Nebraska. There is some difference.

Mr. BARR. I have herded cattle in Newcastle, Wyo., sir, where the nearest store was 70 miles and I can remember riding in and buying a gun.

Senator HRUSKA. On horseback, perhaps?

Mr. BARR. No, sir, a pickup truck.

Chairman DODD. With respect to those who have been convicted of certain crimes this is nothing new. I believe this has been in the law since 1938.

Mr. BARR. That is right, sir.

Mr. COHEN. The nature of the crime was changed in 1961.

Senator HRUSKA. We want to improve on the law. The witness previously stated the law is indefinite and vague and hard to enforce. We want to improve on it. Amendment 90 has one way to improve on it it is said and I don't think it has any.

Chairman DODD. You have made a good point. Let me ask the witnesses what has been the experience with this provision since 1938? Do you know of any injustices that have been worked? Have there been any complaints?

Mr. COHEN. We have had no real problems that way, sir. The good gun dealer knows his customers. He knows the kind of people he is dealing with.

Senator HRUSKA. Mr. Cohen, you just got through telling us of the thousands of guns that are sold to nonresidents, and it makes all kinds of troubles for Massachusetts and Missouri and New Jersey and so on. Let me refer you to your statement. You just got through saying it is a big problem. Do you want to change that part of your statement?

Mr. COHEN. No, sir. Under present law such sales are not proscribed. I am talking about if we had the restrictions on the out-of-State purchase this should not be any problem of consequence.

Senator HRUSKA. The chairman asked whether you have had any trouble under present law?

Mr. COHEN. I said the good gun dealers, sir. We have some good and some bad in this country today.

Senator HRUSKA. Didn't you just get through testifying as to the thousands of guns just from Illinois alone?

Mr. COHEN. Yes, sir; and I also testified that there were no licensing standards under which we could control who the gun dealers were, whether they were people of ethical standards or not.

Senator HRUSKA. What did you do with those 479 instances mentioned on page 10 of your statement? You gave many other examples.

Mr. COHEN. There were no findings that the gun dealer had violated anything that he was required under the present statute to do, sir, in most of those cases. There were a few there that were.

Senator HRUSKA. In that regard is there any difference between present law and Amendment 90, the administration bill?

Mr. COHEN. In what regard, sir?

Senator HRUSKA. In the regard of determining whether the dealer has exercised good faith in trying to find out if a guy had a felony record?

Mr. COHEN. There is an additional requirement of his recordkeeping. He must be more complete in his recordkeeping, which was not the case under the old law, sir, which would give us a better indication of whether he was in good faith or not.

Senator HRUSKA. You had no trouble identifying 18,670 such instances.

Mr. COHEN. There were many of those, thousands of those that were discarded because it was obvious that we could not follow them up, from our own knowledge.

Chairman DODD. Does the Senator from Nebraska have other questions?

Senator HRUSKA. I have many more.

Chairman DODD. We have a witness from out of State.

Senator THURMOND. Mr. Chairman, could I have just about 2 minutes?

Chairman DODD. Yes; of course.

Senator THURMOND. Mr. Chairman, I ask unanimous consent to put in the record a newsletter written by me on June 19, 1967, entitled "The Right To Bear Arms."

Chairman DODD. Yes; without objection that will be included.

(The document referred to was marked "Exhibit No. 13" and is as follows:)

EXHIBIT No. 13

[Vol. XIII, No. 23, June 19, 1967]

STROM THURMOND, U.S. SENATOR FROM SOUTH CAROLINA REPORTS TO THE PEOPLE
ON THE RIGHT TO BEAR ARMS

The tempo of the demands for some type of gun legislation has been increasing this year. Rising crime rates have led to more heated argument about the need for gun control by the authorities, State or Federal. The debate today is whether the Federal Government should provide assistance for State laws on the subject, or set up substantive legislation of its own.

I believe, as I have indicated many times in the past, that Congress has no authority to prevent people from buying and owning firearms. The Second Amendment to the Constitution provides that "the right of the people to keep and bear Arms, shall not be infringed." These prohibitions are directed against the National Government, but not against the States. The people of each State, therefore, can regulate the sale of firearms without running afoul of the Constitution.

Most of the States have laws designed to prevent firearms from being sold to juveniles, insane persons and people with criminal records. The State laws vary in strictness and enforcement, according to the needs of each State. The New York law, for instance, requires that a person apply for and be granted a permit from the State as a prerequisite to purchasing or possessing a hand gun. In most States, however, control over gun sales is exercised by licensing the merchants who sell firearms, and by requiring the sellers to adhere to the law in order to keep their licenses.

In recent years, State laws governing the sale of firearms have been increasingly circumvented by mail order sales of weapons. Dealers in weapons located outside State boundaries often do not comply with State laws restricting sales. Guns have been sold through the mail to children, persons of unsound mind, and people with long criminal records. Some irresponsible mail order merchants sell with impunity to anyone who has the price, since they do not have to obtain a license in the State where the purchaser lives, and are beyond the reach of criminal laws of the State to which the gun is shipped.

The problem is easily solved without overstepping the safeguards of the Second Amendment. Congress has the power to regulate interstate commerce. Therefore, Congress can make it unlawful to ship firearms in interstate commerce unless the sale is consistent with the law of the State to which the weapon is shipped.

Congress should require the gun seller to obtain from the would-be purchaser a sworn statement that the buyer is not prevented by the law of his home State from purchasing the weapon. This should be coupled with a requirement that the seller, prior to shipping the weapon, send a copy of the sworn statement by registered mail to the chief law enforcement officer of the area in which the would-be purchaser lives. Failure to comply would be a Federal criminal offense.

Legislation of this type would protect the rights of the States and the rights of the people, without working an undue hardship on seller or buyer. In most States, the people feel strongly that law-abiding, sane adults should be permitted to own firearms. If the National Government prohibited the sale of firearms, law-abiding citizens would not obtain firearms, but lawbreakers would. Criminals do not hesitate to obtain firearms illegally. Moreover, they would know that a gun would provide them with a bigger advantage over a citizenry disarmed by law.

Congress should enact legislation to support the laws which the people of each State have passed according to their varying requirements. It is just as important, however, for Congress to obey the Constitutional mandate that protects the right of the people to keep and bear arms.

Sincerely,

STROM THURMOND.

Senator THURMOND. There are just two or three statements from this that I would like to emphasize at this time. The first is that Congress has no authority to prevent people from buying and owning firearms.

Next, that the people of each State can regulate the sale of firearms without running afoul of the Constitution.

The next is that the Congress has the power to regulate interstate commerce. Therefore Congress can make it unlawful to ship firearms in interstate commerce unless the sale is consistent with the law of the State in which the weapon is shipped. Therefore I suggest that Congress would require the gun seller to obtain from the would-be purchaser the sworn statement that the buyer is not prevented by the law of his home State from purchasing the weapon.

This would be coupled with a requirement that the seller prior to shipping the weapon send a copy of the sworn statement by registered mail to the chief law enforcement officer of the area in which the would-be purchaser lives. Failure to comply would be a Federal criminal offense.

Now, legislation of this type would protect the rights of the states and the rights of the people, without working an undue hardship on the seller or the buyer. I am convinced that if the National Government prohibited the sale of firearms, the law-abiding citizens would not obtain firearms but the lawbreakers would. Criminals do not hesitate to obtain firearms illegally.

Moreover, they would know that a gun would provide them with a big advantage over a citizenry disarmed by law. It is my opinion that Congress should enact legislation to support the laws which the people of each State have passed according to their varying requirements, and I think it is important, just as important, for Congress to obey the constitutional mandate that protects the right of the people to keep and bear arms.

I just wanted to make those statements for the record to set out my position. I wish to thank you gentlemen for your statements here, and I feel that we could enact some legislation along the line indicated, that it would be helpful, but I feel that what has been advocated by the administration goes beyond the jurisdiction of the National Government, if we are going to observe the Constitution.

Thank you, Mr. Chairman.

Chairman DODD. Would it be acceptable to you, Mr. Commissioner and Mr. Secretary, if we interrupted your testimony? We have an official from out of State to whom I made a commitment that we

would get him away today. We may not be able to do that. By the way, as I understand it, the Judiciary Committee meeting for tomorrow morning has been canceled.

Senator HRUSKA. I am so told, because we have a meeting of the full committee.

Chairman DODD. Can we possibly meet here tomorrow morning?

Senator HRUSKA. Sure, as far as I am concerned.

Chairman DODD. Senator Thurmond, is it acceptable to you that we meet tomorrow morning?

Senator THURMOND. Yes.

Chairman DODD. Would that be acceptable to you?

Mr. BARR. Yes, sir.

Chairman DODD. Very well. Without objection then we will excuse you now and ask you to return tomorrow morning. We will now call Mr. Ludwig.

I thank you very much.

Mr. COHEN. Thank you, Senator.

Mr. BARR. Thank you.

Chairman DODD. Mr. Frederick J. Ludwig is the chief assistant district attorney of Queens County, N.Y. He is a lawyer, a graduate from the City College of New York Law School and Columbia University School of Law. He was a professor of law for several years. He was formerly a member of the New York Police Force. He is now retired from the New York City Police Force. As I said, he is the chief assistant district attorney for Queens County.

We are very interested and pleased that you were able to come, Mr. Ludwig.

**STATEMENT OF FREDERICK J. LUDWIG, CHIEF ASSISTANT
DISTRICT ATTORNEY, QUEENS, LONG ISLAND, N.Y.**

Mr. LUDWIG. Thank you, Mr. Chairman. I appear here on behalf of the Queens district attorney, Thomas J. Mackell, who is now in Europe with the New York State Attorneys Association, so I am now the acting district attorney of Queens and I am anxious to get back.

Chairman DODD. I know that.

Mr. LUDWIG. Because Queens has maybe twice as many people as some of the States that are represented at the table. May I begin, Mr. Chairman?

Chairman DODD. Oh, yes, go right ahead.

Mr. LUDWIG. Very briefly, I have submitted, as the committee rules require, an advance statement which I will cover.

Senator KENNEDY. Can I ask, will you talk about the Jamaica Rifle Club?

Mr. LUDWIG. I will talk about it as far as *Shepherd v. Maxwell*, the decision of the Supreme Court a year ago will permit me to. I am not allowed to discuss evidence, but within the ranges of the constitutional strictures of that decision I certainly will, Senator. Thank you.

One of the things the Federal Government could do is to refrain from aiding and abetting and supplying with arms persons who are engaged in criminal conspiracy. On two occasions out of three major investigations during the few months we have been in office since the first of the year, we have found that the Office of Civilian Marks-

EXHIBIT 24

Gun Crime in the Age Group 18-20

A Report by:

**The Department of the Treasury
and
The Department of Justice**

June 1999



Gun Crime in the Age Group 18 to 20

In 1996, 34,040 people in the United States were killed with guns. Of those deaths, 18,166 were suicides, 14,037 were homicides, 1,134 were unintentional shootings, and 413 deaths were of unknown intent. (National Center for Health Statistics, Centers for Disease Control, U.S. Department of Health and Human Services.) This report focuses primarily on firearms homicides and other gun crime in the age group 18 to 20.

Current Law on Firearms Possession by Young People

Current federal minimum age regulations relating to firearms vary by type of gun and means of access. The Gun Control Act of 1968 made it unlawful for federal firearms dealers to sell handguns to persons under 21. The Youth Handgun Safety Act of 1994 generally prohibited transfers of handguns to and possession of handguns by anyone under 18. Exceptions include official military use, and the following activities with the written consent of the parent or guardian: employment, ranching, farming, target practice, hunting and handgun safety instruction. Persons between the ages of 18 and 21 may still acquire handguns from non-licensed sellers.

There is no federal age restriction on possession of long guns (including rifles and shotguns). While licensed dealers may only sell rifles and shotguns to persons aged 18 and older, there is no age restriction on the transfer of shotguns and rifles by non-licensed sellers.

The Violent Crime Control and Law Enforcement Act of 1994 banned the possession of semiautomatic assault weapons manufactured after passage of the law. Under the law, assault weapons are defined either by specific make and model or by specific features. Assault weapons can be pistols, rifles, or shotguns. A person of any age may acquire an assault rifle or assault shotgun manufactured before 1994 from a non-licensed seller, and as of age 18, a person may buy assault rifles and assault shotguns manufactured before 1994 from licensed dealers. Pistols classified as semiautomatic assault weapons that are grandfathered are subject to the same restrictions as other handguns. There are no age restrictions on transfer or possession of large capacity ammunition feeding devices (more than 10 rounds); thus a person of any age may purchase such devices manufactured before 1994.

Age Restrictions in The Youth Gun Crime Enforcement Act of 1999

The Youth Gun Crime Enforcement Act of 1999 would raise the minimum age for possession of a handgun from 18 to 21 and bar all handgun transfers to anyone in that age group, with exceptions for employment, hunting, farming, target practice, and for safety instruction. The legislation would also raise the minimum age to possess an assault rifle from 18 to 21, and bar assault rifle transfers by anyone to anyone in that age group, without exception. The same is true for large capacity magazine feeding devices.

Murder and Violent Crime Arrests in the 18 to 20 Age Range

In 1997, the most frequent age for arrest for murder was 18, accounting for 8 percent of all arrests for murder. The second most frequent age for murder was 19, accounting for 8 percent of those arrests, and the third most frequent age for arrest for murder was 20, accounting for 7 percent. Eighteen to 20 year olds comprised 22 percent of all those arrested for murder. Similarly, the most frequent age for arrest for violent crime was 18, accounting for 5 percent of all violent crime

arrests. Eighteen to 20 year olds comprised 14 percent, or one in seven, of all of those arrested for violent crime. (FBI Uniform Crime Reports, Table 38, 1997).

Criminal Use of Firearms in the 18 to 20 Age Range

In 1997, 18, 19 and 20 year olds ranked first, second, and third in the number of gun homicides committed. Of all gun homicides where an offender was identified, 24 percent were committed by 18 to 20 year olds. (Figure 1). This is consistent with the historical pattern of gun homicides over the past 10 years.

Among murderers, 18 to 20 year olds were more likely to use a firearm than adults 21 and over. More specifically, in 1997, 74 percent of the homicides committed by 18 to 20 year old offenders involved firearms. In contrast, only 61 percent of homicides committed by offenders 21 or over involved firearms. (Table 1). The under-21 offender age groups showed a significant shift toward the use of firearms in committing homicides by the mid-1980's. By the 1990's, these offender groups were using firearms to commit homicides more than 70 percent of the time. Although the proportion of 18 to 20 year olds who use firearms to commit homicides has declined since the 1994 peak, it remains higher than levels recorded before 1990. (Figure 2). Similarly, in non-lethal crimes, including assault, rape, and robbery, 18 to 20 year old offenders were more likely to use guns than both younger and older offender age groups. For non-lethal crimes of violence from 1992 to 1997, in cases where the weapon and age of offender were identified, 15 percent of 18 to 20 year old offenders used a firearm, in contrast to 10 percent of adult offenders, and 5 percent of offenders 17 and under. (Table 2).

Youth Gun Acquisition Through the Illegal Market

Young offenders can and do obtain firearms illegally. The complexity of the firearms market poses a challenge for law enforcement officials seeking to develop strategies to attack the illegal market that supplies criminals and juveniles. The firearms market includes federal firearms licensees (FFLs); unregulated sellers and private transferors in what is known as the secondary market; and the illegal market. The illegal market involves transfers both from FFLs and from unregulated transferors. Gun violence is also facilitated when firearms are inadequately secured by FFLs, common carriers, and gun owners, especially parents with children at home.

Recent Law Enforcement Information on the Illegal Market in Firearms

During the past six years, the Bureau of Alcohol, Tobacco and Firearms (ATF), working with law enforcement agencies around the country, academic researchers, and the Department of Justice, has significantly increased efforts to determine how felons and other prohibited persons, including juveniles and youth offenders, obtain firearms. Better information enables ATF and State and local law enforcement officials to deploy regulatory and criminal investigative resources more effectively against illegal traffickers.

ATF has encouraged all law enforcement agencies to submit crime guns for tracing by the National Tracing Center (NTC). An NTC trace can identify the FFL that sold the crime gun as a new gun, and the purchaser of the crime gun. This information can assist law enforcement officials in identifying illegal traffickers. ATF has worked with law enforcement officials in an increasing number of jurisdictions to trace *all* recovered crime guns as part of an effort to obtain better investigative and strategic information about how the illegal market in firearms operates locally.

When crime guns are traced comprehensively, and this information is analyzed, patterns in the illegal supply can be discerned and illegal sources of supply can be better targeted by law enforcement officials. Crime gun traces by federal, state and local officials grew from about 55,000 traces in 1993, to over 197,000 traces in 1998, a 258 percent increase. Efforts to trace crime guns comprehensively by jurisdiction and analyze the results to support investigations and arrests of illegal traffickers in firearms are now underway in 37 cities through the Youth Crime Gun Interdiction Initiative (YCGII). The Youth Gun Crime Enforcement Act of 1999 increases this program to 75 cities over the next four years.

The Structure of the Illegal Market in Firearms

Information derived from analyses of crime gun traces and investigative information confirms what survey evidence also shows: while some juveniles and criminals steal guns for their own use, many underage gun users obtain firearms through illegal diversion from retail sources, and from purveyors of stolen guns.¹ While it used to be assumed that there were two primary sources of illegally supplied firearms — older guns that were stolen, primarily by criminals and juveniles stealing the guns for their own use, and new guns that were trafficked, primarily across state lines in bulk — it has become clear that there are many more. These include interstate and intrastate trafficking in *new* firearms, *used* firearms, and in new and used *stolen* firearms.

Trafficking in *new and used firearms* involves licensed firearms dealers, including pawnbrokers; large scale straw purchasers and straw purchasing rings; small scale straw purchasers, e.g. buying one or a few guns; private sellers, including unlicensed sellers at gun shows and flea markets, or those who sell through want ads, gun magazines, the Internet, and personal associations; and bartering and trading within criminal networks. Trafficking in *stolen firearms*, both new and used, involves theft from licensed gun dealers, including pawnbrokers; organized fencing of stolen guns; theft from common carriers; theft from households and automobiles; bartering and trading within criminal networks; and theft from manufacturers. Law enforcement must address all of these channels in order to prevent juveniles and other prohibited persons from obtaining firearms.

Crime Gun Trace Information Involving 18 to 20 Year Olds in Selected Cities

Crime gun trace data show that reducing illegal trafficking is essential for reducing firearms violence in the 18 to 20 age group. For the 27 cities where law enforcement officials submitted all recovered crime guns for tracing through the Youth Crime Gun Interdiction Initiative from August 1997 through July 1998, the most frequent age of crime gun possession was 19, and the second most frequent was 18. Approximately 15 percent of crime guns were recovered from 18 to 20 year olds. (Figure 3).

Handguns comprised 85 percent of the crime guns known to be recovered from 18 to 20 year olds in the 27 cities. Semiautomatic pistols accounted for 59 percent of all the crime guns known to be recovered from this age group. (Table 3). Eighteen to 20 year old crime gun possessors were

¹ See e.g. "Gun Acquisition and Possession in Selected Juvenile Samples," Sheley, Joseph F. and Wright, James D., Department of Justice, Office of Justice Programs, p. 6, December 1993, (12 percent of surveyed juvenile inmates and 2 percent of surveyed high school students reported stealing their most recent handgun).

involved in crimes of violence, drug crimes, and in possessing these guns illegally. Crimes of violence--including homicide, rape, assault, and robbery--and narcotics crimes accounted for 28 percent of the crime gun traces for this age group in the 27 cities. (Table 4).

On average, of the crime guns that were recovered and traced from the 27 cities, an estimated 43 percent moved from the shelf of an FFL to recovery by law enforcement within three years, a time period ATF considers an indicator of potential illegal trafficking. This estimate includes only potential trafficking in new guns, not potential trafficking in used and stolen firearms.² (Table 5). Analysis of ATF's recent illegal trafficking investigations involving juveniles and youth shows that over half of them involved used guns, and 35 percent involved trafficking in stolen firearms. (Table 7). Finally, crime guns recovered from 18 to 20 year olds are often concentrated among a relatively few kinds of firearms, and nine of the top ten most frequently traced crime guns in the 27 cities were handguns. (Table 6).

The Youth Gun Crime Enforcement Act of 1999: Provisions to Reduce Youth Gun Violence

The significant role that 18 to 20 year olds have in gun crime and violence in our Nation demands that we make changes in the legal regulation of their access to guns. A further benefit to restricting possession of firearms by 18 to 20 year olds will be to decrease the likelihood that younger family members, friends, and classmates will be able to obtain guns illegally.

Raising the age at which young people can legally obtain unauthorized access to guns is not by itself enough to reduce the level of gun violence among 18 to 20 year olds. There must be a vigorous attack on the illegal supply of guns to youth, as well as deterrence of illegal youth acquisition of guns: appropriate punishment of those who transfer guns illegally, and of young persons who violate laws prohibiting firearms possession or who commit crimes with guns. Different methods of regulatory and criminal enforcement are needed to reduce the various illegal channels of supply to 18 to 20 year olds, and punishments must be appropriate for both underage criminal firearms users and adult felons. The Youth Crime Gun Enforcement Act of 1999 contains a number of provisions that will address these issues. It will:

- Raise the age for possession of handguns from 18 to 21;
- Prohibit possession of semiautomatic assault weapons and large capacity magazines by persons under the age of 21;
- Require background checks and crime gun tracing records for all firearms sales at gun shows;
- Increase penalties for those who engage in the business of dealing in firearms without a license;
- Increase the punishment for serious recordkeeping violations by FFLs;
- Provide new administrative remedies, including license suspension and civil monetary penalties, for FFLs who violate federal firearms laws;
- Increase penalties for transactions involving firearms with obliterated serial numbers;

² For a full discussion of the methodologies used to arrive at the estimate of the percentage of crime guns moving from FFL shelf to recovery by law enforcement officials within a three year time period, see *Crime Gun Trace Analysis Reports: The Illegal Youth Firearms Markets in 27 Communities*, Department of the Treasury, Bureau of Alcohol, Tobacco and Firearms, p. 9 and Technical Notes A1-A3, February 1999.

Department of Justice

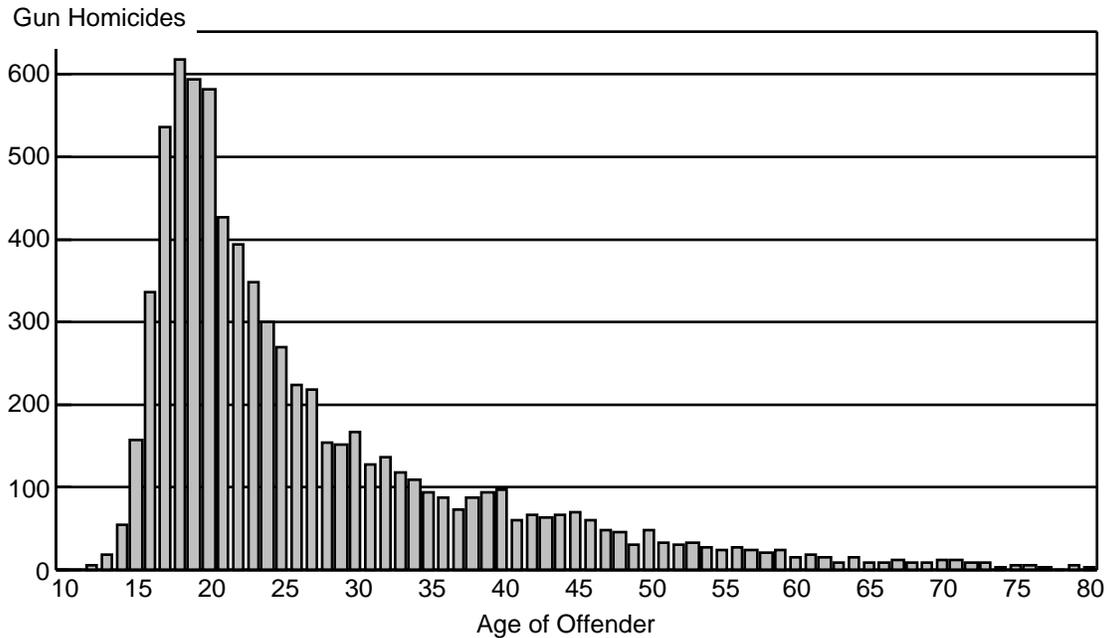
Department of the Treasury

- Limit individuals to one handgun purchase a month, with certain exceptions;
- Criminalize the transfer of a firearm by one who knows or has reasonable cause to believe that the firearm will be used to commit a crime of violence or a drug trafficking crime;
- Enable used guns to be traced by requiring FFLs to report information about firearms that are acquired from nonlicensees for resale (without including names or identifying information about firearms purchasers);
- Require FFLs to securely store their firearms inventories;
- Impose responsibility upon common carriers to report the theft or loss of a firearm;
- Prohibit possession of firearms by persons adjudicated delinquent as juveniles for serious drug offenses or violent felonies;
- Increase the penalty for possession of firearms by persons under 21;
- Include serious juvenile drug trafficking offenses as Armed Career Criminal Act predicates;
- Add a number of gang-related firearms offenses to the RICO statute;
- Increase the number of cities participating in comprehensive crime gun tracing and firearms law enforcement through the Youth Crime Gun Interdiction Initiative.

Adoption of these measures will greatly assist in curbing gun violence by the Nation's young people.

Gun Homicide Offenders by Age Group

Figure 1



Source: Federal Bureau of Investigation (FBI), Uniform Crime Reports, Supplemental Homicide Reports, 1997, special tabulation prepared by Northeastern University, Boston, Massachusetts.

In 1997, 18, 19, and 20 year olds ranked first, second, and third in the number of gun homicides committed. For each of these ages, the number of homicides exceeded the number for any ages older or younger than 18 to 20. Of all gun homicides where an offender was identified, 24 percent were committed by 18 to 20 years olds. This is consistent with the historical pattern of gun homicides over the past 10 years.

Homicide Offenders by Type of Weapon and Age Group

Table 1

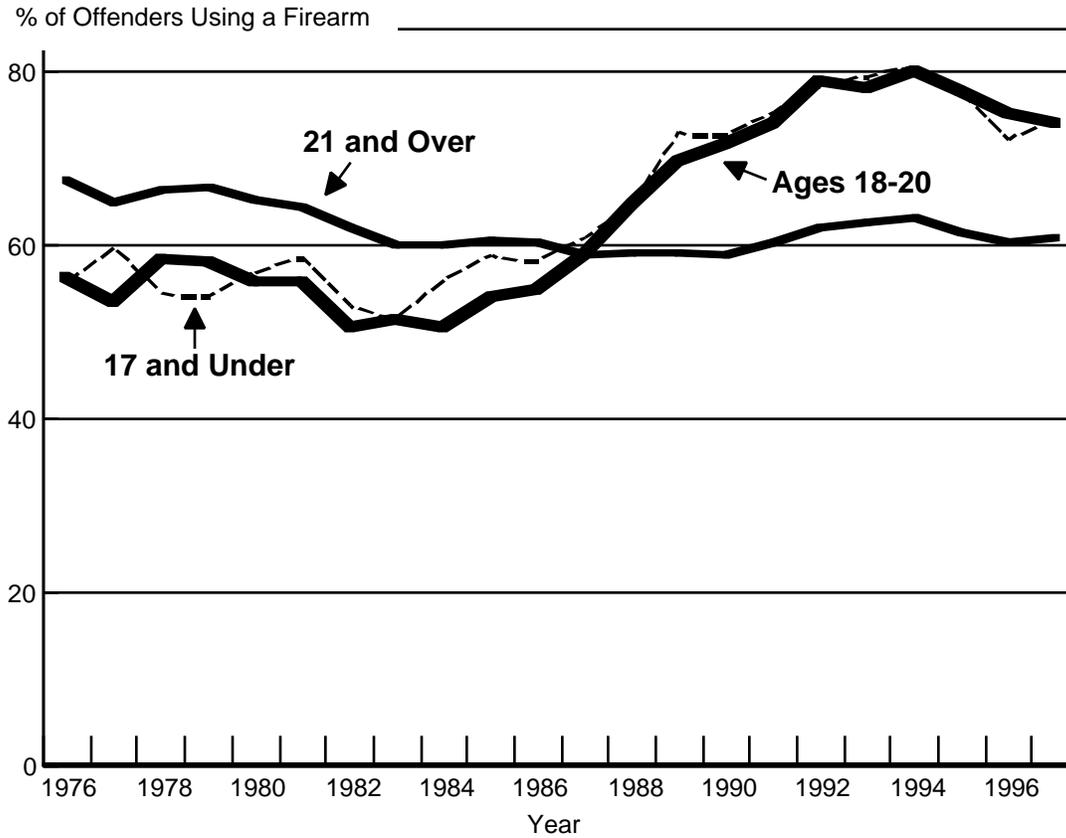
Type of Weapon	Age of Offender			Percent Total
	Percent 17 and Under	Percent 18-20	Percent 21 and Over	
Gun	74.6	74.0	61.0	65.5
Other Weapon	23.3	23.8	35.1	31.2
Unknown Weapon	2.1	2.2	3.9	3.3
Total Percent	100.0	100.0	100.0	100.0
Total # of Homicide Offenders	1,487	2,420	7,723	11,630

Source: FBI Uniform Crime Reports, Supplemental Homicide Reports, 1997, special tabulation prepared by Northeastern University, Boston, Massachusetts.

Among murderers, 18 to 20 year olds, as well as those 17 and under, were more likely to use a firearm than adults. More specifically, in 1997, about three quarters of the homicides committed by 18 to 20 year old offenders, and by offenders 17 and under, involved firearms. In contrast, only about three fifths of homicides committed by offenders 21 or over during 1997 involved firearms.

Percentage of Homicide Offenders Using a Firearm by Age Group for the Years 1976-1997

Figure 2



Source: FBI Uniform Crime Reports, Supplemental Homicide Reports, 1976-1997, special tabulation prepared by Bureau of Justice Statistics.

The under-21 offender age groups showed a significant shift toward the greater use of firearms in committing homicides by the mid-1980's. By the 1990's, these offender groups were using firearms to commit homicides more than 70 percent of the time. Although the proportion of 18 to 20 year olds who use firearms to commit homicides has declined since the 1994 peak, it remains higher than levels recorded before 1990.

*Department of Justice**Department of the Treasury*

Non-Lethal Crimes of Violence by Type of Weapon and Offender Age Group

Table 2

Type of weapon	Age of Offender		
	Percent 17 and Under	Percent 18-20	Percent 21 and Over
Firearm	5.0	14.8	10.0
Knife	6.9	9.4	7.2
Other Weapon	8.0	10.3	8.8
No Weapon	80.1	65.5	74.4
Total Percent	100.0	100.0	100.0
Total # of Victimitizations	12,449,485	5,505,453	30,971,671

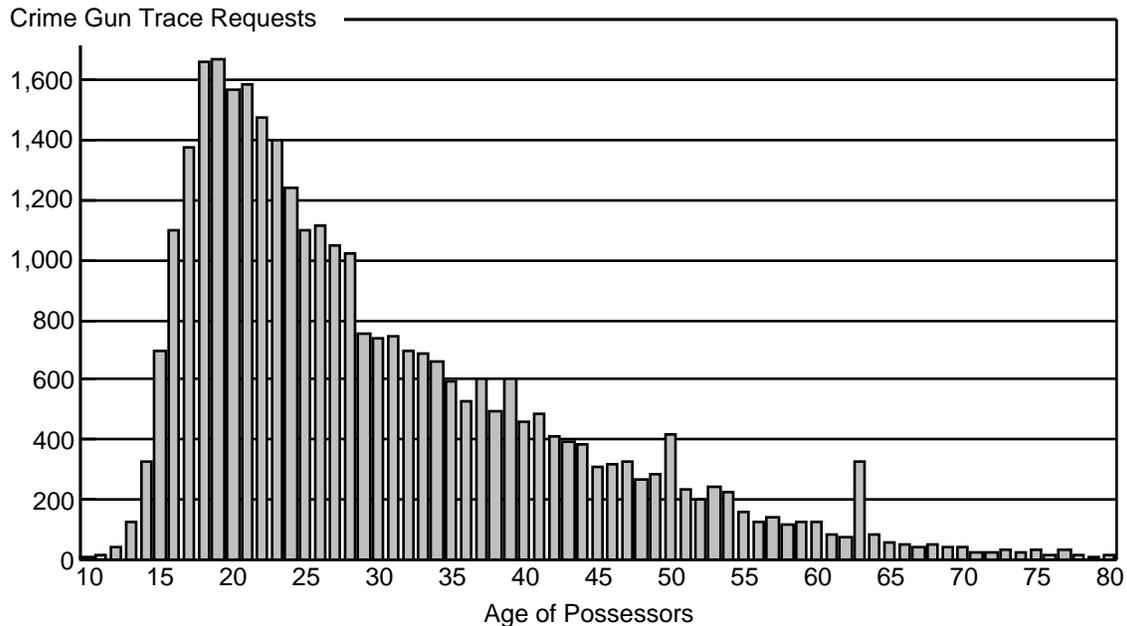
Source: Bureau of Justice Statistics, National Crime Victimization Survey, 1992-1997, special tabulation.

In non-lethal crimes, including assault, rape, and robbery, 18 to 20 year old offenders were more likely to use guns than both younger and older age groups. From 1992 to 1997, in cases where the weapon and age of offender were identified, 15 percent of 18 to 20 year old offenders used a firearm, in contrast to 10 percent of adult offenders, and 5 percent of offenders 17 and under.

Crime Gun Possession by Age in Selected Cities

Figure 3

Based on trace requests submitted August 1, 1997 to July 31, 1998 from 27 cities participating in the Youth Crime Gun Interdiction Initiative*



Source: Bureau of Alcohol, Tobacco and Firearms (ATF), National Tracing Center, *Youth Crime Gun Interdiction Initiative 27 Communities Report*, 1999. For a discussion of trace analysis methodology, see pp. 7-9 and Technical Notes.

For 27 cities where law enforcement officials submitted all recovered crime guns for tracing, the most frequent age of crime gun possession was 19 (5 percent) and the second most frequent was 18 (5 percent). Approximately 15 percent of crime guns were recovered from 18 to 20 year olds.

*The Youth Crime Gun Interdiction Initiative is a firearms law enforcement program of the Bureau of Alcohol, Tobacco and Firearms (ATF). Law enforcement agencies in cities participating with ATF in the program trace all recovered crime guns with ATF's National Tracing Center to determine the last known seller and purchaser of the firearm. This information is used by federal, state, and local law enforcement officials to determine patterns of crime gun supply, and to investigate illegal sources of firearms and arrest firearms offenders. The most recent available data is from 27 cities that submitted traces during the period August 1, 1997 to July 31, 1998. The participating cities were: Atlanta, Georgia; Baltimore, Maryland; Birmingham, Alabama; Boston, Massachusetts; Bridgeport, Connecticut; Chicago, Illinois; Cincinnati, Ohio; Cleveland, Ohio; Detroit, Michigan; Gary, Indiana; Houston, Texas; Inglewood, California; Jersey City, New Jersey; Los Angeles, California; Memphis, Tennessee; Miami, Florida; Milwaukee, Wisconsin; Minneapolis, Minnesota; New York City, New York; Philadelphia, Pennsylvania; Richmond, Virginia; Salinas, California; San Antonio, Texas; Seattle, Washington; St. Louis, Missouri; Tucson, Arizona; Washington, D.C.

Type of Crime Guns Recovered From the 18 to 20 Age Group in Selected Cities

Table 3

Based on trace requests submitted August 1, 1997 to July 31, 1998 from 27 cities participating in the Youth Crime Gun Interdiction Initiative*

Type of Weapon	Memphis Percent	San Antonio Percent	St. Louis Percent	Philadelphia Percent	Tucson Percent	27 Cities Percent
Semiautomatic Pistol	54.5	51.1	33.5	62.0	66.7	58.9
Revolver and other						
Handgun	28.8	19.5	35.5	26.8	14.4	26.1
Long Gun	16.5	29.5	30.2	11.2	19.0	14.9
Other	.3	0.0	.8	0.0	0.0	.1
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0
Total # of Cases	400	190	245	508	201	4,888

Source: Bureau of Alcohol, Tobacco and Firearms (ATF), National Tracing Center, Youth Crime Gun Interdiction Initiative, 1999, special tabulation prepared by Northeastern University, Boston, Massachusetts. For a discussion of trace analysis methodology, see *Youth Crime Gun Interdiction Initiative 27 Communities Report*, 1999, pp. 7-9 and Technical Notes.

Handguns (including semiautomatic pistols) comprised 85 percent of the crime guns known to be recovered from 18 to 20 year olds in 27 cities where law enforcement officials submitted all recovered crime guns for tracing. Semiautomatic pistols clearly predominate, accounting for 59 percent of all the firearms known to be recovered from 18 to 20 year olds in these cities. Information for five geographically diverse cities among the 27 cities are provided to show local variations.

*The Youth Crime Gun Interdiction Initiative is a firearms law enforcement program of the Bureau of Alcohol, Tobacco and Firearms (ATF). Law enforcement agencies in cities participating with ATF in the program trace all recovered crime guns with ATF's National Tracing Center to determine the last known seller and purchaser of the firearm. This information is used by federal, state, and local law enforcement officials to determine patterns of crime gun supply, and to investigate illegal sources of firearms and arrest firearms offenders. The most recent available data is from 27 cities that submitted traces during the period August 1, 1997 to July 31, 1998. The participating cities were: Atlanta, Georgia; Baltimore, Maryland; Birmingham, Alabama; Boston, Massachusetts; Bridgeport, Connecticut; Chicago, Illinois; Cincinnati, Ohio; Cleveland, Ohio; Detroit, Michigan; Gary, Indiana; Houston, Texas; Inglewood, California; Jersey City, New Jersey; Los Angeles, California; Memphis, Tennessee; Miami, Florida; Milwaukee, Wisconsin; Minneapolis, Minnesota; New York City, New York; Philadelphia, Pennsylvania; Richmond, Virginia; Salinas, California; San Antonio, Texas; Seattle, Washington; St. Louis, Missouri; Tucson, Arizona; Washington, D.C.

Type of Crime Associated with Crime Guns Recovered From the 18 to 20 Age Group in Selected Cities

Table 4

Based on trace requests submitted August 1, 1997 to July 31, 1998 from 27 cities participating in the Youth Crime Gun Interdiction Initiative*

Type of Crime	Memphis Percent	San Antonio Percent	St. Louis Percent	Philadelphia Percent	Tucson Percent	27 Cities Percent
Crimes of Violence	9.7	13.1	12.6	24.4	24.3	15.3
Firearms Offense	84.0	43.7	53.9	52.3	45.8	66.1
Narcotics	2.3	25.8	29.8	19.9	18.9	12.7
Property/Fraud	3.0	10.5	3.3	3.0	6.5	3.4
Other	1.0	6.9	.4	.4	4.5	2.5
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0
Total # of Cases	400	190	245	508	201	4,888

Source: Bureau of Alcohol, Tobacco and Firearms (ATF), National Tracing Center, Youth Crime Gun Interdiction Initiative, 1999, special tabulation prepared by Northeastern University, Boston, Massachusetts. For a discussion of trace analysis methodology, see *Youth Crime Gun Interdiction Initiative 27 Communities Report*, 1999, pp. 7-9 and Technical Notes.

Eighteen to 20 year old crime gun possessors were involved in crimes of violence, drug crimes, and in carrying these guns illegally. Crimes of violence, including homicide, rape, assault, and robbery, and narcotics crimes accounted for 28 percent of the crime gun traces for this age group in 27 cities where law enforcement officials submitted all recovered crime guns for tracing. Information from five geographically diverse cities is provided to show local variations.

*The Youth Crime Gun Interdiction Initiative is a firearms law enforcement program of the Bureau of Alcohol, Tobacco and Firearms (ATF). Law enforcement agencies in cities participating with ATF in the program trace all recovered crime guns with ATF's National Tracing Center to determine the last known seller and purchaser of the firearm. This information is used by federal, state, and local law enforcement officials to determine patterns of crime gun supply, and to investigate illegal sources of firearms and arrest firearms offenders. The most recent available data is from 27 cities that submitted traces during the period August 1, 1997 to July 31, 1998. The participating cities were: Atlanta, Georgia; Baltimore, Maryland; Birmingham, Alabama; Boston, Massachusetts; Bridgeport, Connecticut; Chicago, Illinois; Cincinnati, Ohio; Cleveland, Ohio; Detroit, Michigan; Gary, Indiana; Houston, Texas; Inglewood, California; Jersey City, New Jersey; Los Angeles, California; Memphis, Tennessee; Miami, Florida; Milwaukee, Wisconsin; Minneapolis, Minnesota; New York City, New York; Philadelphia, Pennsylvania; Richmond, Virginia; Salinas, California; San Antonio, Texas; Seattle, Washington; St. Louis, Missouri; Tucson, Arizona; Washington, D.C.

Time-to-Crime for Crime Guns Recovered From the 18 to 20 Age Group in Selected Cities

Table 5

Based on trace requests submitted August 1, 1997 to July 31, 1998 from 27 cities participating in the Youth Crime Gun Interdiction Initiative*

	Memphis Percent	San Antonio Percent	St. Louis Percent	Philadelphia Percent	Tucson Percent	27 Cities Percent
3 years or under	43.8	38.0	32.3	44.3	68.3	43.3
Over 3 years	56.2	62.0	67.7	55.7	31.7	56.7
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0
Total # of Cases	162	100	62	183	126	2,036

Source: Bureau of Alcohol, Tobacco and Firearms (ATF), National Tracing Center, Youth Crime Gun Interdiction Initiative, 1999, special tabulation prepared by Northeastern University, Boston, Massachusetts. For a discussion of the methodologies used to analyze time-to-crime, see *Youth Crime Gun Interdiction Initiative 27 Communities Report*, 1999, pp. 7-9 and Technical Notes A1-A3.

Time-to-crime is the time it takes for a gun to move from the shelf of a federally licensed firearms dealer to recovery by a law enforcement official in connection with a crime. ATF considers a time-to-crime of three years or less an indicator of potential illegal firearms trafficking that can be investigated by law enforcement to identify an illegal source of supply. On average, of the traced crime guns recovered from 18 to 20 year olds in 27 cities, 43 percent were fast time-to-crime guns.

*The Youth Crime Gun Interdiction Initiative is a firearms law enforcement program of the Bureau of Alcohol, Tobacco and Firearms (ATF). Law enforcement agencies in cities participating with ATF in the program trace all recovered crime guns with ATF's National Tracing Center to determine the last known seller and purchaser of the firearm. This information is used by federal, state, and local law enforcement officials to determine patterns of crime gun supply, and to investigate illegal sources of firearms and arrest firearms offenders. The most recent available data is from 27 cities that submitted traces during the period August 1, 1997 to July 31, 1998. The participating cities were: Atlanta, Georgia; Baltimore, Maryland; Birmingham, Alabama; Boston, Massachusetts; Bridgeport, Connecticut; Chicago, Illinois; Cincinnati, Ohio; Cleveland, Ohio; Detroit, Michigan; Gary, Indiana; Houston, Texas; Inglewood, California; Jersey City, New Jersey; Los Angeles, California; Memphis, Tennessee; Miami, Florida; Milwaukee, Wisconsin; Minneapolis, Minnesota; New York City, New York; Philadelphia, Pennsylvania; Richmond, Virginia; Salinas, California; San Antonio, Texas; Seattle, Washington; St. Louis, Missouri; Tucson, Arizona; Washington, D.C.

Most Frequent Crime Gun Trace Requests by Type, Manufacturer, and Caliber of Firearm for the 18 to 20 Age Group in Selected Cities

This table depicts the most frequently recovered and traced crime guns by firearm type, manufacturer, and caliber recovered from 18 to 20 year olds in 27 cities, and in five geographically diverse cities from among those 27 cities. This report does not distinguish among models of firearms of the same type, manufacturer and caliber. For instance, all .38 caliber revolvers manufactured by Smith and Wesson are considered as a group. Recovered crime guns are often concentrated among relatively few kinds of firearms. This information facilitates strategic enforcement against illegal traffickers of particular kinds of firearms. To the extent that youth acquisition is being fueled by illegal trafficking, preventing such trafficking would inhibit youth acquisition of the handguns, rifles, and shotguns identified below.

Table 6

Based on trace requests submitted August 1, 1997 to July 31, 1998 from 27 cities participating in the Youth Crime Gun Interdiction Initiative*

27 Cities

Type of Crime Gun	Manufacturer	Caliber	Number of Kinds of Crime Guns	Number of Crime Guns	Percent of Crime Guns
Semiautomatic Pistol	Lorcin	.380		214	4.4
Revolver	Smith & Wesson	.38		189	3.9
Semiautomatic Pistol	Raven	.25		164	3.4
Semiautomatic Pistol	Davis	.380		141	2.9
Semiautomatic Pistol	Ruger	9mm		135	2.8
Semiautomatic Pistol	Bryco	.380		103	2.1
Semiautomatic Pistol	Bryco	9mm		91	1.9
Revolver	Smith & Wesson	.357		87	1.8
Semiautomatic Pistol	Smith & Wesson	9mm		83	1.7
Shotgun	Mossberg	12GA		82	1.7
Summary for top weapons:			10	1,289	26.4
All other weapons:			538	3,599	73.6

Memphis, Tennessee

Type of Crime Gun	Manufacturer	Caliber	Number of Kinds of Crime Guns	Number of Crime Guns	Percent of Crime Guns
Semiautomatic Pistol	Lorcin	.380		23	5.8
Revolver	Smith & Wesson	.357		14	3.5
Semiautomatic Pistol	Davis	.380		13	3.3
Revolver	Smith & Wesson	.38		13	3.3
Semiautomatic Pistol	Bryco	.380		12	3.0
Revolver	Rossi	.38		11	2.8
Revolver	RG Industries	.22		10	2.5
Semiautomatic Pistol	Ruger	9mm		10	2.5
Semiautomatic Pistol	Raven	.25		10	2.5
Semiautomatic Pistol	Smith & Wesson	.38		9	2.3
Summary for top weapons:			10	125	31.3
All other weapons:			143	275	68.8

*Department of Justice**Department of the Treasury***San Antonio, Texas**

Type of Crime Gun	Manufacturer	Caliber	Number of Kinds of Crime Guns	Number of Crime Guns	Percent of Crime Guns
Rifle	Norinco	7.62mm		9	4.7
Semiautomatic Pistol	Lorcin	.380		9	4.7
Semiautomatic Pistol	Raven	.25		9	4.7
Semiautomatic Pistol	Bryco	.9mm		8	4.2
Shotgun	Mossberg	12GA		7	3.7
Semiautomatic Pistol	Ruger	9mm		7	3.7
Revolver	Smith & Wesson	.38		5	2.6
Rifle	Marlin	.22		4	2.1
Semiautomatic Pistol	Glock	9mm		4	2.1
Revolver	Colt	.357		4	2.1
Summary for top weapons:			10	66	34.7
All other weapons:			93	124	65.3

St. Louis, Missouri

Type of Crime Gun	Manufacturer	Caliber	Number of Kinds of Crime Guns	Number of Crime Guns	Percent of Crime Guns
Revolver	Smith & Wesson	.38		20	8.2
Rifle	Norinco	7.62		7	2.9
Shotgun	Mossberg	12GA		7	2.9
Semiautomatic Pistol	Davis	.380		6	2.4
Rifle	Winchester	.22		6	2.4
Rifle	Marlin	.22		6	2.4
Semiautomatic Pistol	Lorcin	.380		6	2.4
Semiautomatic Pistol	Ravin	.25		6	2.4
Revolver	Rohm	.22		4	1.6
Revolver	Rossi	.38		4	1.6
Summary for top weapons:			10	72	29.4
All other weapons:			116	173	70.6

Philadelphia, Pennsylvania

Type of Crime Gun	Manufacturer	Caliber	Number of Kinds of Crime Guns	Number of Crime Guns	Percent of Crime Guns
Semiautomatic Pistol	Bryco	9mm		21	4.1
Revolver	Smith & Wesson	.38		20	3.9
Semiautomatic Pistol	Ruger	9mm		18	3.5
Semiautomatic Pistol	Lorcin	.380		18	3.5
Semiautomatic Pistol	Bryco	.380		13	2.6
Semiautomatic Pistol	Raven	.25		13	2.6
Semiautomatic Pistol	Glock	9mm		11	2.2
Semiautomatic Pistol	Smith & Wesson	.40		10	2.0
Semiautomatic Pistol	Davis	.380		9	1.8
Revolver	Harrington & Richardson	.32		9	1.8
Summary for top weapons:			10	142	28.0
All other weapons:			170	366	72.0

*Department of the Treasury**Department of Justice***Tucson, Arizona**

Type of Crime Gun	Manufacturer	Caliber	Number of Kinds of Crime Guns	Number of Crime Guns	Percent of Crime Guns
Semiautomatic Piston	Ruger	9mm		10	5.0
Semiautomatic Piston	Lorcin	.380		8	4.0
Shotgun	Mossberg	12GA		8	4.0
Semiautomatic Piston	Norino	9mm		7	3.5
Semiautomatic Piston	Bryco	9mm		7	3.5
Semiautomatic Piston	Smith & Wesson	9mm		7	3.5
Rifle	Norinco	7.62		6	3.0
Semiautomatic Piston	Glock	9mm		6	3.0
Semiautomatic Piston	Hi-Point	9mm		6	3.0
Semiautomatic Piston	Lorcin	.25		5	2.5
Summary for top weapons:			10	70	34.8
All other weapons:			80	131	65.2

Source: Bureau of Alcohol, Tobacco and Firearms (ATF), National Tracing Center, Youth Crime Gun Interdiction Initiative, special tabulation prepared by Northeastern University, Boston, Massachusetts. For a discussion of trace analysis methodology, see *Youth Crime Gun Interdiction Initiative 27 Communities Report*, 1999, pp. 7-9 and Technical Notes.

*The Youth Crime Gun Interdiction Initiative is a firearms law enforcement program of the Bureau of Alcohol, Tobacco and Firearms (ATF). Law enforcement agencies in cities participating with ATF in the program trace all recovered crime guns with ATF's National Tracing Center to determine the last known seller and purchaser of the firearm. This information is used by federal, state, and local law enforcement officials to determine patterns of crime gun supply, and to investigate illegal sources of firearms and arrest firearms offenders. The most recent available data is from 27 cities that submitted traces during the period August 1, 1997 to July 31, 1998. The participating cities were: Atlanta, Georgia; Baltimore, Maryland; Birmingham, Alabama; Boston, Massachusetts; Bridgeport, Connecticut; Chicago, Illinois; Cincinnati, Ohio; Cleveland, Ohio; Detroit, Michigan; Gary, Indiana; Houston, Texas; Inglewood, California; Jersey City, New Jersey; Los Angeles, California; Memphis, Tennessee; Miami, Florida; Milwaukee, Wisconsin; Minneapolis, Minnesota; New York City, New York; Philadelphia, Pennsylvania; Richmond, Virginia; Salinas, California; San Antonio, Texas; Seattle, Washington; St. Louis, Missouri; Tucson, Arizona; Washington, D.C.

Involvement of Used Guns in ATF Illegal Trafficking Investigations Involving Juveniles and Youth

Table 7

Based on an analysis of 648 ATF illegal trafficking investigations involving youth (ages 18-24) and/or juveniles (ages 17 and under) conducted by all 23 ATF field divisions after the Youth Crime Gun Interdiction Initiative* commenced in July 1996.

Note: Since more than one type of firearm can be recovered in an investigation, an investigation can be included in more than one category.

Type of firearm	Number of Investigations	Percent of Investigations
New guns	507	78.2%
Used guns	357	55.1%
Stolen guns	227	35.0%
Unknown	8	1.2%
Stolen firearms:		
New guns	136	61.2%
Used guns	182	80.2%
Mutually exclusive categories for new and used firearms:		
New guns only	283	43.6%
New and used guns	224	34.5%
Used guns only	133	20.5%
Unknown	8	1.2%

Source: Bureau of Alcohol, Tobacco and Firearms (ATF), National Tracing Center, Youth Crime Gun Interdiction Initiative, *Performance Report* for the Senate and House Committees on Appropriations, Table 7, p. 16, February 1999. For a discussion of methodology, see p. 22.

*The Youth Crime Gun Interdiction Initiative is a firearms law enforcement program of the Bureau of Alcohol, Tobacco and Firearms (ATF). Law enforcement agencies in cities participating with ATF in the program trace all recovered crime guns with ATF's National Tracing Center to determine the last known seller and purchaser of the firearm. This information is used by federal, state, and local law enforcement officials to determine patterns of crime gun supply, and to investigate illegal sources of firearms and arrest firearms offenders. The most recent available data is from 27 cities that submitted traces during the period August 1, 1997 to July 31, 1998. The participating cities were: Atlanta, Georgia; Baltimore, Maryland; Birmingham, Alabama; Boston, Massachusetts; Bridgeport, Connecticut; Chicago, Illinois; Cincinnati, Ohio; Cleveland, Ohio; Detroit, Michigan; Gary, Indiana; Houston, Texas; Inglewood, California; Jersey City, New Jersey; Los Angeles, California; Memphis, Tennessee; Miami, Florida; Milwaukee, Wisconsin; Minneapolis, Minnesota; New York City, New York; Philadelphia, Pennsylvania; Richmond, Virginia; Salinas, California; San Antonio, Texas; Seattle, Washington; St. Louis, Missouri; Tucson, Arizona; Washington, D.C.

EXHIBIT 25

Sourcebook of criminal justice statistics Online

http://www.albany.edu/sourcebook/pdf/t31252005.pdf

Table 3.125.2005

Rate (per 100,000 persons in each group) of murder and nonnegligent manslaughter victimization

By age, sex, and race of victim, United States, 1976-2005

	Age											
	Total	Age						Sex		Race		
		13 years and younger	14 to 17 years	18 to 24 years	25 to 34 years	35 to 49 years	50 years and older	Male	Female	White	Black	Other
1976	8.8	1.8	4.5	13.8	15.4	12.6	6.8	13.6	4.2	5.1	37.1	4.9
1977	8.8	1.9	4.9	14.3	15.5	12.3	6.6	13.7	4.2	5.4	36.2	4.7
1978	9.0	1.9	5.1	14.6	16.1	12.2	6.3	14.0	4.1	5.6	35.1	4.0
1979	9.7	1.8	5.2	16.5	17.5	12.8	6.7	15.4	4.4	6.1	37.5	4.1
1980	10.2	1.8	5.9	17.5	18.5	13.2	6.8	16.2	4.5	6.3	37.7	5.7
1981	9.8	1.9	5.0	16.0	17.5	13.0	6.7	15.6	4.3	6.2	36.4	6.1
1982	9.1	2.0	4.8	15.0	15.7	11.8	6.2	14.1	4.3	5.9	32.3	6.5
1983	8.3	1.8	4.5	13.8	14.6	10.5	5.5	12.8	3.9	5.3	29.4	6.4
1984	7.9	1.7	4.2	13.2	13.8	10.0	5.1	12.1	3.9	5.2	27.2	5.5
1985	7.9	1.8	4.9	13.2	13.9	9.9	5.0	12.2	4.0	5.2	27.6	5.5
1986	8.6	2.0	5.2	15.3	15.2	10.1	5.0	13.2	4.1	5.4	31.5	6.2
1987	8.3	1.8	5.8	15.5	14.7	9.4	4.9	12.6	4.2	5.1	30.7	5.2
1988	8.4	2.0	6.5	16.4	15.3	9.2	4.7	12.9	4.2	4.9	33.5	4.0
1989	8.7	2.1	7.9	18.2	15.6	9.2	4.6	13.6	4.0	5.0	35.1	4.3
1990	9.4	2.0	9.7	21.1	16.7	9.9	4.4	15.0	4.0	5.4	37.6	4.2
1991	9.8	2.1	11.1	23.9	16.7	10.0	4.5	15.7	4.2	5.5	39.3	6.0
1992	9.3	2.0	11.3	23.4	16.1	9.4	4.2	14.9	4.0	5.3	37.2	5.4
1993	9.5	2.2	12.1	24.4	16.1	9.5	4.2	15.0	4.2	5.3	38.7	5.5
1994	9.0	2.0	11.2	23.6	15.4	8.9	3.8	14.4	3.8	5.0	36.4	4.6
1995	8.2	1.9	11.0	21.5	13.8	8.2	3.8	12.9	3.7	4.8	31.6	4.9
1996	7.4	1.9	9.1	19.5	12.4	7.7	3.4	11.7	3.3	4.3	28.3	4.1
1997	6.8	1.7	7.3	19.1	11.4	6.8	3.2	10.7	3.0	3.9	26.0	4.1
1998	6.3	1.7	6.2	17.5	10.7	6.5	2.8	9.7	3.0	3.8	23.0	2.9
1999	5.7	1.6	5.9	15.4	9.9	5.9	2.6	8.8	2.7	3.5	20.5	3.3
2000	5.5	1.4	4.8	15.0	10.3	5.7	2.5	8.6	2.6	3.3	20.5	2.7
2001	5.6	1.5	4.6	15.4	10.7	5.6	2.6	8.8	2.6	3.4	20.4	2.8
2002	5.6	1.5	4.5	15.3	11.0	5.7	2.5	8.8	2.6	3.3	20.8	2.7
2003	5.7	1.4	4.3	15.7	11.3	5.7	2.6	9.0	2.5	3.4	20.9	2.8
2004	5.5	1.4	4.6	14.3	11.1	5.6	2.6	8.7	2.4	3.3	19.7	2.4
2005	5.6	1.4	4.8	14.9	11.6	5.7	2.6	9.0	2.3	3.3	20.6	2.5

Note: These data are from the Federal Bureau of Investigation's (FBI) Supplementary Homicide Reports (SHR), a component of the Uniform Crime Reporting Program. SHRs are incident-based reports, which include more detail about the offense, offender, and victim, than the other part I UCR offenses. Not all agencies that report aggregate offense data to the FBI also submit supplemental homicide data. On average, about 91% of homicides reported to the FBI are included in the SHR database. To account for homicides for which SHR data were not available, the victim-based analyses include SHR data that have been weighted to match national and State estimates prepared by the FBI. Rates are calculated from U.S. Census Bureau, Current Populations Reports. Deaths resulting from the events of Sept. 11, 2001 are not included in any of the analyses that generated these tables. Some data have been revised by the Source and may differ from previous editions of SOURCEBOOK.

Source: U.S. Department of Justice, Bureau of Justice Statistics, "Homicide Trends in the United States" [Online]. Available: <http://www.ojp.usdoj.gov/bjs/homicide/homtrnd.htm> [July 23, 2007]. Table adapted by SOURCEBOOK staff.

EXHIBIT 26

Expanded Homicide Data Table 8**Murder Victims**

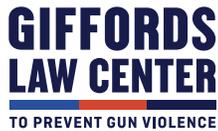
by Weapon, 2014–2018

Weapons	2014	2015	2016	2017	2018
Total	12,278	13,780	15,318	15,195	14,123
Total firearms:	7,803	9,103	10,372	11,006	10,265
Handguns	5,342	6,176	6,762	7,051	6,603
Rifles	235	215	300	390	297
Shotguns	238	247	247	264	235
Other guns	88	151	172	180	167
Firearms, type not stated	1,900	2,314	2,891	3,121	2,963
Knives or cutting instruments	1,545	1,525	1,558	1,609	1,515
Blunt objects (clubs, hammers, etc.)	431	436	464	472	443
Personal weapons (hands, fists, feet, etc.) ¹	668	647	664	710	672
Poison	9	8	12	15	5
Explosives	6	1	1	0	4
Fire	55	63	78	96	72
Narcotics	70	69	118	110	78
Drowning	12	12	9	8	9
Strangulation	84	96	97	89	70
Asphyxiation	93	105	92	111	90
Other weapons or weapons not stated	1,502	1,715	1,853	969	900

¹ Pushed is included in personal weapons.

NOTE: The Uniform Crime Reporting Technical Refresh enables updating of prior years' crime data; therefore, data presented in this table may not match previously published data.

EXHIBIT 27

[SIGN UP](#)[DONATE](#)[SEARCH](#)[GUN LAWS](#)[FACTS](#)[RESOURCES](#)[MEDIA](#)[ABOUT](#)[TAKE ACTION](#)

Minimum Age to Purchase & Possess

Purchasing and possessing a lethal weapon is a serious responsibility and one that should not be taken lightly. Our country sets minimum ages for driving, voting, and drinking alcohol to encourage responsible behavior. Because young adults are at elevated risk of attempting suicide and engaging in violent behaviors, strengthening minimum age laws for purchasing and possessing guns will help protect young people and the public at large.

[FEDERAL LAW](#)[STATE LAW](#)[KEY ELEMENTS](#)

BACKGROUND

Laws imposing minimum age requirements for the possession and purchase of firearms are intended to decrease access to firearms by young people and, correspondingly, to decrease the number of suicides, homicides, and unintentional shootings among that population. Given that young people are at elevated risk of engaging in violent behaviors

against themselves or others, these laws have the potential to protect a particularly vulnerable group.

A robust body of academic literature shows that the human brain continues to develop well past the age of 21, particularly in areas that may alter a person's likelihood of involvement in violence against themselves or others.

- The parts of the brain responsible for impulse control, judgement, and long-range planning are among the last areas of the brain to fully mature, and in fact, may continue to develop until at least age 26.¹
- The developing brains of adolescents and young adults may put them at higher risk of making risky decisions. Hormonal changes can have significant effects on self-control, decision making, emotions, risk-taking behaviors, and aggressive impulses.²

The biological processes that take place during late adolescence and young adulthood can predispose individuals to riskier and more aggressive behaviors.

- A study of offenders incarcerated for crimes committed with firearms found that 17% of offenders would have been prohibited from buying a gun if their state had a law that raised the minimum age to possess a handgun to 21 years.³
- Young people commit gun offenses in high numbers. In 2017, 36,024 young people between the ages of 10 and 21 were arrested for weapons offenses, such as illegally carrying or possessing a firearm.⁴ This group made up 28% of all arrests for weapons offenses that year.⁵
- Data also suggests that young people disproportionately commit gun homicides. For example, 18-20-year olds comprise just 4% of the US population, but account for 17% of known homicide offenders.⁶

Because impulse regulation and emotional control continues to develop into the mid-20s, **young people, including adolescents and people under age 21, are at elevated risk of attempting suicide.**

- Suicide risk is often much higher in the early stages of the onset of major psychiatric conditions, and these symptoms usually first develop in adolescence or early adulthood.⁷
- Suicide attempts that result in death or hospital treatment peak at age 16, but are at the highest rates from age 14 through age 21.⁸

- Gun access can significantly increase these risks. The association between firearm availability and suicide is strongest among adolescents and young adults.⁹

Laws that prohibit unsupervised possession or purchase of firearms by children and young people can reduce harm among people under age 21.

- One study found that state laws raising the minimum legal age to purchase firearms to 21 years were associated with a nine percent decline in rates of firearm suicides among 18-to-20-year-olds.¹⁰
- Controlling for other factors, unintentional firearm deaths and firearm suicides among youth (ages 0-19) also fell after the federal minimum age law was enacted.¹¹

As described below, federal law and the laws in most states continue to allow unsupervised access to firearms by individuals under age 21. Additional information about laws preventing child access to firearms is included in our summary on **Child Access Prevention**.

SUMMARY OF FEDERAL LAW

Federal law in this area distinguishes between long guns (rifles and shotguns) and handguns, and between gun possession and gun sales. Federal law also provides stronger age restrictions for sales by licensed gun sellers.

MINIMUM AGE FOR GUN SALES AND TRANSFERS

<i>Under federal law –</i> Handguns		Long Guns (Rifles and Shotguns)
Licensed firearms dealers	Dealers may not sell or deliver a handgun or ammunition for a handgun to any person the dealer has reasonable cause to believe is under age 21 . ¹²	Dealers may not sell or deliver a long gun, or ammunition for a long gun, to any person the dealer knows or has reasonable cause to believe is under age 18 . ¹³
Unlicensed persons	Unlicensed persons may not sell, deliver or otherwise	Unlicensed persons may sell, deliver, or otherwise transfer a

transfer a handgun or handgun ammunition to any person the transferor knows or has reasonable cause to believe is under age **18**, with certain exceptions*.¹⁴

long gun or long gun ammunition to **a person of any age**.

Minimum Age for Gun Possession: Subject to limited exceptions*, federal law prohibits the possession of a handgun or handgun ammunition by any person under the age of 18.¹⁵ Federal law provides no minimum age for the possession of long guns or long gun ammunition.

***Exceptions:** Federal law provides exceptions for the temporary transfer and possession of handguns and handgun ammunition for specified activities, including employment, ranching, farming, target practice and hunting.¹⁶

SUMMARY OF STATE LAW

Several states and the District of Columbia impose minimum age requirements that extend beyond those contained in federal law. Those laws generally fall into four categories:

- Laws imposing a stricter minimum age for handgun or firearm purchases than federal law;
- Laws imposing a minimum age for all long gun purchases, from licensed or unlicensed sellers;
- Laws imposing age requirements for possession of handguns that are stricter than federal law; and
- Laws imposing a minimum age for possession of long guns.

Additional information about laws preventing child access to firearms is included in our summary on **Child Access Prevention**.

STATE MINIMUM AGE LAWS THAT EXTEND BEYOND FEDERAL LAW

State	Purchase of a Handgun	Purchase of a Long Gun ¹⁷	Possession of a Handgun	Possession of a Long Gun
Alabama	18 ¹⁸		18 ¹⁹	
Alaska		18 ²⁰		16 (without parental consent) ²¹
Arizona		18 (without parental consent) ²²		18 ²³
Arkansas		18 (without parental consent) ²⁴		
California	21 ²⁵	21 ²⁶		
Colorado				
Connecticut	21 ²⁷	18 ²⁸	21 ²⁹	
Delaware	21 ³⁰	18 (without parental consent) ³¹		
D.C.	21 ³²	18 ³³	21 ³⁴	21 or 18 with parental consent ³⁵
Florida	21 ³⁶	21 ³⁷		18 ³⁸
Georgia				
Hawaii	21 ³⁹	21 ⁴⁰	21 ⁴¹	21 ⁴²
Idaho		18 (without parental consent) ⁴³		18 (without parental consent or hunting license, or while hunting) ⁴⁴
Illinois	21 ⁴⁵	21 ⁴⁶	21 ⁴⁷	21 ⁴⁸

Indiana				18 ⁴⁹
Iowa	21 ⁵⁰	18 (without parental consent) ⁵¹	21 ⁵²	18 ⁵³
Kansas				
Kentucky				
Louisiana		18 ⁵⁴		
Maine		16 for transfers, 18 for sales ⁵⁵		
Maryland	21 ⁵⁶	18 ⁵⁷	21 ⁵⁸	
Massachusetts	21 ⁵⁹	18 ⁶⁰	21 ⁶¹	15 (with parental consent) or 18 ⁶²
Michigan		18 ⁶³		18 ⁶⁴
Minnesota		18 in cities (without parental consent) or 14 outside cities (without parental consent) ⁶⁵		14 (with firearms safety certificate), otherwise 16 ⁶⁶
Mississippi				
Missouri		18 (without parental consent) ⁶⁷		
Montana				
Nebraska	21 ⁶⁸	18 ⁶⁹		
Nevada ⁷⁰				18 ⁷¹

New Hampshire

New Jersey	21 ⁷²	18 ⁷³	21 ⁷⁴	18 ⁷⁵
------------	------------------	------------------	------------------	------------------

New Mexico			19 ⁷⁶	
------------	--	--	------------------	--

New York	21 ⁷⁷		21 ⁷⁸	16 ⁷⁹
----------	------------------	--	------------------	------------------

North Carolina

North Dakota	“a minor” ⁸⁰		18 ⁸¹	
--------------	-------------------------	--	------------------	--

Ohio	21 ⁸²	18 ⁸³		
------	------------------	------------------	--	--

Oklahoma		18 ⁸⁴		18 ⁸⁵
----------	--	------------------	--	------------------

Oregon		18 ⁸⁶		18 (without parental consent) ⁸⁷
--------	--	------------------	--	---

Pennsylvania		18 ⁸⁸		18 ⁸⁹
--------------	--	------------------	--	------------------

Rhode Island	21 ⁹⁰	18 ⁹¹		18 ⁹²
--------------	------------------	------------------	--	------------------

South Carolina	18 ⁹³		18 ⁹⁴	
----------------	------------------	--	------------------	--

South Dakota

Tennessee

Texas		18 (without parental consent) ⁹⁵		
-------	--	---	--	--

Utah		18 (without parental consent) ⁹⁶		18 (without parental consent) ⁹⁷
------	--	---	--	---

Vermont	21 (without a hunting safety certificate) ⁹⁸	21 (without a hunting safety certificate) ⁹⁹	16 (without parental consent) ¹⁰⁰	
---------	---	---	--	--

Virginia	18 ¹⁰¹		18 (subject to certain exceptions) ¹⁰²	
----------	-------------------	--	---	--

Washington	21 ¹⁰³	21 (for semiautomatic	21 (for possession	18 ¹⁰⁶
------------	-------------------	-----------------------	--------------------	-------------------

	rifles) ¹⁰⁴	outside private property) ¹⁰⁵	21 (for possession of semiautomatic rifles outside private property) ¹⁰⁷
West Virginia			18 (except in hunting) ¹⁰⁸
Wisconsin	18 ¹⁰⁹		18 ¹¹⁰
Wyoming	21 ¹¹¹	18 ¹¹²	

STATE LAWS GOVERNING MINIMUM AGE TO PURCHASE AND POSSESS FIREARMS

For citations to these laws, please see the chart above.

States Imposing Minimum Age Requirements for All Firearm Purchases

Although federal law prohibits licensed dealers from selling long guns to persons under 18, there is no federal regulation of the sale of long guns by unlicensed dealers to minors. Similarly, while federal law prohibits handgun sales by licensed dealers to persons under 21, unlicensed dealers are prohibited only from selling handguns to persons under 18. As listed above, many states have imposed a minimum age for the purchase of all firearms, including both handguns and long guns, regardless of whether they are purchased from a licensed firearms dealer.

States with Stricter Minimum Age Requirements for Possession of Handguns than Federal Law

Connecticut, Hawaii, Illinois, Iowa, Maryland, Massachusetts, New Jersey, New Mexico, New York, Washington, and the District of Columbia impose minimum age requirements for the possession of handguns which are stricter than the federal minimum of 18.¹¹³

States Imposing Minimum Age Requirements for Possession of Long Guns

While federal law prohibits federally licensed firearms dealers from selling a long gun to anyone under 18, there is no federal minimum age for possession of a long gun. Twenty-

three states have enacted laws to at least partially close this gap, and impose a minimum age at which persons can possess long guns. Many of these laws contain exceptions which allow younger children to possess long guns where the minor's parent or guardian is present, or when the minor is engaged in hunting or target shooting.

SELECTED LOCAL LAW

New York City

In New York City, however, no person under age 21 may be granted a permit or license to purchase, possess or carry any firearm, with certain exceptions. It is also unlawful to transfer a firearm to any person under age 21 unless he or she is exempted. A person under 21 may carry, fire or use a rifle or shotgun without being subject to the permit requirement if he or she is in the presence of, or under the direct supervision of, a permit holder, or engaged in a military drill, competition, or target practice at a firing range.¹¹⁴

KEY LEGISLATIVE ELEMENTS

The features listed below are intended to provide a framework from which policy options may be considered. A jurisdiction considering new legislation should consult with counsel.

- Minimum age of 21 is imposed for all handgun sales, from licensed or unlicensed sellers (*California, Connecticut, Delaware, Hawaii, Illinois, Iowa, Maryland, Massachusetts, New Jersey, New York, Ohio, Rhode Island, Vermont, and District of Columbia*).
- Minimum age of 18 is imposed for all long gun sales, from licensed or unlicensed sellers (*23 states and the District of Columbia*).
- Minimum age of 21 is imposed for possession of handguns (*Connecticut, Hawaii, Illinois, Iowa, Maryland, Massachusetts, New Jersey, New York and the District of Columbia*).
- Minimum age of 18 is imposed for possession of long guns (*16 states and the District of Columbia*).
- Younger teens are allowed to possess long guns only under direct adult supervision.

NOTES >

SIGN UP FOR UPDATES

First Name

Last Name

Email

Zip

SIGN UP

POLICY AREAS

STATES

TAKE ACTION

ABOUT

Copyright 2018 Giffords Law Center to Prevent Gun Violence. All Rights Reserved. Legal Disclaimer.

EXHIBIT 28



OJJDP

Working for Youth Justice and Safety

JUVENILE JUSTICE

BULLETIN

March 2015

Robert L. Listenbee, Administrator

Pathways to Desistance

How and why do many serious adolescent offenders stop offending while others continue to commit crimes? This series of bulletins presents findings from the Pathways to Desistance study, a multidisciplinary investigation that attempts to answer this question.

Investigators interviewed 1,354 young offenders from Philadelphia and Phoenix for 7 years after their convictions to learn what factors (e.g., individual maturation, life changes, and involvement with the criminal justice system) lead youth who have committed serious offenses to persist in or desist from offending.

As a result of these interviews and a review of official records, researchers have collected the most comprehensive dataset available about serious adolescent offenders and their lives in late adolescence and early adulthood.

These data provide an unprecedented look at how young people mature out of offending and what the justice system can do to promote positive changes in the lives of these youth.

Psychosocial Maturity and Desistance From Crime in a Sample of Serious Juvenile Offenders

Laurence Steinberg, Elizabeth Cauffman, and Kathryn C. Monahan

Highlights

The Pathways to Desistance study followed more than 1,300 serious juvenile offenders for 7 years after their conviction. In this bulletin, the authors present key findings on the link between psychosocial maturity and desistance from crime in the males in the Pathways sample as they transition from midadolescence to early adulthood (ages 14–25):

- Recent research indicates that youth experience protracted maturation, into their midtwenties, of brain systems responsible for self-regulation. This has stimulated interest in measuring young offenders' psychosocial maturity into early adulthood.
- Youth whose antisocial behavior persisted into early adulthood were found to have lower levels of psychosocial maturity in adolescence and deficits in their development of maturity (i.e., arrested development) compared with other antisocial youth.
- The vast majority of juvenile offenders, even those who commit serious crimes, grow out of antisocial activity as they transition to adulthood. Most juvenile offending is, in fact, limited to adolescence.
- This study suggests that the process of maturing out of crime is linked to the process of maturing more generally, including the development of impulse control and future orientation.





MARCH 2015

Psychosocial Maturity and Desistance From Crime in a Sample of Serious Juvenile Offenders

Laurence Steinberg, Elizabeth Cauffman, and Kathryn C. Monahan

Involvement in delinquent and criminal behavior increases through adolescence, peaking at about age 16 (in cases of property crime) or age 17 (in cases of violent crime) and declining thereafter (Farrington, 1986; Piquero, 2007; Piquero et al., 2001). Although a small number of youth persist in antisocial behavior across this developmental period, the vast majority of antisocial adolescents desist from criminal behavior as they enter adulthood (Laub and Sampson, 2001; Piquero, 2007; Sampson and Laub, 2003). Understanding why most juvenile offenders desist from antisocial activity as a part of the normative transition into adulthood may provide important insights into the design of interventions aimed at encouraging desistance. This bulletin describes findings from the Pathways to Desistance study, a multisite, longitudinal sample of adolescent (primarily felony) offenders (see “About the Pathways to Desistance Study”).¹ This study explores the processes through which juvenile offenders desist from crime and delinquency.

Theories of the Psychosocial Maturation Process

Both sociological and psychological theories suggest that one reason most adolescents desist from crime is that they mature out of antisocial behavior, but sociologists and psychologists have different ideas about the nature of this maturation. A traditional sociological view is grounded in the notion that the activities individuals typically enter into during early adulthood—such as full-time employment, marriage, and parenthood—are largely incompatible with criminal activity (Sampson and Laub, 2003). Thus, according to this view, individuals desist from antisocial behavior as a consequence of taking on more mature social roles, either because the time and energy demands of these activities make it difficult to maintain a criminal lifestyle or because embracing the socially approved roles

of adulthood leads individuals to adopt more conventional values and attitudes.

The conventional psychological view describes a different scenario. According to this view, desistance from antisocial behavior is the product of psychosocial maturation (Cauffman and Steinberg, 2000; Steinberg and Cauffman, 1996; Monahan et al., 2009), which includes the ability to:

- Control one’s impulses.
- Consider the implications of one’s actions on others.
- Delay gratification in the service of longer term goals.
- Resist the influences of peers.

Thus, psychologists see that much juvenile offending reflects psychological immaturity and, accordingly, they view desistance from antisocial behavior as a natural consequence of growing up—emotionally, socially, and intellectually. As individuals become better able to regulate their behavior, they become less likely to engage in impulsive, ill-considered acts.

Although the sociological and psychological explanations of desistance from antisocial behavior during the transition to adulthood are not incompatible, there has been much more research in the sociological tradition, largely because psychological maturation during young adulthood has received relatively little attention from psychologists. Indeed, most research on psychological development during adolescence has focused on the first half of the adolescent decade rather than on the transition from adolescence to adulthood (Institute of Medicine, 2013), perhaps because social scientists widely assumed that there was little systematic development after midadolescence (Steinberg, 2014). However, recent research indicating protracted maturation (into the midtwenties) of brain

systems responsible for self-regulation has stimulated interest in charting the course of psychosocial maturity beyond adolescence (Steinberg, 2010). Because juvenile offending is likely to wane during late adolescence and young adulthood (age 16 through age 25), it is important to ask whether desistance from crime and delinquency is linked to normative processes of psychological maturation.

Psychologist Terrie Moffitt (1993, 2003) has advanced the most widely cited theory regarding psychological contributors to desistance from antisocial behavior during the transition to adulthood. She distinguished between the vast majority of individuals (90 percent or more, depending on the study) whose antisocial behavior stopped in adolescence (adolescence-limited offenders) and the small proportion of individuals whose antisocial behavior persisted into adulthood (life-course persistent offenders). Moffitt suggested that different etiological factors explained these groups' involvement in antisocial behavior. Moffitt hypothesizes that adolescence-limited offenders' involvement in antisocial behavior is a normative consequence of their desire to feel more mature, and their antisocial activity is often the result of peer pressure or the emulation of higher status agemates, especially during midadolescence, when opposition to adult authority may confer special prestige with peers. In contrast, she thinks that antisocial behavior that persists into adulthood is rooted in early neurological and cognitive deficits that, combined with environmental risk, lead to early conduct problems and lifelong antisocial behavior. Although the identification of variations in these broad patterns of antisocial behavior has led Moffitt to refine her framework (Moffitt, 2006; Moffitt et al., 2002), the scientific consensus is that the distinction between adolescence-limited and life-course persistent offenders is a useful one.

Although Moffitt never explicitly outlined the role of normative psychosocial maturation in her framework, it follows from this perspective that growth in psychosocial maturity underlies adolescence-limited offenders' desistance from antisocial behavior. That is, if adolescence-limited offenders engage in antisocial behavior to appear and feel more mature, the genuine process of maturation should lessen their need to engage in antisocial behavior to achieve this end, thereby contributing to desistance from crime and delinquency. Moreover, juvenile offenders who are relatively more mature for their age, or who mature faster than their peers, should "age out" of offending sooner than others. Indeed, there is some evidence to suggest that this is the case. In a previous analysis of earlier waves of data from the Pathways study, the researchers found that youth whose antisocial behavior persisted into their early twenties were significantly less psychosocially mature than youth who desisted from antisocial behavior (Monahan et al., 2009). In this bulletin, the researchers

explore whether this pattern characterizes trajectories of antisocial behavior through age 25.

Models of Psychosocial Maturity

Many psychologists have proposed theoretical models of psychosocial maturity (e.g., Greenberger et al., 1974). The researchers' approach to measuring psychosocial maturity is based on a model advanced in the 1990s (Steinberg and Cauffman, 1996), which suggested that during adolescence and early adulthood, three aspects of psychosocial maturity develop:

- **Temperance.** The ability to control impulses, including aggressive impulses.
- **Perspective.** The ability to consider other points of view, including those that take into account longer term consequences or that take the vantage point of others.
- **Responsibility.** The ability to take personal responsibility for one's behavior and resist the coercive influences of others.

Previous studies have demonstrated that youth with lower temperance, perspective, and responsibility report greater antisocial behavior (Cauffman and Steinberg, 2000) and that, over time, deficiencies in developing these aspects of psychosocial maturity are associated with more chronic patterns of antisocial behavior (Monahan et al., 2009).

The researchers' model of psychosocial maturation maps nicely onto one of the most widely cited criminological theories of antisocial behavior: Gottfredson and Hirschi's (1990) General Theory of Crime, which posits that deficits in self-control are the cause of criminal behavior. Gottfredson and Hirschi's definition of self-control, like the definition of maturity, includes components such as orientation toward the future (rather than immediate gratification), planning ahead (rather than impulsive decisionmaking), physical restraint (rather than the use of aggression when frustrated), and concern for others (rather than self-centered or indifferent behavior) (Gottfredson and Hirschi, 1990). Although the General Theory of Crime is useful in explaining which adolescents are more likely to engage in antisocial behavior (i.e., the ones with poor self-control), it does not explain why most antisocial adolescents desist as they mature into adulthood. From a developmental perspective, it may be variability in both individuals' level of maturity during adolescence and their degree of change in maturity over time that distinguishes between those whose antisocial behavior wanes and those whose antisocial behavior persists during the transition to adulthood. The General Theory of Crime predicts that, at any point in time, individuals who are less mature than their peers would be more likely to engage

ABOUT THE PATHWAYS TO DESISTANCE STUDY

The Pathways to Desistance study is a multidisciplinary, multisite longitudinal investigation of how serious juvenile offenders make the transition from adolescence to adulthood. It follows 1,354 young offenders from Philadelphia County, PA, and Maricopa County, AZ (metropolitan Phoenix), for 7 years after their court involvement. This study has collected the most comprehensive dataset currently available about serious adolescent offenders and their lives in late adolescence and early adulthood. It looks at the factors that lead youth who have committed serious offenses to persist in or desist from offending. Among the aims of the study are to:

- Identify initial patterns of how serious adolescent offenders stop antisocial activity.
- Describe the role of social context and developmental changes in promoting these positive changes.
- Compare the effects of sanctions and interventions in promoting these changes.

Characteristics of Study Participants

Enrollment took place between November 2000 and March 2003, and the research team concluded data collection in 2010. In general, participating youth were at least 14 years old and younger than 18 years old at the time of their study index petition; 8 youth were 13 years old, and 16 youth were older than age 18 but younger than age 19 at the time of their index petition. The youth in the sample were adjudicated delinquent or found guilty of a serious (overwhelmingly felony-level) violent crime, property offense, or drug offense at their current court appearance. Although felony drug offenses are among the eligible charges, the study limited the proportion of male drug offenders to no more than 15 percent; this limit ensures a heterogeneous sample of serious offenders. Because investigators wanted to include a large enough sample of female offenders—a group neglected in previous research—this limit did not apply to female drug offenders. In addition, youth whose cases were considered for trial in the adult criminal justice system were enrolled regardless of the offense committed.

At the time of enrollment, participants were an average of 16.2 years old. The sample is 84 percent male and 80 percent minority (41 percent black, 34 percent Hispanic, and 5 percent American Indian/other). For approximately one-quarter (25.5 percent) of study participants, the study index petition was their first petition to court. Of the remaining participants (those with a petition before the study index petition), 69 percent had 2 or more prior petitions; the average was 3 in Maricopa County and 2.8 in Philadelphia County (exclusive of the study index offense). At both sites, more than 40 percent of the adolescents enrolled were adjudicated of felony crimes against persons (i.e., murder, robbery, aggravated assault, sex offenses, and kidnapping). At the time of the baseline

interview for the study, 50 percent of these adolescents were in an institutional setting (usually a residential treatment center); during the 7 years after study enrollment, 87 percent of the sample spent some time in an institutional setting.

Interview Methodology

Immediately after enrollment, researchers conducted a structured 4-hour baseline interview (in two sessions) with each adolescent. This interview included a thorough assessment of the adolescent's self-reported social background, developmental history, psychological functioning, psychosocial maturity, attitudes about illegal behavior, intelligence, school achievement and engagement, work experience, mental health, current and previous substance use and abuse, family and peer relationships, use of social services, and antisocial behavior.

After the baseline interview, researchers interviewed study participants every 6 months for the first 3 years and annually thereafter. At each followup interview, researchers gathered information on the adolescent's self-reported behavior and experiences during the previous 6-month or 1-year reporting period, including any illegal activity, drug or alcohol use, and involvement with treatment or other services. Youth's self-reports about illegal activities included information about the range, the number, and other circumstances of those activities (e.g., whether or not others took part). In addition, the followup interviews collected a wide range of information about changes in life situations (e.g., living arrangements, employment), developmental factors (e.g., likelihood of thinking about and planning for the future, relationships with parents), and functional capacities (e.g., mental health symptoms).

Researchers also asked participants to report monthly about certain variables (e.g., school attendance, work performance, and involvement in interventions and sanctions) to maximize the amount of information obtained and to detect activity cycles shorter than the reporting period.

In addition to the interviews of study participants, for the first 3 years of the study, researchers annually interviewed a family member or friend about the study participant to validate the participants' responses. Each year, researchers also reviewed official records (local juvenile and adult court records and FBI nationwide arrest records) for each adolescent.

Investigators have now completed the last (84-month) set of followup interviews, and the research team is analyzing interview data. The study maintained the adolescents' participation throughout the project: At each followup interview point, researchers found and interviewed approximately 90 percent of the enrolled sample. Researchers have completed more than 21,000 interviews in all.

in antisocial behavior. In this bulletin, the researchers examine this proposition but also ask whether individuals who mature more quickly over time compared to their peers are more likely to desist from crime as they get older.

To investigate whether and to what extent changes in psychosocial maturity across adolescence and young adulthood account for desistance from antisocial behavior, it is necessary to study a sample of individuals who are known to be involved in antisocial behavior. The Pathways study affords an ideal opportunity to do this because it is the first longitudinal study that examined psychosocial development among serious adolescent offenders during their transition to adulthood. As a result, the researchers examined whether the majority of juvenile offenders demonstrate significant growth in psychosocial maturity over time, as the psychological theories of desistance predict, and whether individual variability in the development of psychosocial maturity accounts for variability in patterns of desistance. They also examined whether differential development of psychosocial maturity over time is linked to differential timing in desistance; presumably, those who mature faster should desist earlier. Because individuals generally cease criminal activity by their midtwenties (Piquero, 2007), this extension of a previous analysis through age 25 allows greater confidence in any conclusions drawn about the connection between psychosocial maturation and desistance from antisocial behavior.

Measuring Psychosocial Maturity

As noted earlier, in the researchers' theoretical model, psychosocial maturity consists of three separate components: temperance, perspective, and responsibility (Steinberg and Cauffman, 1996). Each of these components was indexed by two different measures. For more detail on the psychometric properties of the measures, see Monahan and colleagues (2009).

Temperance

The measures were self-reported impulse control (e.g., "I say the first thing that comes into my mind without thinking enough about it") and suppression of aggression (e.g., "People who get me angry better watch out"), both of which are subscales of the Weinberger Adjustment Inventory (Weinberger and Schwartz, 1990).

Perspective

The measures were self-reported consideration of others (e.g., "Doing things to help other people is more important to me than almost anything else," also from the Weinberger Adjustment Inventory; Weinberger and Schwartz, 1990) and future orientation (e.g., "I will keep

working at difficult, boring tasks if I know they will help me get ahead later") (Cauffman and Woolard, 1999).

Responsibility

The measures were self-reported personal responsibility (e.g., "If something more interesting comes along, I will usually stop any work I'm doing," reverse scored) from the Psychosocial Maturity Inventory (Greenberger et al., 1974), and resistance to peer influence (e.g., "Some people go along with their friends just to keep their friends happy, but other people refuse to go along with what their friends want to do, even though they know it will make their friends unhappy") (Steinberg and Monahan, 2007).

In addition to examining each indicator of psychosocial maturity independently, the researchers also standardized each measure across the age distribution and then calculated the average to create a global measure of psychosocial maturity.

Measuring Antisocial Behavior

Involvement in antisocial behavior was assessed using the Self-Report of Offending, a widely used instrument in delinquency research (Huizinga, Esbensen, and Weiher, 1991). Participants reported if they had been involved in any of 22 aggressive or income-generating antisocial acts (e.g., taking something from another person by force, using a weapon, carrying a weapon, stealing a car or motorcycle to keep or sell, or using checks or credit cards illegally). At the baseline interview and the 48- through 84-month annual interviews, these questions were asked with the qualifying phrase, "In the past 12 months have you ...?" At the 6- through 36-month biannual interviews, these questions were asked with the qualifying phrase, "In the past 6 months, have you ...?" The researchers counted the number of different types of antisocial acts that an individual reported having committed since the previous interview to derive the measure of antisocial activity. So-called "variety scores"² are widely used in criminological research because they are highly correlated with measures of seriousness of antisocial behavior yet are less prone to recall errors than self-reported frequency scores, especially when the antisocial act is committed frequently (such as selling drugs). In the Pathways sample, self-reported variety scores also were significantly correlated with official arrest records (Brame et al., 2004).

Identifying Trajectories of Antisocial Behavior

The first task was to see whether individuals followed different patterns of antisocial behavior over time. The



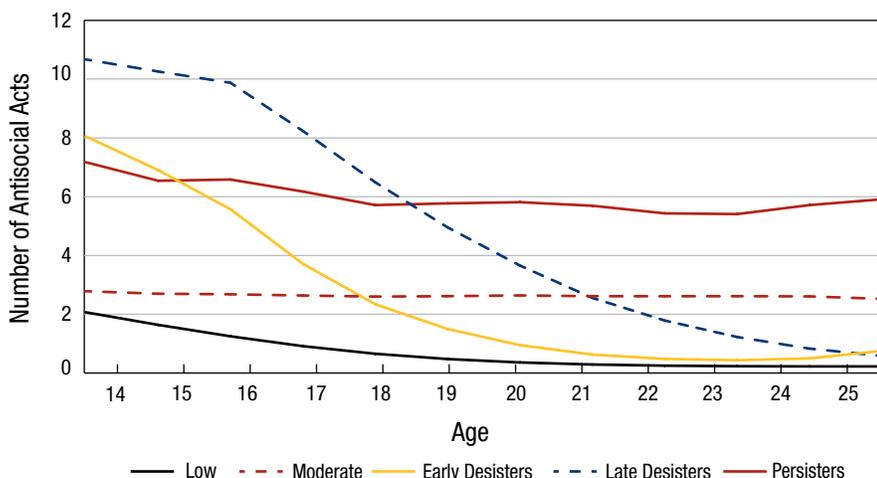
research team used a type of analysis called group-based trajectory modeling (Nagin, 2005; Nagin and Land, 1993) to determine whether they could reliably divide the participants into distinct subgroups, each composed of individuals who demonstrated a common pattern of antisocial behavior. This analysis indicated that there were five different patterns, which are shown in figure 1.

The first group (low, 37.2 percent of the sample) consisted of individuals who reported low levels of offending at every time point. The second group (moderate, 13.5 percent) showed consistently moderate levels of antisocial behavior. The third group (early desisters, 31.3 percent) engaged in high levels of antisocial behavior in early adolescence, but their antisocial behavior declined steadily and rapidly thereafter. The fourth group (late desisters, 10.5 percent) engaged in high levels of antisocial behavior through midadolescence, which peaked at about age 15 and then declined during the transition to adulthood. The fifth group (persistent offenders, 7.5 percent) reported high levels of antisocial behavior consistently from ages 14 to 25.

Several points about these patterns are noteworthy:

- As expected—and consistent with other studies—the vast majority of serious juvenile offenders desisted from antisocial activity by the time they were in their early twenties. Less than 10 percent of the sample could be characterized as chronic offenders. This statistic is similar to that reported in other studies.
- More than one-third of the sample were infrequent offenders for the entire 7-year study period. Although all of these individuals were arrested for a very serious crime during midadolescence, their antisocial behavior did not continue.
- Even among the subgroup of juveniles who were high-frequency offenders at the beginning of the study (about 40 percent of the sample), the majority stopped offending by the time they reached young adulthood. Indeed, at age 25, most of the individuals who had been high-frequency offenders when they were in midadolescence were no longer committing crimes. This, too, is consistent with previous research showing that very few individuals—even those with a history of involvement in serious crime—were engaging in criminal activity after their midtwenties.

Figure 1. Five Trajectories of Antisocial Behavior



Patterns of Change in Psychosocial Maturity Over Time

The researchers next examined patterns of change in psychosocial maturity. Was adolescence a time of psychosocial maturation for these juveniles? Was it a period of continued growth in temperance, perspective, and responsibility? To answer these questions, they used an approach called growth curve modeling. This statistical technique examines whether, on average, individuals matured over the course of the study and whether there was significant variability within the sample

“As expected—and consistent with other studies—the vast majority of serious juvenile offenders desisted from antisocial activity by the time they were in their early twenties.”

in the level, degree, and rate of change in psychosocial maturation.

Across each of the six individual indicators of psychosocial maturity—impulse control, suppression of aggression, consideration of others, future orientation, personal responsibility, and resistance to peer influence—and the global index of psychosocial maturity, the pattern of results was identical. Individuals showed increases in all aspects of psychosocial maturity over time, but the rate of increase slowed in early adulthood.

Figure 2 illustrates this pattern; it shows the growth curve for the composite psychosocial maturity variable and steady psychosocial maturation from age 14 to about age 22, and then maturation begins to slow down. The researchers investigated whether psychosocial maturation actually stopped by the end of adolescence and found that it did not. Rather, they found that, across each of the six indicators of psychosocial maturity and the global measure of psychosocial maturity, individuals in the Pathways sample were still maturing psychosocially at age 25. At this age, individuals in the sample continued to increase in impulse control, suppression of aggression, consideration of others, future orientation, personal responsibility, and resistance to peer influence—indicating that psychosocial

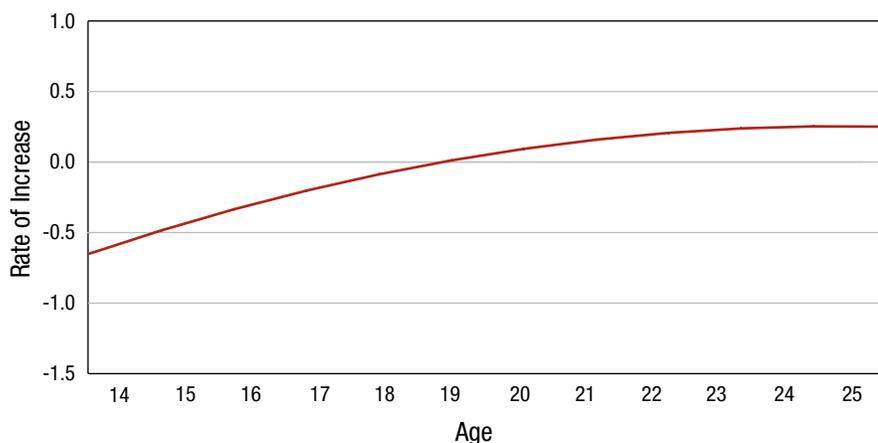
development continues beyond adolescence. This finding is consistent with new research on brain development, which shows that there is continued maturation of brain systems that support self-regulation—well into the midtwenties. It is important to note that this pattern of growth was seen in a sample of serious juvenile offenders, a population that is often portrayed as “deviant.”

Although these analyses indicate that, on average, adolescence and (to a lesser extent) early adulthood are times of psychosocial maturation, the analyses also indicated—not surprisingly—that individuals differ in their level of psychosocial maturity (i.e., some are more mature than others of the same chronological age) and in the way they develop psychosocial maturity during adolescence and early adulthood (i.e., some mature to a greater degree or faster than others) (see Monahan et al., 2009, for a fuller discussion). These results confirm that the population of juvenile offenders—even serious offenders—is quite heterogeneous, at least with respect to their psychosocial maturation. This variability also leads to the question of whether differences in patterns of offending are linked to differences in patterns of psychosocial development.

Psychosocial Maturation and Patterns of Offending

If it is true that desistance from crime during the transition to adulthood is due, at least in part, to normative psychosocial maturation, then there should be a connection between patterns of offending and patterns of psychosocial growth. Juvenile offenders vary in their patterns of offending and their patterns of psychosocial development. Are the two connected? More specifically, is psychosocial maturation linked to desistance from antisocial behavior? To explore this question, the researchers compared patterns of development in psychosocial maturity within each of the

Figure 2. Rates of Psychosocial Maturity Across Adolescence and Early Adulthood



antisocial trajectory groups (figure 3). They selected age 16, the average age of participants when first enrolled in the study, to compare analyses that examined absolute levels of maturity with those that examined changes in maturity over time across the entire age range (ages 14–25).

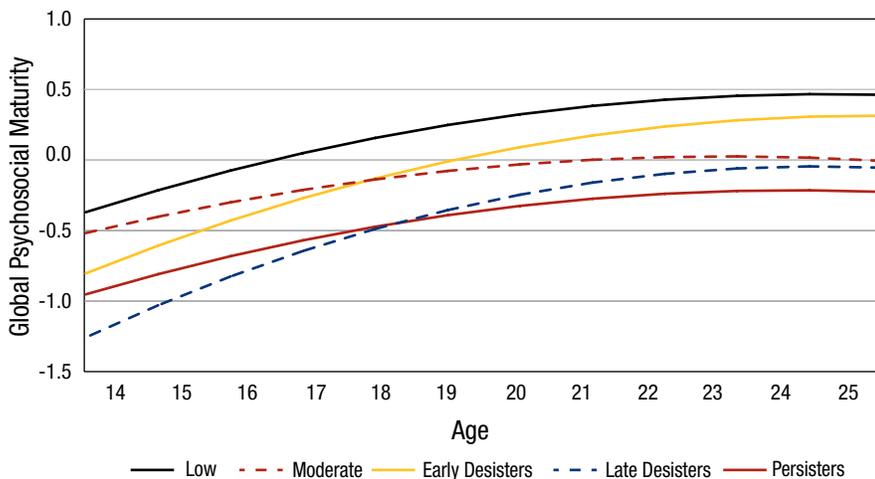
As hypothesized, individuals in different antisocial trajectory groups differed in their absolute levels of psychosocial maturity and the extent to which their psychosocial maturity increased with age. The pattern of group differences was similar for the different psychosocial maturity subscales and for the composite psychosocial maturity index. At age 16, persistent offenders were significantly less mature than individuals in the low, moderate, and early desister groups and were not significantly different from those in the late desister group. Moreover, at age 16, late desisters, who did not start desisting from crime until about age 17, were significantly less mature than early desisters, whose desistance from crime was evident before they turned 16. The findings regarding changes in maturity over time were consistent with the concept that desistance from antisocial activity is linked to the process of psychosocial maturation. As expected, offenders who desisted from antisocial activity

during adolescence showed significantly greater growth in psychosocial maturity than those who persisted into adulthood.

These findings are important for several reasons:

- Even in a population of serious juvenile offenders, there were significant gains in psychosocial maturity during adolescence and early adulthood. Between ages 14 and 25, youth continue to develop an increasing ability to control impulses, suppress aggression, consider the impact of their behavior on others, consider the future consequences of their behavior, take personal responsibility for their actions, and resist the influence of peers. Psychosocial development is far from over at age 18.
- Although the rate of maturation slows as individuals reach early adulthood (about age 22), it does not come to a standstill. Individuals are still maturing socially and emotionally when they are in their midtwenties; much of this maturation is probably linked to the maturation of brain systems that support self-control.
- There is significant variability in psychosocial maturity within the offender population with respect to both how mature individuals are in midadolescence and to what extent they continue to mature as they transition to adulthood.
- This variability in psychosocial maturity is linked to patterns of antisocial activity. Less mature individuals are more likely to be persistent offenders, and high-frequency offenders who desist from antisocial activity are likely to become more mature psychosocially than those who continue to commit crimes as adults. The association between immature impulse control and continued offending is consistent with Gottfredson and Hirschi's General Theory of Crime, which posits that poor self-control is the root cause of antisocial behavior

Figure 3. Trajectories of Antisocial Behavior and Global Psychosocial Maturity



“New research on brain development ... shows that there is continued maturation of brain systems that support self-regulation—well into the midtwenties.”

(Gottfredson and Hirschi, 1990), and with Moffitt's theory of "adolescence-limited offending," which suggests that most antisocial behavior in adolescence is the product of transient immaturity (Moffitt, 1993, 2003, 2006; Moffitt et al., 2002).

Summary

Far more is known about the factors that cause young people to commit crimes than about the factors that cause them to stop committing crimes. The Pathways to Desistance study provides evidence that, just as immaturity is an important contributor to the emergence of much adolescent misbehavior, maturity is an important contributor to its cessation. This observation provides an important complement to models of desistance from crime that emphasize individuals' entrance into adult roles and the fact that the demands of these roles are incompatible with a criminal lifestyle (Laub and Sampson, 2001; Sampson and Laub, 2003).

The results of the analyses suggest that the transition to adulthood involves the acquisition of more adultlike psychosocial capabilities and more adult responsibilities; however, not all adolescents mature to the same degree. Youth whose antisocial behavior persists into early adulthood exhibit lower levels of psychosocial maturity in adolescence and also demonstrate deficits in the development of psychosocial maturity compared with other antisocial youth. In a sense, these chronic offenders show a lack of psychosocial maturation that might be characterized as arrested development. Although it is reasonable to assume that this factor contributed to persistent involvement in criminal activity, researchers do not know the extent to which continued involvement in crime impeded the development of these individuals. To the extent that chronic offending leads to placement in institutional settings that do not facilitate positive development, the latter is certainly a strong possibility. In all likelihood, the connection between psychosocial immaturity and offending is bidirectional; that is, each factor affects the other factor. One important implication for practitioners is that interventions for juvenile offenders

should be aimed explicitly at facilitating the development of psychosocial maturity and that special care should be taken to avoid exposing young offenders to environments that might inadvertently derail this developmental process. More research is needed that examines outcomes of interventions for antisocial youth that go beyond standard measures of recidivism.

Perhaps the most important lesson learned from these analyses is that the vast majority of juvenile offenders grow out of antisocial activity as they make the transition to adulthood; most juvenile offending is, in fact, limited to adolescence (i.e., these offenders do not persist into adulthood). Although this is well documented, the researchers believe that the Pathways study is the first investigation to show that the process of maturing out of crime is linked to the process of maturing more generally. It is therefore important to ask whether the types of sanctions and interventions that serious offenders are exposed to are likely to facilitate this process or are likely to impede it (Steinberg, Chung, and Little, 2004). When the former is the case, the result may well be desistance from crime. However, if responses to juvenile offenders slow the process of psychosocial maturation, in the long run these responses may do more harm than good.

Endnotes

1. OJJDP is sponsoring the Pathways to Desistance study (project number 2007-MU-FX-0002) in partnership with the National Institute of Justice (project number 2008-IJ-CX-0023), the John D. and Catherine T. MacArthur Foundation, the William T. Grant Foundation, the Robert Wood Johnson Foundation, the William Penn Foundation, the National Institute on Drug Abuse (grant number





Cauffman, E., and Woolard, J. 1999. The Future Outlook Inventory. Measure developed for the MacArthur Network on Adolescent Development and Juvenile Justice. Unpublished manuscript.

Farrington, D.P. 1986. Age and crime. *Crime and Justice: A Review of Research* 7:189–250.

Gottfredson, M., and Hirschi, T. 1990. *A General Theory of Crime*. Stanford, CA: Stanford University Press.

Greenberger, E., Josselson, R., Knerr, C., and Knerr, B. 1974. The measurement and structure of psychosocial maturity. *Journal of Youth and Adolescence* 4:127–143.

Huizinga, D., Esbensen, F., and Weiher, A. 1991. Are there multiple paths to delinquency? *Journal of Criminal Law and Criminology* 82:83–118.

Institute of Medicine. 2013. *Improving the Health, Safety, and Well-Being of Young Adults*. Washington, DC: National Academies Press.

Laub, J.H., and Sampson, R.J. 2001. Understanding desistance from crime. *Crime and Justice: A Review of Research* 28:1–69.

Moffitt, T.E. 1993. Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review* 100(4):674–701.

Moffitt, T.E. 2003. Life-course-persistent and adolescence-limited antisocial behaviour: A 10-year research review and a research agenda. In *The Causes of Conduct Disorder and Serious Juvenile Delinquency*, edited by B. Lahey, T.E. Moffitt, and A. Caspi. New York, NY: Guilford Press, pp. 49–75.

Moffitt, T.E. 2006. Life-course-persistent versus adolescence-limited antisocial behavior. In *Developmental Psychopathology*, vol. 3: *Risk, Disorder, and Adaptation*, 2d ed., edited by D. Cicchetti and D.J. Cohen. Hoboken, NJ: John Wiley & Sons, pp. 570–598.

Moffitt, T.E., Caspi, A., Harrington, H., and Milne, B.J. 2002. Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26 years. *Development and Psychopathology* 14:179–207.

Monahan, K.C., Steinberg, L., Cauffman, E., and Mulvey, E. 2009. Trajectories of antisocial behavior and psychosocial maturity from adolescence to young adulthood. *Developmental Psychology* 45(6):1654–1668.

Mulvey, E.P. 2011. *Highlights From Pathways to Desistance: A Longitudinal Study of Serious Adolescent Offenders*. Washington, DC: U.S. Department of Justice,

R01DA019697), the Centers for Disease Control and Prevention, the Pennsylvania Commission on Crime and Delinquency, and the Arizona State Governor’s Justice Commission. Investigators for this study are Edward P. Mulvey, Ph.D. (University of Pittsburgh), Robert Brame, Ph.D. (University of North Carolina–Charlotte), Elizabeth Cauffman, Ph.D. (University of California–Irvine), Laurie Chassin, Ph.D. (Arizona State University), Sonia Cota-Robles, Ph.D. (Temple University), Jeffrey Fagan, Ph.D. (Columbia University), George Knight, Ph.D. (Arizona State University), Sandra Losoya, Ph.D. (Arizona State University), Alex Piquero, Ph.D. (University of Texas–Dallas), Carol A. Schubert, M.P.H. (University of Pittsburgh), and Laurence Steinberg, Ph.D. (Temple University). More details about the study can be found in a previous OJJDP fact sheet (Mulvey, 2011) and at the study website (www.pathwaysstudy.pitt.edu), which includes a list of publications from the study.

2. The variety score is calculated as the number of different types of antisocial acts that the participant reported during the period that the interview covered, divided by the number of different antisocial acts the participant was asked about.

References

Brame, R., Fagan, J., Piquero, A., Schubert, C., and Steinberg, L. 2004. Criminal careers of serious delinquents in two cities. *Youth Violence and Juvenile Justice* 2:256–272.

Cauffman, E., and Steinberg, L. 2000. (Im)maturity of judgment in adolescence: Why adolescents may be less culpable than adults. *Behavioral Sciences and the Law* 18:741–760.

Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

Nagin, D.S. 2005. *Group-Based Modeling of Development*. Cambridge, MA: Harvard University Press.

Nagin, D.S., and Land, K.C. 1993. Age, criminal careers, and population heterogeneity: Specification and estimation of a nonparametric, mixed Poisson model. *Criminology* 31:327–362.

Piquero, A.R. 2007. Taking stock of developmental trajectories of criminal activity over the life course. In *The Long View of Crime: A Synthesis of Longitudinal Research*, edited by A.M. Liberman. New York, NY: Springer, pp. 23–78.

Piquero, A.R., Blumstein, A., Brame, R., Haapanen, R., Mulvey, E.P., and Nagin, D.S. 2001. Assessing the impact of exposure time and incapacitation on longitudinal trajectories of criminal offending. *Journal of Adolescent Research* 16:54–74.

Sampson, R.J., and Laub, J.H. 2003. Life-course desisters? Trajectories of crime among delinquent boys followed to age 70. *Criminology* 41:555–592.

Steinberg, L. 2010. A behavioral scientist looks at the science of adolescent brain development. *Brain and Cognition* 72:160–164.

Steinberg, L. 2014. *Age of Opportunity: Lessons From the New Science of Adolescence*. New York, NY: Houghton Mifflin Harcourt.

Steinberg, L., and Cauffman, E. 1996. Maturity of judgment in adolescence: Psychosocial factors in adolescent decision making. *Law and Human Behavior* 20:249–272.

Steinberg, L., Chung, H., and Little, M. 2004. Reentry of young offenders from the justice system: A developmental perspective. *Youth Violence and Juvenile Justice* 1:21–38.

Steinberg, L., and Monahan, K.C. 2007. Age differences in resistance to peer influence. *Developmental Psychology* 43:1531–1543.

Weinberger, D.A., and Schwartz, G.E. 1990. Distress and restraint as superordinate dimensions of self-reported adjustment: A typological perspective. *Journal of Personality* 58:381–417.

U.S. Department of Justice
Office of Justice Programs
Office of Juvenile Justice and Delinquency Prevention
8660 Cherry Lane
Laurel, MD 20707-4651



PRESORTED STANDARD
POSTAGE & FEES PAID
DOJ/OJJDP/GPO
PERMIT NO. G - 26

Official Business
Penalty for Private Use \$300

Acknowledgments

Laurence Steinberg, Distinguished University Professor and Laura H. Carnell Professor of Psychology at Temple University, is one of the principal investigators on the Pathways to Desistance study. His research focuses on brain and behavioral development in adolescence.

Elizabeth Cauffman, Professor and Chancellor's Fellow in the Department of Psychology and Social Behavior at the University of California, Irvine, is one of the principal investigators on the Pathways to Desistance study. Dr. Cauffman is interested in applying research on normative and atypical adolescent development to issues with legal and social policy implications.

Kathryn C. Monahan is Assistant Professor of Psychology at the University of Pittsburgh. Dr. Monahan's research focuses on risk and resilience during adolescence in typically developing and high-risk populations.

This bulletin was prepared under grant number 2007-MU-FX-0002 from the Office of Juvenile Justice and Delinquency Prevention (OJJDP), U.S. Department of Justice.

Points of view or opinions expressed in this document are those of the authors and do not necessarily represent the official position or policies of OJJDP or the U.S. Department of Justice.

The Office of Juvenile Justice and Delinquency Prevention is a component of the Office of Justice Programs, which also includes the Bureau of Justice Assistance; the Bureau of Justice Statistics; the National Institute of Justice; the Office for Victims of Crime; and the Office of Sex Offender Sentencing, Monitoring, Apprehending, Registering, and Tracking.

EXHIBIT 29



Review article

Adolescent Maturity and the Brain: The Promise and Pitfalls of Neuroscience Research in Adolescent Health Policy

Sara B. Johnson, Ph.D., M.P.H.^{a,*}, Robert W. Blum, M.D., Ph.D.^b, and Jay N. Giedd, M.D.^c

^a*Johns Hopkins School of Medicine, Department of Pediatrics Johns Hopkins Bloomberg School of Public Health, Department of Population, Family & Reproductive Health, Baltimore, Maryland*

^b*Johns Hopkins Bloomberg School of Public Health, Department of Population, Family & Reproductive Health, Baltimore, Maryland*

^c*National Institute of Mental Health, Child Psychiatry Branch, Unit on Brain Imaging, Bethesda, Maryland*

Manuscript received March 11, 2009; manuscript accepted June 4, 2009

Abstract

Longitudinal neuroimaging studies demonstrate that the adolescent brain continues to mature well into the 20s. This has prompted intense interest in linking neuromaturation to maturity of judgment. Public policy is struggling to keep up with burgeoning interest in cognitive neuroscience and neuroimaging. However, empirical evidence linking neurodevelopmental processes and adolescent real-world behavior remains sparse. Nonetheless, adolescent brain development research is already shaping public policy debates about when individuals should be considered mature for policy purposes. With this in mind, in this article we summarize what is known about adolescent brain development and what remains unknown, as well as what neuroscience can and cannot tell us about the adolescent brain and behavior. We suggest that a conceptual framework that situates brain science in the broader context of adolescent developmental research would help to facilitate research-to-policy translation. Furthermore, although contemporary discussions of adolescent maturity and the brain often use a deficit-based approach, there is enormous opportunity for brain science to illuminate the great strengths and potentialities of the adolescent brain. So, too, can this information inform policies that promote adolescent health and well-being. © 2009 Society for Adolescent Medicine. All rights reserved.

Keywords: Adolescent; Health policy; Neuroscience; Neuroimaging; Judgment

In the last decade, a growing body of longitudinal neuroimaging research has demonstrated that adolescence is a period of continued brain growth and change, challenging longstanding assumptions that the brain was largely finished maturing by puberty [1–3]. The frontal lobes, home to key components of the neural circuitry underlying “executive functions” such as planning, working memory, and impulse control, are among the last areas of the brain to mature; they may not be fully developed until halfway through the third decade of life [2]. This finding has prompted interest in linking stage of neuromaturation to maturity of judgment. Indeed, the promise of a biological explanation for often puzzling adolescent health risk behavior has captured the

attention of the media, parents, policymakers, and clinicians alike. Although such research is currently underway, many neuroscientists argue that empirical support for a causal relationship between neuromaturation processes and real-world behavior is currently lacking [4].

Despite the lack of empirical evidence, there has been increasing pressure to bring adolescent brain research to bear on adolescent health-and-welfare policy. For example, in the policy process, adolescent brain immaturity has been used to make the case that teens should be considered less culpable for crimes they commit; however, parallel logic has been used to argue that teens are insufficiently mature to make autonomous choices about their reproductive health [5]. This apparently conflicting use of neuroscience research evidence highlights the need for brain scientists, neurocognitive psychologists, and adolescent health professionals to work together to ensure appropriate translation of science for policy. Failing to proactively define or engage in

*Address correspondence to: Sara Johnson, Ph.D., M.P.H., Johns Hopkins Division of General Pediatrics and Adolescent Medicine, 200 N. Wolfe Street, Room 2017, Baltimore, MD 21287.

E-mail address: sjohnson@jhsph.edu

a discussion about the role of neuroimaging research in policy may catalyze a course of action many adolescent health professionals would not endorse.

In this review, we begin by outlining historical attempts to use developmental benchmarks as measures of adolescent maturity. (When we refer to “maturity” we do not intend to suggest the end of development, but rather use this as shorthand for the achievement of adult-like capacities and privileges.) We then briefly summarize what is known about adolescent brain development, and what is unknown. (For in-depth reviews of adolescent brain development, and more nuanced discussions of research findings, which are beyond the scope of this review, see [6] and [7]). We provide an overview of what neuroimaging research can and cannot tell us about the adolescent brain and behavior. We then highlight the current use of the brain sciences in adolescent health policy debates. Finally, we outline a strategy for increasing the utility of brain science in public policy to promote adolescents’ well-being.

A Historical Perspective on Development and Maturity

Throughout history there have been biological benchmarks of maturity. For example, puberty has often been used as the transition point into adulthood. As societal needs have changed, so too have definitions of maturity. For example, in 13th century England, when feudal concerns were paramount, the age of majority was raised from 15 to 21 years, citing the strength needed to bear the weight of protective armor and the greater skill required for fighting on horseback [8]. More recently, in the United States the legal drinking age has been raised to 21, whereas the voting age has been reduced to 18 years so as to create parity with conscription [9]. Similarly, the minimum age to be elected varies by office in the U.S.: 25 years for the House of Representatives, 30 years for the Senate, and 35 years for President. However, individuals as young as 16 can be elected Mayor in some municipalities. The variation evident in age-based definitions of maturity illustrates that most are developmentally arbitrary [9]. Nonetheless, having achieved the legal age to participate in a given activity (e.g., driving, voting, marrying) often comes to be taken as synonymous with the developmental maturity required for it.

Age-based policies are not exceptional; policies are frequently enacted in the face of contradictory or nonexistent empirical support [10]. Although neuroscience has been called upon to determine adulthood, there is little empirical evidence to support age 18, the current legal age of majority, as an accurate marker of adult capacities. Less clear is whether neuroimaging, at present, helps to inform age-based determinations of maturity. If so, can generic guidelines be established, or is individual variation so great as to preclude establishing a biological benchmark for adult-like maturity of judgment?

Brain Development in Adolescence

Current studies demonstrate that brain structures and processes change throughout adolescence and, indeed, across

the life course [11]. These findings have been facilitated by imaging technologies such as structural and functional magnetic resonance imaging (sMRI and fMRI, respectively). Much of the popular discussion about adolescent brain development has focused on the comparatively late maturation of the frontal lobes [12], although recent work has broadened to the increasing “connectivity” of the brain.

Throughout childhood and into adolescence, the cortical areas of the brain continue to thicken as neural connections proliferate. In the frontal cortex, gray matter volumes peak at approximately 11 years of age in girls and 12 years of age in boys, reflecting dendritic overproduction [7]. Subsequently, rarely used connections are selectively pruned [6] making the brain more efficient by allowing it to change structurally in response to the demands of the environment [13]. Pruning also results in increased specialization of brain regions [14]; however, the loss of gray matter that accompanies pruning may not be apparent in some parts of the brain until young adulthood [2,15,16]. In general, loss of gray matter progresses from the back to the front of the brain with the frontal lobes among the last to show these structural changes [3,6].

Neural connections that survive the pruning process become more adept at transmitting information through myelination. Myelin, a sheath of fatty cell material wrapped around neuronal axons, acts as “insulation” for neural connections. This allows nerve impulses to travel throughout the brain more quickly and efficiently and facilitates increased integration of brain activity [17]. Although myelin cannot be measured directly, it is inferred from volumes of cerebral white matter [18]. Evidence suggests that, in the prefrontal cortex, this does not occur until the early 20s or later [15,16].

The prefrontal cortex coordinates higher-order cognitive processes and executive functioning. Executive functions are a set of supervisory cognitive skills needed for goal-directed behavior, including planning, response inhibition, working memory, and attention [19]. These skills allow an individual to pause long enough to take stock of a situation, assess his or her options, plan a course of action, and execute it. Poor executive functioning leads to difficulty with planning, attention, using feedback, and mental inflexibility [19], all of which could undermine judgment and decision making.

Synaptic overproduction, pruning and myelination—the basic steps of neuromaturation—improve the brain’s ability to transfer information between different regions efficiently. This information integration undergirds the development of skills such as impulse control [20]. Although young children can demonstrate impulse control skills, with age and neuromaturation (e.g., pruning and myelination), comes the ability to *consistently* use these skills [21].

Evidence from animal studies suggests that the neural connections between the amygdala (a limbic structure involved in emotional processing, especially of fear and vigilance) and the cortices that comprise the frontal lobes become

denser during adolescence [22]. These connections integrate emotional and cognitive processes and result in what is often considered to be “emotional maturity” (e.g., the ability to regulate and to interpret emotions). The evidence suggests that this integration process continues to develop well into adulthood [23]. Steinberg, Dahl, and others have hypothesized that a temporal gap between the development of the socioemotional system of the brain (which experiences an early developmental surge around puberty) and the cognitive control system of the brain (which extends through late adolescence) underlies some aspects of risk-taking behavior [24,25]. This temporal gap has been compared with starting the engine of a car without the benefit of a skilled driver [25].

Adolescent Neuropsychology: Linking Brain and Behavior

As detailed above, across cultures and millennia, the teen years have been observed to be a time of dramatic changes in body and behavior. During adolescence, most people successfully navigate the transition from dependence upon caregivers to self-sufficient adult members of society. Where specifically, along the maturational path of cognitive and emotional development, individuals should be given certain societal rights and responsibilities continues to be a topic of intense interest. Increasingly, neuroscience has been called on to inform this question.

Impulse control, response inhibition, and sensation seeking

Among the many behavior changes that have been noted for teens, the three that are most robustly seen across cultures are: (1) increased novelty seeking; (2) increased risk taking; and (3) a social affiliation shift toward peer-based interactions [13]. This triad of behavior changes is seen not only in human beings but in nearly all social mammals [13]. Although the behaviors may lead to danger, they confer an evolutionary advantage by encouraging separation from the comfort and safety of the natal family, which decreases the chances of inbreeding. The behavior changes also foster the development and acquisition of independent survival skills [13].

Studying the link between behavioral changes and brain changes has been greatly facilitated by recent advances in neuroimaging technology and behavioral assessments. One challenge has been to identify the fundamental units of emotion and cognition and how they combine to determine more complicated “real-world” behaviors. For instance, younger adolescents are less likely than older adolescents to wait a given period of time to receive a larger reward [26]. This tendency can be studied using experiments in which the subject is asked questions such as whether they would rather receive \$800 now or \$1,000 in 12 months. By varying the amount of monetary difference and/or time between the transactions, an “indifference point” can be calculated to quantify an individual’s tendency to prefer the “here and now” to some future reward. There is an extensive

literature characterizing effects of age, gender, intelligence quotient (IQ), and other variables on this phenomenon, which is termed “delay discounting” [26,27]. However, more recent work has demonstrated that delay discounting is determined in part by the more fundamental traits of impulse control and future orientation, each with their own neural representations and developmental trajectories [28]. Furthermore, future orientation itself is a multidimensional construct involving cognitive, affective, and motivational systems.

Studies using fMRI are beginning to contribute to this parsing of behavior into more fundamental units by characterizing different neural representations and maturational courses for separate but related concepts such as impulse control and sensation seeking. Whereas sensation seeking changes seem to reflect striatal dopamine changes related to the onset of puberty, impulse control, as discussed previously, is more protracted and related to maturational changes in the frontal lobe [21].

“Hot” and “cold” cognition

Perhaps because of the relative ease of quantifying hormonal levels in animal models, it is tempting to attribute all adolescent behavioral changes to “raging hormones.” More nuanced investigations of adolescent behavior seek to understand the specific mechanisms by which hormones affect neural circuitry and to discern these processes from nonhormonal developmental changes. An important aspect of this work is the distinction between “hot” and “cold” cognition. Hot cognition refers to conditions of high emotional arousal or conflict; this is often the case for the riskiest of adolescent behaviors [29]. Most research to date has captured information in conditions of “cold cognition” (e.g., low arousal, no peers, and hypothetical situations). Like impulse control and sensation seeking, hot and cold cognition are subserved by different neuronal circuits and have different developmental courses [30]. Thus, adolescent maturity of judgment and its putative biological determinants are difficult to disentangle from socioemotional context.

What We Do Not Know About Brain Development in Adolescence

In many respects, neuroimaging research is in its infancy; there is much to be learned about how changes in brain structure and function relate to adolescent behavior. As of yet, however, neuroimaging studies do not allow a chronologic cut-point for behavioral or cognitive maturity at either the individual or population level. The ability to designate an adolescent as “mature” or “immature” neurologically is complicated by the fact that neuroscientific data are continuous and highly variable from person to person; the bounds of “normal” development have not been well delineated [5].

Neuroimaging has captured the public interest, arguably because the resulting images are popularly seen as “hard” evidence whereas behavioral science data are seen as

subjective. For example, in one study, subjects were asked to evaluate the credibility of a manufactured news story describing neuroimaging research findings. One version of the story included the text, another included an fMRI image, and a third summarized the fMRI results in a chart accompanying the text. Subjects who saw the brain image rated the story as more compelling than did subjects in other conditions [31]. More strikingly, simply referring verbally to neuroimaging data, even if logically irrelevant, increases an explanation's persuasiveness [32].

Despite being popularly viewed as revealing the “objective truth,” neuroimaging techniques involve an element of subjectivity. Investigators make choices about thickness of brain slices, level of clarity and detail, techniques for filtering signal from noise, and choice of the individuals to be sampled [5]. Furthermore, the cognitive or behavioral implications of a given brain image or pattern of activation are not necessarily straightforward. Researchers generally take pains to highlight the correlative nature of the relationship; however, such statements are often misinterpreted as causal [5]. Establishing a causal relationship is more complicated than it might, at first, seem. For example, there is rarely a one-to-one correspondence between a particular brain region and its discrete function; a given brain region can be involved in many cognitive processes, and many types of cognitive processes may be subserved by a particular brain structure [33].

Some neuroscientists lament that the technology has been used too liberally to draw conclusions where there is little empirical basis for interpreting the results. For example, a 2007 *New York Times* Op-Ed piece reported the results of a study in which fMRI was used to view the brains of 20 undecided voters while they watched videos of presidential candidates; they had previously rated the candidates on a scale of 1 to 10 from “very unfavorable” to “very favorable” [34]. The results of the brain scans were interpreted as reflecting the inner thoughts of the participants. For instance, “[w]hen viewing images of [Senator Clinton], these voters exhibited significant activity in the anterior cingulate cortex, an emotional center of the brain that is aroused when a person feels compelled to act in two different ways but must choose one. It looked as if they were battling unacknowledged impulses to like [Senator] Clinton” [34]. The editorial drew a swift response from several neuroscientists who believed that, in addition to subverting the standard peer review process before presenting data to the public, the investigators did not address the issue of reverse inference [35]. In neuroimaging terms, reverse inference is using neuroimaging data to infer specific mental states, motivations, or cognitive processes. Because a given brain region may be activated by many different processes, careful study design and analysis are imperative to making valid inferences [36,37]. In symbolic logic terminology, reverse inference errors are related to the “fallacy of affirming the consequent” (e.g., “All dogs are mammals. Fred is a mammal. Therefore, Fred is a dog.”).

In sum, neuroimaging modalities involve an element of subjectivity, just as behavioral science modalities do. A

concern is that high-profile media exposures may leave the mistaken impression that fMRI, in particular, is an infallible mind-reading technique that can be used to establish guilt or innocence, infer “true intentions,” detect lies, or establish competency to drive, vote, or consent to marriage.

The adolescent brain in context

Neuroimaging technologies have made more information available about the structure and function of the human brain than ever before. Nonetheless, there is still a dearth of empirical evidence that allows us to anticipate behavior in the real world based on performance *in the scanner* [5]. Linking brain scans to real-world functioning is hampered by the complex integration of brain networks involved in behavior and cognition. Further hindering extrapolation from the laboratory to the real world is the fact that it is virtually impossible to parse the role of the brain from other biological systems and contexts that shape human behavior [6]. Behavior in adolescence, and across the lifespan, is a function of multiple interactive influences including experience, parenting, socioeconomic status, individual agency and self-efficacy, nutrition, culture, psychological well-being, the physical and built environments, and social relationships and interactions [38–42]. When it comes to behavior, the relationships among these variables are complex, and they change over time and with development [43]. This causal complexity overwhelms many of our “one factor at a time” explanatory and analytic models and highlights the need to continually situate research from brain science in the broader context of interdisciplinary developmental science to advance our understandings of behavior across the lifespan [44].

Adolescent Maturity and Policy in the Real World: Scientific Complexity Meets Policy Reality

The most prominent use of neuroscience research in adolescent social policy was the 2005 U.S. Supreme Court Case, *Roper vs. Simmons*, which has been described as the “*Brown v. Board of Education* of ‘neurolaw,’” recalling the case that ended racial segregation in American schools [45]. In that case, 17-year-old Christopher Simmons was convicted of murdering a woman during a robbery. Ultimately, he was sentenced to death for his crime. Simmons’ defense team argued that he did not have a specific, diagnosable brain condition, but rather that his still-developing adolescent brain made him less culpable for his crime and therefore not subject to the death penalty. *Amicus* briefs were filed by, among others, by the American Psychological Association (APA) and the American Medical Association (AMA) summarizing the existing neuroscience evidence and suggesting that adolescents’ still-developing brains made them fundamentally different from adults in terms of culpability.

The AMA brief argued that: “[a]dolescents’ behavioral immaturity mirrors the anatomical immaturity of their brains. To a degree never before understood, scientists can now

demonstrate that adolescents are immature not only to the observer's naked eye, but in the very fibers of their brains” [46]. (Notably, the brief submitted by the AMA et al., implied a causal link among brain structure, function, and behavior in adolescence [5]). The neuroscientific evidence is thought to have carried significant weight in the Court's decision to overturn the death penalty for juveniles [47].

In a dissenting opinion in that case, Justice Antonin Scalia reflected on a 1990 brief filed by the APA in support of adolescents' right to seek an abortion without parental consent (*Hodgson v. Minnesota*). In this case, the APA argued that adolescent decision making was virtually indistinguishable from adult decision making by the age of 14 or 15. Scalia pointed out this seeming inconsistency: “[The APA] claims in this case that scientific evidence shows persons under 18 lack the ability to take moral responsibility for their decisions, [the APA] has previously taken precisely the opposite position before this very Court...Given the nuances of scientific methodology and conflicting views, courts—which can only consider the limited evidence on the record before them, are ill equipped to determine which view of science is the right one” [48]. Although one can make the case that the “cold cognitive” context in which abortion-related decisions are made encourages more mature judgment than the “hot cognitive” context of a murder, Scalia's comments highlight the peril of leaving nonscientists to arbitrate and translate neuroscience for policy.

The Supreme Court used neuroimaging research to protect juveniles from the death penalty based on reduced capacity and consequently reduced culpability. A year after *Roper vs. Simmons* was decided, the same logic was extended to limit adolescent sexual behavior. In 2006, the State of Kansas used its interpretation of adolescent neuroscience research to expand the state's child abuse statute to include any consensual touching between minors under the age of 16 years. Although scientists may be reticent to apply their research to policy, in some cases, policy makers are doing it for them.

Some argue that one must only look to the use of early-life brain science to anticipate what happens when brain science is overgeneralized [49]. In the early 1990s, there were several high-profile studies that suggested that there was rapid growth brain growth and plasticity in the first 3 years of life and, therefore, that “enriched” environments could hasten the achievement of some developmental milestones [50]. This research was used to perpetuate the idea that videos, classical music, and tailored preschool educational activities could give a child a cognitive advantage before the door of neural plasticity swung shut forever [49]. One could imagine that such a perspective would discourage the allocation of resources for school-aged children and adolescents because, if this were true, after early childhood it would simply be “too late.” The use of neuroscientific research to support “enriched” environments demonstrates that if neuroscientists do not direct the interpretation and application of their findings (or the lack of applicability), others will do it for them, perhaps without the benefit of their nuanced

understanding. A proactive approach to research and research-to-policy translation that includes neuroscientists, adolescent health professionals, and policy makers is an important next step.

Toward a Policy-Relevant Neuroscientific Research Agenda

Public policy is struggling to keep up with burgeoning interest in cognitive neuroscience and neuroimaging [51]. In a rush to assign biological explanations for behavior, adolescents may be caught in the middle. Policy scholar Robert Blank comments, “We have not kept up in terms of policy mechanisms that anticipate the implications beyond the technologies. We have little evidence that there is any anticipatory policy. Most policies tend to be reactive” [51]. There is a need to situate research from the brain sciences in the broader context of adolescent developmental science, and to find ways to communicate the complex relationships among biology, behavior, and context in ways that resonate with policymakers and research consumers.

Furthermore, the time is right to advance collaborative, multidisciplinary research agendas that are explicit in the desire to link brain structure to function as well as adolescent behavior and implications for policy [52].

Ultimately, the goal is to be able to articulate the conditions under which adolescents' competence, or demonstrated maturity, is most vulnerable *and* most resilient. Resilience, it seems, is often overlooked in contemporary discussions of adolescent maturity and brain development. Indeed, the focus on pathologic conditions, deficits, reduced capacity, and age-based risks overshadows the enormous opportunity for brain science to illuminate the unique strengths and potentialities of the adolescent brain. So, too, can this information inform policies that help to reinforce and perpetuate opportunities for adolescents to thrive in this stage of development, not just survive.

References

- [1] Giedd J, Blumenthal J, Jeffries NO, et al. Brain development during childhood and adolescence: A longitudinal MRI study. *Nature Neurosci* 1999;2:861–3.
- [2] Sowell ER, Thompson PM, Holmes CJ, et al. In vivo evidence for post-adolescent brain maturation in frontal and striatal regions. *Nature Neurosci* 1999;2:859–61.
- [3] Sowell ER, Thompson PM, Tessner KD, et al. Mapping continued brain growth and gray matter density reduction in dorsal frontal cortex: Inverse relationships during postadolescent brain maturation. *J Neurosci* 2001;21:8819–29.
- [4] Schaffer A. Head case: Roper v. Simmons asks how adolescent and adult brains differ. *Slate* October 15, 2004.
- [5] Aronson J. Brain imaging, culpability and the juvenile death penalty. *Psychol Public Pol Law* 2007;13:115–42.
- [6] Giedd JN. The teen brain: Insights from neuroimaging. *J Adolesc Health* 2008;42:335–43.
- [7] Lenroot RK, Giedd JN. Brain development in children and adolescents: Insights from anatomical magnetic resonance imaging. *Neurosci Biobehav Rev* 2006;30:718–29.
- [8] James T. The age of majority. *Am J Legal Hist* 1960;4:22–33.

- [9] Scott E. The legal construction of childhood. In: Rosenheim M, Dohn B, Tanenhaus D, eds. *A century of juvenile justice*. Chicago, IL: University of Chicago Press, 2002.
- [10] Gardner W, Scherer D, Tester M. Asserting scientific authority: Cognitive development and legal rights. *Am Psychol* 1989;44:895–902.
- [11] Sowell ER, Thompson PM, Holmes CJ, et al. Localizing age-related changes in brain structure between childhood and adolescence using statistical parametric mapping. *NeuroImage* 1999;9:587–97.
- [12] Park A, Wallis C, Dell K. What makes teens tick. *Time Magazine* 2008. May 10, 2004.
- [13] Spear LP. The adolescent brain and age-related behavioral manifestations. *Neurosci Biobehav Rev* 2000;24:417–63.
- [14] Casey BJ, Trainor RJ, Orendi JL, et al. A developmental functional MRI study of prefrontal activation during performance of a Go–No-Go task. *J Cogn Neurosci* 1997;9:835–47.
- [15] Rubia K, Overmeyer S, Taylor E, et al. Functional frontalisation with age: Mapping neurodevelopmental trajectories with fMRI. *Neurosci Biobehav Rev* 2000;24:13–9.
- [16] Sowell ER, Petersen BS, Thompson PM, et al. Mapping cortical change across the human life span. *Nature Neurosci* 2003;6:309–15.
- [17] Anderson P. Assessment and development of executive function (EF) during childhood. *Neuropsychol Dev Cogn Sect C Child Neuropsychol* 2002;8:71–82.
- [18] Paus T, Collins DL, Evans AC, et al. Maturation of white matter in the human brain: A review of magnetic resonance studies. *Brain Res Bull* 2001;54:255–66.
- [19] Anderson VA, Anderson P, Northam E, et al. Development of executive functions through late childhood and adolescence in an Australian sample. *Dev Neuropsychol* 2001;20:385–406.
- [20] Luna B, Thulborn KR, Munoz DP, et al. Maturation of widely distributed brain function subserves cognitive development. *NeuroImage* 2001;13:786–93.
- [21] Luna B, Sweeney JA. The emergence of collaborative brain function: FMRI studies of the development of response inhibition. *Ann N Y Acad Sci* 2004;1021:296–309.
- [22] Cunningham MG, Bhattacharyya S, Benes FM. Amygdalo-cortical sprouting continues into early adulthood: Implications for the development of normal and abnormal function during adolescence. *J Compar Neurol* 2002;453:116–30.
- [23] Benes FM. Brain development, VII: Human brain growth spans decades. *Am J Psychiatry* 1998;155:1489.
- [24] Steinberg L. Risk-taking in adolescence: New perspectives from brain and behavioral science. *Curr Direct Psychol Sci* 2007;16:55–9.
- [25] Dahl RE. Affect regulation, brain development, and behavioral/emotional health in adolescence. *CNS Spectr* 2001;6:60–72.
- [26] Steinberg L, Graham S, O'Brien L, et al. Age differences in future orientation and delay discounting. *Child Dev* 2009;80:28–44.
- [27] Furby L, Beyth-Marom R. Risk-taking in adolescence—a decision-making perspective. *Dev Rev* 1992;12:1–44.
- [28] Steinberg L, Albert D, Cauffman E, et al. Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Dev Psychol* 2008;44:1764–78.
- [29] MacArthur Foundation Research Network on Adolescent Development and Juvenile Justice. Issue Brief 3: Less guilty by reason of adolescence September 21, 2006.
- [30] Steinberg L. Cognitive and affective development in adolescence. *Trends Cogn Sci* 2005;9:69–74.
- [31] McCabe DP, Castel AD. Seeing is believing: The effect of brain images on judgments of scientific reasoning. *Cognition* 2008;107:343–52.
- [32] Weisberg DS, Keil FC, Goodstein J, et al. The seductive allure of neuroscience explanations. *J Cogn Neurosci* 2008;20:470–7.
- [33] Snead OC. Neuroimaging and capital punishment. *The New Atlantis: A Journal of Technology and Society* 2008;19 (Winter):35–63.
- [34] Iacombi M, Freedman J, Kaplan J, et al. This is your brain on politics. *New York Times* November 11, 2007.
- [35] Aron A, Badre D, Brett M, et al. Letter: Politics and the brain. *New York Times* November 14, 2007.
- [36] Poldrack R. Can cognitive processes be inferred from neuroimaging data? *Trends in Cognitive Sciences* 2006;10:59–63.
- [37] Poldrack RA. The role of fMRI in cognitive neuroscience: Where do we stand? *Curr Opin Neurobiol* 2008;18:223–7.
- [38] Arnett JJ. Reckless behavior in adolescence: A developmental perspective. *Dev Rev* 1992;12:339–73.
- [39] Irwin CE Jr, Millstein SG, Susman EJ, et al. Risk-taking behaviors and biopsychosocial development during adolescence. *Emotion, cognition, health, and development in children and adolescents*. Hillsdale, NJ: Lawrence Erlbaum, 1992. 75–102.
- [40] Jessor R, Turbin MS, Costa FM. Protective factors in adolescent health behavior. *J Pers Soc Psychol* 1998;75:788–800.
- [41] Moffitt TE, McCord J. Neuropsychology, antisocial behavior, and neighborhood context. *Violence and childhood in the inner city*. Cambridge: Cambridge University Press, 1997. 116–170.
- [42] Susman EJ, Ponirakis A. Hormones—context interaction and antisocial behavior in youth. *NATO ASI Series Life Sci* 1997;292:251–69.
- [43] Bronfenbrenner U. *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press, 1979.
- [44] Wang C. Invited commentary: Beyond frequencies and coefficients—toward meaningful descriptions for life course epidemiology. *Am J Epidemiol* 2006;164:122–5.
- [45] Rosen J. The brain on the stand. *New York Times Magazine* March 11, 2007.
- [46] American Medical Association APA, American Academy of Psychiatry and the Law, American Society for Adolescent Psychiatry, American Academy of Child & Adolescent Psychiatry, National Association of Social Workers, Missouri Chapter of the National Association of Social Workers, and National Mental Health Association. Brief of amicus curiae supporting respondent, *Roper v. Simmons*, 543 U.S. 551 (No. 03-633). 2005.
- [47] Haider A. *Roper v. Simmons: The role of the science brief*. *Ohio State J Crimin Law* 2006;375:369–77.
- [48] Scalia A. Dissenting Opinion, *Roper vs. Simmons*. In: *Supreme Court of the United States*, No. 03–633, 2005.
- [49] Bruer JT. *A new understanding of early brain development and lifelong learning, The Myth of the First Three Years*. New York: Free Press, 1999.
- [50] Bruer JT. Avoiding the pediatrician's error: How neuroscientists can help educators (and themselves). *Nature Neurosci* 2002;5(Suppl):1031–3.
- [51] Blank R. Policy implications of advances in cognitive neuroscience. In: Teich A, Nelson S, Lita S, eds. *AAAS Science and Technology Yearbook 2003*. AAAS, 2003.
- [52] Steinberg L. Adolescent development and juvenile justice. *Annu Rev Clin Psychol* 2009;5:459.

EXHIBIT 30



AMERICAN
PSYCHOLOGICAL
ASSOCIATION



American
Psychology-Law
Society

Adolescents' Cognitive Capacity Reaches Adult Levels Prior to Their Psychosocial Maturity: Evidence for a “Maturity Gap” in a Multinational, Cross-Sectional Sample

Grace Icenogle, Laurence Steinberg, Natasha Duell,
and Jason Chein
Temple University

Lei Chang
University of Macau

Nandita Chaudhary
University of Delhi

Laura Di Giunta
Università di Roma “La Sapienza”

Kenneth A. Dodge
Duke University

Kostas A. Fanti
University of Cyprus

Jennifer E. Lansford
Duke University

Paul Oburu
Maseno University

Concetta Pastorelli
Università di Roma “La Sapienza”

Ann T. Skinner
Duke University

Emma Sorbring
University West

Sombat Tapanya
Chiang Mai University

Liliana M. Uribe Tirado
Universidad de San Buenaventura

Liane P. Alampay
Ateneo de Manila University

Suha M. Al-Hassan
Hashemite University and Emirates College for
Advanced Education

Hanan M. S. Takash
Hashemite University

Dario Bacchini
University of Naples “Federico II”

All countries distinguish between minors and adults for various legal purposes. Recent U.S. Supreme Court cases concerning the legal status of juveniles have consulted psychological science to decide where to draw these boundaries. However, little is known about the robustness of the relevant research, because it has been conducted largely in the U.S. and other Western countries. To the extent that lawmakers look to research to guide their decisions, it is important to know how generalizable the scientific conclusions are. The present study examines 2 psychological phenomena relevant to legal questions about adolescent maturity: cognitive capacity, which undergirds logical thinking, and psychosocial maturity, which comprises individuals' ability to restrain themselves in the face of emotional, exciting, or risky stimuli. Age patterns of these constructs were assessed in 5,227 individuals (50.7% female), ages 10–30 ($M = 17.05$, $SD = 5.91$) from 11 countries. Importantly, whereas cognitive capacity reached adult levels around age 16, psychosocial maturity reached adult levels beyond age 18, creating a “maturity gap” between cognitive and psychosocial development. Juveniles may be capable of deliberative decision

Grace Icenogle, Laurence Steinberg, Natasha Duell, and Jason Chein, Department of Psychology, Temple University; Lei Chang, Department of Psychology, University of Macau; Nandita Chaudhary, Department of Human Development and Childhood Studies, Lady Irwin College, Univer-

sity of Delhi; Laura Di Giunta, Department of Psychology, Università di Roma “La Sapienza”; Kenneth A. Dodge, Center for Child and Family Policy, Duke University; Kostas A. Fanti, Department of Psychology, University of Cyprus; Jennifer E. Lansford, Center for Child and Family

continued

making by age 16, but even young adults may demonstrate “immature” decision making in arousing situations. We argue it is therefore reasonable to have different age boundaries for different legal purposes: 1 for matters in which cognitive capacity predominates, and a later 1 for matters in which psychosocial maturity plays a substantial role.

Public Significance Statement

Cognitive capacity—the basic cognitive functions that serve as the foundation for higher-level, complex thinking processes—reaches adult levels during adolescence (around 16). In contrast, psychosocial maturity—one’s ability to exercise self-restraint in emotional situations—reaches adult levels during the 20s. Importantly, in a study of over 5,200 participants, these distinct age patterns emerge across 11 diverse countries around the world. Thus, having two legal age boundaries that distinguish adolescence and adulthood—one for decisions typically made with deliberation and another for decisions typically made in emotionally charged situations—may be more sensible than having just one.

Keywords: adolescence, maturity, law, age of majority, cross-national

Supplemental materials: <http://dx.doi.org/10.1037/lhb0000315.supp>

All developed societies draw chronological age boundaries between minors and adults for legal purposes, among them, determining who is permitted to vote, drive, purchase alcohol, and make autonomous medical decisions and, if arrested, who is tried as an adult. In many countries, age 18 is used for most purposes with some exceptions (e.g., consent to research or medical treatment; [World Health Organization, 2014](#)). In others, such as the United States, different ages are used for different matters. For example, although the presumptive age of majority in the U.S. is 18, eligibility for driver’s licensing is generally granted at a younger age, whereas the minimum legal purchase age for alcohol is 21.

The idea that young people lack certain capacities or abilities necessary to assume the responsibilities or enjoy the privileges of adulthood is undoubtedly part of the logic behind differentiating between adults and minors in the law ([Woolard & Scott, 2009](#)). For example, the infancy doctrine, which allows minors who enter into contracts to void them at their discretion, was fashioned to protect minors from their immature judgment as well as adults who might capitalize on youths’ lack of understanding of the consequences of the contract ([Preston & Crowther, 2012](#)). In the early 20th century, legislators established a separate justice system in the U.S. for juveniles ([Scott & Steinberg, 2008](#)) based on similar logic, namely, that children differ from adults in ways that require special

protection in criminal matters: Children suffer from deficient decision-making abilities, which makes them less responsible for their bad acts; children are more amenable to rehabilitation, so they should be reformed, not punished ([Davis, Scott, Wadlington, & Whitebread, 2009](#); [Woolard & Scott, 2009](#)).

The delineation of a specific age-boundary that separates children from adults has often resulted from practical considerations, without reference to relevant empirical and theoretical foundations ([Scott, 2000](#)). For example, initially there were no age restrictions for driving. As traffic safety became a concern, states began setting a minimum driving age, typically 18 ([Mayhew, Fields, & Simpson, 2000](#)). In the 1920s and 1930s, many states lowered the driving age from 18 to 16 to allow minors to work in occupations requiring a vehicle. As teen driving fatalities increased, many states adopted “graduated driver-licensing” in the 1990s, which lets 16-year-olds drive, but only under certain circumstances (e.g., no other teen passengers in the car; [Williams, 1999](#)).

In other instances, political considerations led legislators to draw or change legal boundaries. At the height of the Vietnam War, when the military draft age was 18, the voting age was 21. Many politicians argued that it was unfair to send 18-year-olds into battle but prohibit them from voting, and Congress amended the Constitution in 1971 to lower the voting age to 18. In response,

Policy, Duke University; Paul Oburu, Department of Educational Psychology, Maseno University; Concetta Pastorelli, Department of Psychology, Università di Roma “La Sapienza”; Ann T. Skinner, Center for Child and Family Policy, Duke University; Emma Sorbring, Centre for Child and Youth Studies, University West; Sombat Tapanya, Department of Psychiatry, Chiang Mai University; Liliana M. Uribe Tirado, Consultorio Psicológico Popular, Universidad San Buenaventura; Liane P. Alampay, Department of Psychology, Ateneo de Manila University; Suha M. Al-Hassan, Queen Rania Faculty for Childhood, Hashemite University, and Emirates College for Advanced Education; Hanan M. S. Takash, Queen Rania Faculty for Childhood, Hashemite University; Dario Bacchini, Department of Humanistic Studies, University of Naples “Federico II”.

Natasha Duell is now at the Center for Developmental Science and Department of Psychology and Neuroscience, University of North Carolina, Chapel Hill.

The data reported here are drawn from a larger study of decision making in everyday life and an ongoing longitudinal study of parenting across cultures (funded by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, grant RO1-HD054805). Previous publications and parallel conference presentations have drawn on portions of the data described in the present study (e.g., [Duell et al., 2017](#); [Icenogle et al., 2016](#); [Steinberg et al., 2017](#)). This research was supported by a grant to Laurence Steinberg from the Klaus J. Jacobs Foundation.

Correspondence concerning this article should be addressed to Grace Icenogle, who is now at Department of Psychological Science, University of California, Irvine, 4201 Social and Behavioral Sciences Gateway, Irvine, CA 92697. E-mail: gicenogle@uci.edu

some states lowered their legal drinking age from 21 to 18 or 19 (Cook & Tauchen, 1984). Because not all states did this, young people living in places with higher drinking ages would drive across state lines to purchase and consume alcoholic beverages—and then drive back home intoxicated. In 1984, under pressure from the federal government, all states raised the minimum legal drinking age back to 21.

Until recently, developmental psychology has not been an explicit force in determining specific legal age boundaries—when legislators lowered the driving age or raised the drinking age, no one asked whether research on psychological development supported either change. However, developmental science has gradually become more influential (Steinberg, 2017). In both legal and nonlegal venues, experts have weighed in on whether, and at what age, the law should distinguish between adolescents and adults. But considerable controversy has arisen because scientists have answered this question in different ways, depending on the legal issue involved.

In 2005, when the American Psychological Association (APA) submitted an amicus brief in *Roper v. Simmons* (2005) the U.S. Supreme Court case that abolished the juvenile death penalty for 16- and 17-year-olds, the APA argued that people younger than 18 lacked the psychological maturity necessary to be held fully responsible for their crimes and, therefore, that they should not be eligible for capital punishment (American Psychological Association [APA], 2004). Justice Antonin Scalia, in his dissenting opinion, criticized the APA, because in an earlier case its experts had opined that teenagers should have the right to make decisions about abortion without involving their parents, on the grounds that their decision-making abilities were just as mature as adults' (APA, 1989).

A group of psychologists argued that this apparent logical inconsistency was actually in keeping with developmental science (Steinberg, Cauffman, Woolard, Graham, & Banich, 2009a). They contended that because different abilities mature along different timetables, adolescents of a given age could be adult-like in some respects but not others. Based on analyses of data from over 900 individuals between the ages of 10 and 30, they noted that cognitive capacity—the basic cognitive processes supporting the ability to reason logically—matures by 16, whereas psychosocial maturity—the capacity to exercise self-restraint, especially in emotionally arousing contexts—does not fully mature until several years later. Steinberg, Cauffman, Woolard, Graham, and Banich (2009a) argued that these patterns justify having a lower age boundary for legal decisions that allow deliberation and a higher age boundary for matters pertaining to acts typically made under emotionally arousing circumstances (Scott & Steinberg, 2008).

One way to think about the difference between these capacities and abilities is to distinguish between “cold” cognition and “hot” cognition. Cold cognition refers to mental processes (such as working memory or response inhibition) employed in situations calling for deliberation in the absence of high levels of emotion (e.g., Figner, Mackinlay, Wilkening, & Weber, 2009). Hot cognition involves mental processes in affectively charged situations where deliberation is unlikely or difficult. Recent research has borne out this distinction, showing that on response inhibition tasks, young adults (aged 18–21) perform comparably with somewhat older individuals when tested under emotionally neutral

conditions but more poorly—and similarly with younger teenagers—when tested under arousing ones (Cohen et al., 2016).

Legal issues pertaining to cold cognition include voting, granting consent for research participation, and making autonomous medical decisions, where the presence of adult consultants and the absence of time pressure impose sufficient external control to minimize the dangers of impulsive decision making (Grisso et al., 2003; Hein et al., 2015). Issues related to hot cognition include driving, consuming alcohol, and criminal behavior; it is easy to make impulsive choices when emotions are aroused, such as when behind the wheel, intoxicated, or committing a crime, behaviors that often occur in the presence of peers during adolescence (Albert & Steinberg, 2011).

Importantly, the developmental trajectories of cold and hot cognition differ. In studies using cold cognitive tasks, performance increases dramatically from childhood to early- or midadolescence and then plateaus. This pattern is demonstrated on tasks of response inhibition (e.g., Huizinga, Dolan, & van der Molen, 2006; Luna, Garver, Urban, Lazar, & Sweeney, 2004), cognitive flexibility (e.g., Crone, Ridderinkhof, Worm, Somsen, & van der Molen, 2004), and working memory (e.g., Huizinga et al., 2006; Luna et al., 2004; Prencipe et al., 2011). A similar developmental pattern appears in the psycholegal literature as well. For example, younger juveniles (11–15 years) are impaired at significantly higher rates than older adolescents (16–17 years) on measures of understanding and appreciation of Miranda rights and on other measures of adjudicative competence (Viljoen, Zapf, & Roesch, 2007). But by the time they are 16- to 17-years-old, adolescents and adults score comparably on abilities relevant to competence to stand trial, (Grisso et al., 2003; Redlich & Shteynberg, 2016).

In contrast, facets of hot cognition, including sensation seeking (or lack thereof), impulse control, future orientation, and resistance to peer influence, follow a protracted development into adulthood. Sensation seeking, which peaks during adolescence (Steinberg et al., 2008), decreases into the early- to mid-20s (Harden & Tucker-Drob, 2011; Shulman, Harden, Chein, & Steinberg, 2014). On the other hand, impulse control, future orientation, and resistance to peer influence improve into adulthood in studies employing either self-report assessments (e.g., Harden & Tucker-Drob, 2011; Romer, Duckworth, Sznitman, & Park, 2010; Steinberg et al., 2009c; Steinberg & Monahan, 2007) or behavioral tasks (e.g., Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Cohen et al., 2016; Steinberg et al., 2009c). Similarly, relative to adults, adolescents demonstrate impaired decision making in emotionally arousing contexts, such as when being interrogated by police (e.g., Malloy, Shulman, & Cauffman, 2014). To the extent that these legal contexts become emotionally arousing as a consequence of external pressures—by friends, family, police, or the adolescent's own lawyer—adolescents' decision making lags behind adults'. Thus, if our laws were more closely aligned with developmental science, age boundaries for matters involving cold cognition might be lower than those involving hot cognition, because effective hot cognition requires both cognitive capacity and psychosocial maturity (e.g., self-restraint).

There is no universally agreed-upon way to measure cognitive capacities or psychosocial maturity. Steinberg et al. (2009a) measured cognitive capacity using tests of short-term memory (STM), working memory, and verbal fluency. These measures of executive functioning undergird goal-directed behavior and higher-order log-

ical reasoning (Diamond, 2013). Their measure of psychosocial maturity was based on self-reports of traits such as impulse control, sensation seeking, future orientation, and resistance to peer influence. These measures tap individuals' ability to restrain themselves in the face of temptations to pursue rewarding, immediately gratifying, socially encouraged, or risky activities. These measures capture some, but not *all*, important aspects of cognitive and psychosocial functioning that are relevant to decision making (e.g., neither measure included an index of morality or perspective taking; see Fischer, Stein, & Heikkinen, 2009 and Steinberg, Cauffman, Woolard, Graham, & Banich, 2009b for a response). It is notable that Steinberg et al. (2009a) measure of cognitive capacity comprised all behavioral tasks, whereas their measure of psychosocial maturity comprised all self-report measures. These limitations notwithstanding, both constructs include measures that are essential to decision making competence in legal contexts—executive functions facilitate flexible, optimized decision making (Diamond, 2013) whereas elements of psychosocial maturity are strongly tied to what some writers have referred to as “judgment” (e.g., Scott, Reppucci, & Woolard, 1995; Steinberg & Cauffman, 1996).

Overview and Rationale of Present Study

The present study replicates Steinberg et al. (2009a) in a large international sample. Such a replication is warranted for several reasons. First, because most of the relevant research has been conducted in Western countries, it is not known to what degree conclusions drawn from these countries extend to non-Western societies. Further, of the few cross-national studies of cognitive capacity or psychosocial development that do exist, most suffer at least one major limitation. Studies typically examine only a single developmental period (e.g., middle adolescence, excluding the transition into adulthood). Furthermore, these studies often examine mean differences between cultures and not age trends (e.g., Thorell, Veleiro, Siu, & Mohammadi, 2013). In addition, apart from a few studies (e.g., Matsumoto et al., 2008; Vazsonyi & Ksinan, 2017), most cross-cultural work examines only a few countries or cultures at a time. Although some studies have collected data from a large number of participants from many countries (e.g., Rossier et al., 2007), such studies are limited to adult samples and rely on self-report measures, which typically do not assess executive functions. To our knowledge, no cross-cultural study has measured multiple elements of both cognitive and psychosocial development within a single, multiage sample. To the extent that lawmakers look to science to guide their decisions, it is important to know how robust the scientific conclusions are. This is especially important with respect to laws within the U.S., with its ever-growing population of immigrants (Migration Policy Institute, 2018).

Despite the limitations of most of the published cross-cultural research, some studies have examined age patterns of legally relevant psychological phenomenon. For example, cognitive capacity improves with age across childhood and into adolescence in Kenya (Alcock, Holding, Mung'ala-Odera, & Newton, 2008), Japan (Imada, Carlson, & Itakura, 2013), and Hong Kong (Wang, Devine, Wong, & Hughes, 2016). Using self-report indices of facets of psychosocial maturity, Rossier et al. (2007) found that sensation seeking decreased with age during young adulthood

(from age 18 to 25) in China, Germany, Italy, Spain, and Switzerland, though impulsivity did not.

The paucity of cross-cultural work in this area is regrettable because there is reason to expect cultural variation in development, particularly with respect to psychosocial maturity. Cross-cultural studies of self-regulation focus on the socialization of appropriate behaviors (i.e., emotional displays), especially in social interactions. That is, to the extent that emotions motivate or precipitate behavior (e.g., feeling anger may lead to an act of aggression), emotion regulation is necessary to comply with the behavioral norms of a culture (LeCuyer & Zhang, 2015; Matsumoto et al., 2008). In this view, parents and peers shape self-regulation by encouraging culturally appropriate behaviors and discouraging inappropriate behaviors (Chen & French, 2008). Cultures valuing individuality (typically Western cultures) encourage autonomy and self-assertion, whereas more collectivistic cultures stress the importance of suppressing one's desires to benefit the group (Chen & French, 2008).

Cultural variations in self-regulation also extend to the management of positive emotions. Americans, for example, are less likely to dampen positive emotions than are people from East Asian countries (Ma, Tamir, & Miyamoto, 2018; Miyamoto & Ma, 2011). This cultural difference has particular implications for sensation seeking, which often involves a lack of regulation of positive affect (e.g., the thrill or excitement of doing something fun, but dangerous, with friends). Indeed, according to Hofstede (2011), cultures vary considerably along a dimension of “indulgence-restraint,” the degree to which societal norms encourage hedonic satisfaction rather than the strict regulation of impulses. In summary, in East Asian and collectivistic cultures, children must learn to suppress (regulate) undesirable behaviors (LeCuyer & Zhang, 2015). Thus, self-regulation may develop earlier in these contexts than in Western/individualistic societies for both positive and negative affect (Lamm et al., 2017). Comparative cross-cultural research on the development of self-regulation is limited and equivocal. Some studies indicate similar developmental patterns cross-culturally, but other research examining the socialization of self-regulation suggests divergent developmental trajectories.

A second reason for the present replication concerns the measurement of psychosocial maturity. Steinberg et al. (2009a) employed behavioral tasks to assess cognitive capacity and self-report measures to assess psychosocial maturity. One outstanding question is whether previously documented differences in age patterns of cognitive capacity and psychosocial maturity are an artifact of differences in methodology. For example, whereas self-report measures tap the individual's subjective assessment of their behavior, behavioral tasks provide a brief snapshot of behavior while controlling for context, an important consideration in cross-national studies. In the present study, we employ a measure of psychosocial maturity that is based mainly on behavioral assessments, which allows us to more directly compare its growth with a measure of cognitive capacity that is also based on behavioral assessments.

Finally, since its 2005 decision on the juvenile death penalty, the Supreme Court has heard several other cases in which developmental science was applied. During the past decade, the Court has decided cases on the constitutionality of sentencing juveniles to life without the possibility of parole (*Graham v. Florida*, 2010; *Miller v. Alabama*, 2012) and on the admissibility of the results of

interrogations of adolescents in situations in which they may be inadvertently encouraged to confess to crimes (*JDB v. North Carolina*, 2011). And, in light of new evidence that brain maturation continues into adulthood (Casey, 2015), a number of experts have asked whether these findings support raising the age of majority under criminal law and processing young adult offenders in the juvenile justice system (Schiraldi, Western, & Bradner, 2015). Importantly, the relevant research on psychological development in young adulthood—especially comparing young adults with people in their mid- and late 20s—is very limited (Scott, Bonnie, & Steinberg, 2016).

In the present study, we compare two facets of development relevant to the treatment of young people under the law—cognitive capacity (the predominant influence on cold cognition) and psychosocial maturity (the predominant influence on hot cognition)—using some of the same tasks as Steinberg et al. (2009a), but in an 11-country sample of more than 5,200 individuals between the ages of 10 and 30. Countries vary in how they socialize youth (Chen & French, 2008; Matsumoto et al., 2008), but the question of where to draw a boundary between adolescence and adulthood is one that all societies face. Accordingly, we examine the second two decades of life to determine whether and in what ways age differences in cognitive capacity and psychosocial maturity are evinced in a diverse group of countries. The countries in this sample—China, Colombia, Cyprus, Jordan, Kenya, India, Italy, the Philippines, Sweden, Thailand, and the U.S.—are diverse geographically, economically, and culturally, including on dimensions of individualism/collectivism and indulgence/restraint (Hofstede, 2011). For example, Columbia and China rank as some of the world’s most collectivistic cultures, whereas Italy and the U.S. are some of the most individualistic. Likewise, China and India greatly value restraint, whereas Sweden and Columbia are highly indulgent (see Table 1 for details on country-level attributes and the online supplemental materials for details on legal age boundaries by country).

Consistent with Steinberg et al. (2009a), we examine age differences using composite measures of psychosocial maturity and cognitive capacity. These composite variables allow us to capture multiple facets of an overarching construct (executive functions in the case of cognitive capacity and self-restraint in the case of psychosocial maturity). However, unlike Steinberg et al. (2009a),

we rely largely on behavioral measures of psychosocial maturity. Like the original measure of psychosocial maturity, these behavioral tasks tap various manifestations of self-restraint. Here, we include behavioral measures of sensation seeking (using the “stoplight game”), future orientation (using a delay discounting task), and impulse control (using the Tower of London task). We also measure cost sensitivity, or one’s ability to learn from negative outcomes, using a modified version of the Iowa gambling task (IGT). This measure has not been used before as an indicator of psychosocial maturity, but it can be used to assess self-restraint. Specifically, successful performance on the IGT requires that one learn to resist potential rewards that also carry high costs. Lastly, because a behavioral measure was unavailable, we rely on a self-report measure of resistance to peer influence. In its opinion in *Roper v. Simmons* (2005), the Supreme Court explicitly cited teens’ greater susceptibility to others as a mitigating factor for their bad behavior. Thus, given its important place in questions of maturity, self-reported resistance to peer influence was retained in the current study.

Hypotheses

We hypothesized that cognitive capacity would reach adult levels *prior* to age 18 and plateau in midadolescence, but that psychosocial maturity would not reach adult levels until after 18, into the 20s. These hypotheses are consistent with the idea that deliberative, “cold” decision making matures prior to “hot” decision making. Given the substantial cultural variation in expectations for self-regulation (which likely influences each component of self-restraint within the psychosocial maturity composite), we anticipated that patterns of age differences in psychosocial maturity would vary notably across countries (Chen & French, 2008; Matsumoto et al., 2008). In contrast, we expected the pattern of age differences in cognitive capacity to generally be more consistent across countries.

Method

Participants

We recruited nine of the 11 countries of the present sample from an ongoing longitudinal study of parenting across cultures (PAC;

Table 1
Country-Level Attributes

Country	Individualism/Collectivism	Indulgence/Restraint	GDP per capita (PPP) 2014 (USD)
China	20	24	13,200
Columbia	13	83	13,500
Cyprus	—	70	30,900
India	48	26	5,800
Italy	76	30	35,100
Jordan	30	43	12,000
Kenya	25	—	3,100
Philippines	32	42	7,000
Sweden	71	78	46,200
Thailand	20	45	15,600
U.S.	91	68	54,400

Note. The Individualism/Collectivism Scale and the Indulgence/Restraint Scale range from 0–100 (Hofstede, 2011). GDP per capita is given in U.S. dollars (Central Intelligence Agency, 2018).

Lansford & Bornstein, 2011), which has been described elsewhere (Steinberg et al., 2017). The PAC study originally selected these nine countries because they differ in how children are parented and disciplined, which is the focus of that study. In particular, these nine countries differ on several levels: (a) individualism versus collectivism; (b) religious affiliation; and (c) laws governing parenting behaviors (e.g., the one-child policy in China that was in effect at the time of data collection; Lansford & Bornstein, 2011). The current study has a different focus, but collaborating with the PAC group allowed us to build on their cross-national infrastructure. In addition to the PAC countries, the current study included Cyprus and India. Cyprus participated in the current study, but not the PAC project, because PAC data collection had already begun prior to Cyprus' involvement. India was unable to join the PAC group because the Indian Council of Medical Research did not approve the PAC study given that the sample was not nationally representative of India. Because the National Institutes of Health, which funds the PAC study, required this approval to fund data collection, India could not participate in the PAC study. However, because the Jacobs Foundation funded the current study, such approval was not required, thus allowing India to participate.

The sample ($N = 5,404$) comprises individuals between 10 and 30 years of age in 11 countries: China ($n = 493$), Colombia ($n = 513$), Cyprus ($n = 407$), India ($n = 425$), Italy ($n = 561$), Jordan ($n = 506$), Kenya ($n = 488$), the Philippines ($n = 512$), Sweden ($n = 425$), Thailand ($n = 504$), and the U.S. ($n = 570$; see Table S2 for a breakdown of participants by age in each country). We balanced the proportion of males and females in the full sample (50.8% female, $n = 2,746$), within each country (ranging between 48.9%–53.8% female) and across age group (ranging between 48.7%–52.0% female). Each site recruited participants from urban centers in each participating country using flyers posted in neighborhoods, advertisements in newspapers, and word of mouth. All sites attempted to recruit a minimum of 60 participants (50% female) for each of seven age groups: 10–11 years, 12–13 years, 14–15 years, 16–17 years, 18–21 years, 22–25 years, and 26–30 years. (Because the 10- to 11-year-old group comprised PAC participants, within PAC countries, the number of participants in this group generally exceeded those in other age groups.) Participants came from households with similar levels of parental education (average = “some college”) and reflected the majority ethnicity of the country (except in the U.S., where we tried to recruit equal numbers of Black, Latino, and White participants, and in Kenya, where participants were of the Luo ethnic group).

Procedure

At each data collection site, research staff received identical training for administering the test battery. Measures were administered in the predominant language at each site, following forward- and back-translation and a process of cultural adaptation (Erkut, 2010). Translators were fluent in both English and the target language, and identified any items that translated poorly, were culturally insensitive or inappropriate, or may have multiple meanings. Site coordinators and translators then modified items as appropriate. During data collection, investigators from each site attended an annual in-person meeting to resolve any questions, concerns, or obstacles, and to review study procedures. In addition, sites regularly used e-mail and Skype calls to resolve ongoing

questions or issues. A central coordinating center received and checked all incoming data each week.

Participants completed a session that lasted 2 hr. Staff members tested participants individually in their homes, schools, or other locations designated by the participants. Parental consent and adolescent assent were obtained at all sites for all youth under 18 except Sweden, where parental consent is not required for participants over 15. Participants completed computerized versions of all measures including self-report measures, behavioral tasks, an intelligence assessment, and a demographic questionnaire.

In order to maintain participants' interest and motivation, they were told they would receive a base payment (\$30 in the U.S.) for participating in the study, but that they could earn a bonus (equal to 50% of the base payment) based on their performance on the computer tasks. In actuality, all participants received this bonus. Research staff debriefed participants regarding this deception in countries where local Institutional Review Boards (IRBs) deemed such disclosure necessary. Local investigators set base payments so as not to be coercive; the participating university in Sweden prohibits paying research participants, so these participants received a base payment of two movie tickets and a bonus of one additional ticket. Local IRBs approved all procedures.

Measures

Analyses focused on a demographic questionnaire, a measure of intellectual ability, three measures of cognitive capacity, and five measures of psychosocial maturity.

Demographics. Participants reported their age, sex, and the level of education of each of their parents, as a proxy for socioeconomic status. Due to small but significant differences among age groups, we added average parental education as a covariate in all analyses.

Intellectual ability. We used the Matrix Reasoning subtest of the *Wechsler Abbreviated Scale of Intelligence* (WASI; Psychological Corporation, 1999), administered on a laptop, to estimate *nonverbal intellectual ability*. (Verbal subscales of the WASI were excluded due to the variability in language across sites in the sample.) The WASI has been normed for individuals between the ages of 6 and 89 years; an age-normed score (i.e., *t*-score) was computed for each participant (see Icenogle et al., 2016 for more details about this measure). We included intellectual ability, which may influence task performance, as a covariate in all analyses to control for small but significant age differences in intellectual functioning in some of the countries.

Cognitive capacity. We computed a measure of cognitive capacity by averaging within-country standardized scores from digit span, working memory, and verbal fluency tasks.

Digit span. Participants recalled strings of digits beginning with two digits and increasing to eight. The outcome of interest is the highest number of digits recalled in reverse order (DSB). DSB taps working memory because it requires individuals to hold and manipulate information held in memory (Diamond, 2013).

Working memory. Participants saw four probe letters on the screen, followed by a target letter (Thompson-Schill et al., 2002). Participants indicated whether the target letter was among the four probes. On difficult trials, two of the four probes had appeared on the previous trial; on easy trials, none of the four probes had appeared in the two previous trials. Participants completed two

blocks of 32 trials. The outcome of interest is average accuracy across all trials.

Verbal fluency. Participants generated as many words as possible belonging to a given category in 1 min. Three categories were used: fruits, vegetables, and animals. The number of valid words (i.e., those that were not proper nouns, repeats, or different forms of the same word) generated within each category were averaged to create an overall fluency score. Kenyan participants scored notably lower than any other country (e.g., two thirds of the sample did not produce one example of a fruit). A discussion with the principal investigator in Kenya revealed that these low scores may be the result of low exposure to a variety of fruits, vegetables, and animals, or to performance-related anxiety. Further, Kenyans who have attended school are often multilingual, and a language mix-up could have contributed to poor performance. Accordingly, the cognitive capacity variable for Kenyan participants excluded verbal fluency.

Psychosocial maturity. We computed a composite measure of psychosocial maturity by averaging within-country standardized scores from five measures: self-reported resistance to peer influence, the stoplight task, delay discounting, the modified Iowa gambling task, and the Tower of London task. Although Steinberg et al. (2009a) also included a measure of risk perception, this measure was excluded from the current analyses (although it was administered). Unlike the other psychosocial measures, the risk perception questionnaire asks about specific risky behaviors (e.g., riding in a car with a drunk driver), perceptions of which may differ across countries simply because the behavior is more or less normative or common (e.g., sanctions against alcohol use in Jordan give intoxicated driving a different meaning than in the United States).

These specific measures were chosen both because they tap aspects of development frequently cited in legal debates, and because they are behavioral, not self-report, assessments. By using behavioral measures of both psychosocial maturity and cognitive capacity, we are able to determine whether previously reported divergent age patterns of the two are merely a reflection of measurement type. Although our measures, like those used by Steinberg et al. (2009a), reflect multiple domains of psychosocial functioning, we create an aggregate for two main reasons. Conceptually, these measures are related; each is undergirded by self-restraint (which manifests in different ways). Second, it is important to produce scientific research that meaningfully guides the legal field. Practically speaking, the courts and policymakers require simple explanations to complicated questions (Steinberg, Cauffman, Woolard, Graham, & Banich, 2009b). Thus, we consolidate across measures to make our study more directly applicable to legal settings.

Resistance to peer influence. We used the Resistance to Peer Influence Scale (RPI; Steinberg & Monahan, 2007), a 10-item questionnaire that uses a two-stage response format (see online supplemental materials for an example and full scale). Participants first indicated which of two opposing statements best described them (e.g., “For some people, it’s pretty easy for their friends to get them to change their mind BUT for other people, it’s pretty hard for their friends to get them to change their mind”). Then, participants rated whether this statement is “really true” or “sort of true,” yielding a 4-point scale. Because, in our sample, confirmatory factor analyses (CFAs) indicated poor model fit using the

4-point scale in all countries, we used dichotomized responses (i.e., which of the two statements was selected)—which yield better model fit indices—to compute scales scores. Further, psychometric properties of the RPI (based on fit indices from CFA) were improved when using only seven of the original 10 items. Thus, we used only dichotomized responses from these seven items. (See the online supplemental materials for details of this procedure.) Reliabilities ranged from $\alpha = .43$ (Philippines) to $.79$ (India; see supplemental materials for reliabilities in each country and the full 10-item scale).

The stoplight task. To obtain a behavioral index of sensation seeking, participants completed a computerized driving task called the “stoplight task” (Steinberg et al., 2008). In this task, participants approached a series of 20 intersections at which they decided whether to run a stoplight as it turned yellow, or to stop safely. If the participant chose to stop, he or she must wait 3 s before restarting. If the participant ran the light, he or she either passed through successfully (resulting in no loss of time) or crashed into another car (resulting in a loss of 6 s). Performance on this task is associated with self-reported sensation seeking (Chein et al., 2011; Steinberg et al., 2008). We defined sensation seeking as the proportion of lights run (regardless of whether the participant passed safely through the intersection). Z-scores for this measure were reversed so that higher values indicate greater restraint (i.e., less sensation seeking).

Delay discounting. We employed a computerized delay discounting task to assess individuals’ future orientation (see Steinberg et al., 2009a for details). In this task, participants made hypothetical decisions between an immediate but smaller reward and a delayed but larger reward. The value of the delayed reward was held constant at 1,000 units of local currency. The starting value of the immediate reward was randomly determined for each participant to be 200, 500, or 800 units of currency. Our version of the task uses six delay periods: 1 day, 1 week, 1 month, 3 months, 6 months, and 1 year (e.g., “Would you rather have 200 euros today or 1,000 euros in 6 months?”). The size of the immediate reward was adjusted after each offer to converge at a value reflecting the subjective value of the delayed reward if it were offered immediately, referred to as the “indifference point” (Ohmura, Takahashi, Kitamura, & Wehr, 2006). As the delay period lengthens, one must have a stronger sense of future orientation to forgo the immediate reward. That is, when waiting only 1 day or 1 week to receive a reward, it is relatively easy to forgo the immediate option. Longer delays, then, may better inform our understanding of future orientation because they require projection into the extended future. Accordingly, indifference points for the three longest delay intervals (3 months, 6 months, and 1 year) were averaged and used as a measure of future orientation. A higher value indicates a stronger willingness to forgo an immediate smaller reward for a more valuable reward in the future (i.e., greater future orientation).

Many researchers report that on delay discounting measures, there often are a small number of participants who fail to vary their responses across delay periods (i.e., they always choose the immediate reward regardless of the delay, or they always choose the delayed reward regardless of the delay). Because these responses show an absence of discounting behavior (indicating that participants either do not take the task seriously, or do not understand the task), we recoded them as missing for these participants.

Modified Iowa gambling task. We measured cost sensitivity with a modified IGT (Cauffman et al., 2010). Participants played from four decks of cards to earn money. Two of the decks resulted in a monetary gain over repeated play (advantageous decks), whereas the other two resulted in a net loss over repeated play (disadvantageous decks). In this modified version of the IGT, one deck was highlighted with an arrow, and participants were given four seconds to decide to play or pass on that card (see Cauffman et al., 2010 for details). This “play or pass” modification allowed us to independently track avoidance of disadvantageous decks (Peters & Slovic, 2000). The task was administered in six blocks of 20 trials. A running total of each participant’s earnings remained on the screen throughout the task. Cost sensitivity was operationalized as the change in proportion of cards played on disadvantageous decks from the first block to the last block. The more individuals resist the disadvantageous decks over the course of the task, the better they are at learning to avoid harmful decks despite their potential for reward. So that higher values indicated greater cost sensitivity and restraint, scores were z -scored and reversed.

Tower of London task. We measured impulse control using a computerized version of the Tower of London task (Shallice, 1982; Steinberg et al., 2008). Participants saw pictures of two sets of three colored balls distributed across three rods, one of which can hold three balls, one can hold two balls, and the last, only one ball. The first picture showed the starting positioning of the three balls and the second picture depicted the goal position. The purpose of the task is for participants to match the goal arrangement in as few moves as possible by moving the balls from peg to peg. Participants saw 20 trials, beginning with trials that can be solved in three moves and progressing to those that require a minimum of seven moves.

One capacity assessed by this task is whether one can inhibit acting before a plan is fully formed (i.e., impulse control). Impulse control was measured by the latency to the first move (in milliseconds) on difficult problems (those requiring six or seven moves to complete). To prevent extreme outliers from influencing the results, we recoded as missing responses from any participants with latencies greater than 60 s ($n = 18$). As is often the case with response time data, latencies were markedly skewed. A log trans-

formation was applied to these data, which improved the distribution.

Data Analyses

We excluded a relatively small number of participants (172; 3.18%) based on interviewer feedback (e.g., the participant did not appear to understand tasks or did not evince adequate effort during the assessment). We also excluded three participants who failed to report their age or whose age exceeded the specified age range for the study. Of the remaining 5,227 participants, 78 (1.50%) did not provide information on parental education, 83 (1.59%) lacked Tower of London data, and 165 (3.16%) lacked data from the stoplight task (mostly due to technical difficulties with the program). Forty-one participants were missing delay discounting, and an additional 171 failed to vary their responses (either always choosing the immediate option or always choosing the delay option) and were recoded as missing. In total, 212 (4.06%) of participants lacked delay discounting data. Less than 1% of the sample were missing data on any other covariate or measure. Analyses were completed with Mplus statistical software (Version 7.31; Muthén & Muthén, 1998–2010) using full-information maximum likelihood to handle missing data.

We tested for linear, quadratic, and cubic age patterns of the cognitive capacity and psychosocial maturity composites in the sample as a whole and separately within each country. All analyses controlled for parental education and intellectual ability. To produce meaningful decimals and avoid rounding errors, we multiplied composite values by 100. Age was centered at 10 years, and both parental education and intellectual functioning were centered at their respective means.

Results

Zero-order correlations among all variables and descriptive statistics for each measure by age group are reported in Table 2 and Table 3, respectively. For all regression analyses, we report only coefficients from the model with the highest-order significant age trend. Lower-order age trends are reported in the [online supplemental materials](#). Results of age patterns of individual components can be found in the [online supplemental materials](#).

Table 2
Zero-Order Correlations Among Variables

Variable	Par. Ed.	WASI	RPI	Stoptlight	DD	IGT	ToL	WM	VF	DSB
Age	-.07***	.15***	.15***	-.03*	.06***	-.16***	.18***	.29***	.26***	.20***
Par. Ed.	—	.20***	.05**	.004	.09***	-.08***	.04**	.10***	-.03*	.09***
WASI		—	.10***	.06***	.13***	-.15***	.21***	.36***	.30***	.36***
RPI			—	-.05***	.07***	-.07***	.06***	.15***	.04*	.06***
Stoptlight				—	-.03	.04**	.02	.09***	.09***	.07***
DD					—	-.12***	.09***	-.01	.09***	.05***
IGT						—	-.14***	-.13***	-.10***	-.10***
ToL							—	.16***	.08***	.23***
WM								—	.26***	.37***
VF									—	.27***

Note. Par. Ed. = Parental education; WASI = WASI t -score; RPI = Resistance to peer influence; DD = delay discounting, average indifference point for longest delays; IGT = Iowa gambling task, corresponding to the proportion decrease in plays on disadvantageous decks; ToL = Tower of London, latency to first move; WM = working memory; VF = verbal fluency; DSB = digit span backward.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Descriptive Statistics by Age Group: Mean (SD)

Variable	10–11	12–13	14–15	16–17	18–21	22–25	26–30
Par. Ed.	11.83 (3.00)	12.07 (2.91)	12.12 (2.78)	11.86 (2.88)	12.01 (2.79)	11.78 (3.03)	11.24 (3.24)
WASI	48.33 (11.00)	46.01 (11.07)	46.18 (10.87)	46.97 (10.54)	49.81 (10.41)	51.36 (10.19)	51.42 (11.62)
RPI	.57 (.25)	.60 (.25)	.60 (.25)	.62 (.25)	.62 (.24)	.67 (.23)	.67 (.25)
Stoplight	.42 (.22)	.42 (.21)	.44 (.23)	.42 (.21)	.43 (.23)	.42 (.23)	.39 (.23)
DD	400.85 (301.17)	375.29 (303.76)	384.49 (269.58)	400.23 (295.09)	415.20 (291.62)	443.08 (303.11)	437.20 (311.98)
IGT	-.02 (.24)	-.03 (.24)	-.06 (.25)	-.07 (.27)	-.10 (.28)	-.12 (.29)	-.13 (.32)
ToL	4475.99 (3382.75)	4467.41 (3661.45)	5363.33 (5660.86)	5848.01 (6092.83)	6481.17 (5978.23)	6926.48 (6618.99)	7055.67 (6932.37)
WM	6.11 (1.37)	6.58 (1.26)	6.97 (1.08)	7.15 (1.00)	7.26 (.95)	7.21 (1.08)	7.17 (1.11)
VF	10.5 (4.44)	11.03 (5.15)	12.72 (5.71)	13.65 (6.52)	13.94 (5.84)	14.46 (6.49)	14.90 (6.48)
DSB	4.02 (1.19)	4.26 (1.20)	4.52 (1.47)	4.61 (1.43)	4.82 (1.49)	4.81 (1.52)	4.79 (1.39)
N	1191	702	667	623	715	670	659
% Female	51.8	48.4	50.7	50.9	49.9	51.3	51.4

Note. Par. Ed. = Parental education. WASI = WASI *t*-score; DD = delay discounting, average indifference point for longest delays; RPI = Resistance to peer influence (on a 0–1 scale); IGT = Iowa gambling task, corresponding to the proportion decrease in plays on disadvantageous decks; ToL = Tower of London, latency to first move (in ms); WM = working memory, average accuracy (out of 8); VF = verbal fluency, number of words produced in 1 min; DSB = digit span backward, longest string of digits correctly recalled in reverse order (with a maximum value of 8).

Measurement Invariance

To ensure that self-reported resistance to peer influence was suitable for use in our sample, we examined measurement invariance in all 11 countries. We fit CFAs for this measure within each country to test for unidimensionality and identify problematic items. We used the alignment technique to explore measurement invariance (Muthén & Asparouhov, 2014), which also provided information about the noninvariance of each item in each country.

CFAs indicated that the RPI evinced acceptable model fit when three problematic items (based on visual inspection and alignment analyses) were dropped. Muthén and Asparouhov (2014) suggest that approximate measurement invariance is attained if less than 20%–25% of parameters register as noninvariant. Tests of measurement invariance indicated very few noninvariant items (less than 7%) for the RPI. More details of this process and results can be found in the [online supplemental materials](#).

Full Sample Age Trends

Cognitive capacity followed a significant cubic age trend in the full sample ($b_{\text{Age}} = 22.82$, $SE = 1.07$, 95% CI [20.68, 24.90], $p < .001$; $b_{\text{Age}}^2 = -1.95$, $SE = 0.14$, 95% CI [-2.22, -1.66], $p < .001$; $b_{\text{Age}}^3 = 0.05$, $SE = 0.01$, 95% CI [0.04, 0.06], $p < .001$; $R^2 = .92$, $p < .001$). Improvements in cognitive capacity were most striking from childhood into adolescence, with little change after age 16. Psychosocial maturity, in contrast, followed a significant linear trend ($b_{\text{Age}} = 1.86$, $SE = 0.12$, 95% CIs [1.62, 2.07], $p < .001$; $R^2 = .09$, $p < .001$). [Figure 1](#) displays age patterns of both composites.

Age Trends in Cognitive Capacity by Country

Cognitive capacity followed a significant age pattern in all 11 countries (see [Table 4](#) for regression results). Nine of these countries evinced a cubic pattern, and two (Sweden and Cyprus) followed a curvilinear pattern. [Figure 2](#) depicts the estimated regression lines for all countries. Except in Jordan, cognitive capacity increased steeply from age 10 to around age 16, when it plateaued. In a subset of countries with cubic age patterns (China, Colombia,

India, and Thailand), cognitive capacity increased during childhood and again, albeit modestly, at the end of the age range. Jordan followed a cubic trend, but the pattern departed notably from other countries and from theory-based predictions.

Age Trends in Psychosocial Maturity by Country

Psychosocial maturity evinced a significant age pattern in all countries except Jordan and Kenya (see [Table 5](#)). Notably, there was far more diversity in patterns of psychosocial maturity than in patterns of cognitive capacity (see [Figure 3](#)). Significant linear age patterns for psychosocial maturity were found in China, Cyprus, India, Italy, the Philippines, Sweden, and Thailand. The U.S. evinced a curvilinear age pattern, increasing throughout the teen years before leveling-off in the 20s. Lastly, Colombia followed a cubic pattern where psychosocial maturity improved until the mid-20s, after which it declined.

In the current study, the self-report measure of resistance to peer influence, which was the only nonbehavioral measure used in the present analyses, evinced low reliability in some countries. To ensure that including this variable did not fundamentally change the observed age patterns, we computed the psychosocial maturity composite without the RPI scale, and reran all analyses. By and large, the results of these analyses mirrored the original findings. One exception was in Thailand, where the age pattern of psychosocial maturity without the RPI scale followed a cubic trend rather than the linear trend seen in the original analysis. However, visual inspection of the estimated marginal means of both versions of the psychosocial maturity composite indicates very similar age patterns; in both cases, psychosocial maturity increases with age, but also peaks around 16–17 years. Nevertheless, caution is needed when interpreting age patterns of psychosocial maturity in Thailand.

Post hoc analyses of unusual age patterns. In most of the countries, interpretation of the age patterns was straightforward. In Colombia and the U.S., however, both cognitive capacity and psychosocial maturity follow nonlinear age patterns, making it more challenging to test the hypothesis that the former reaches adult levels earlier than the latter. Visual inspection of age patterns

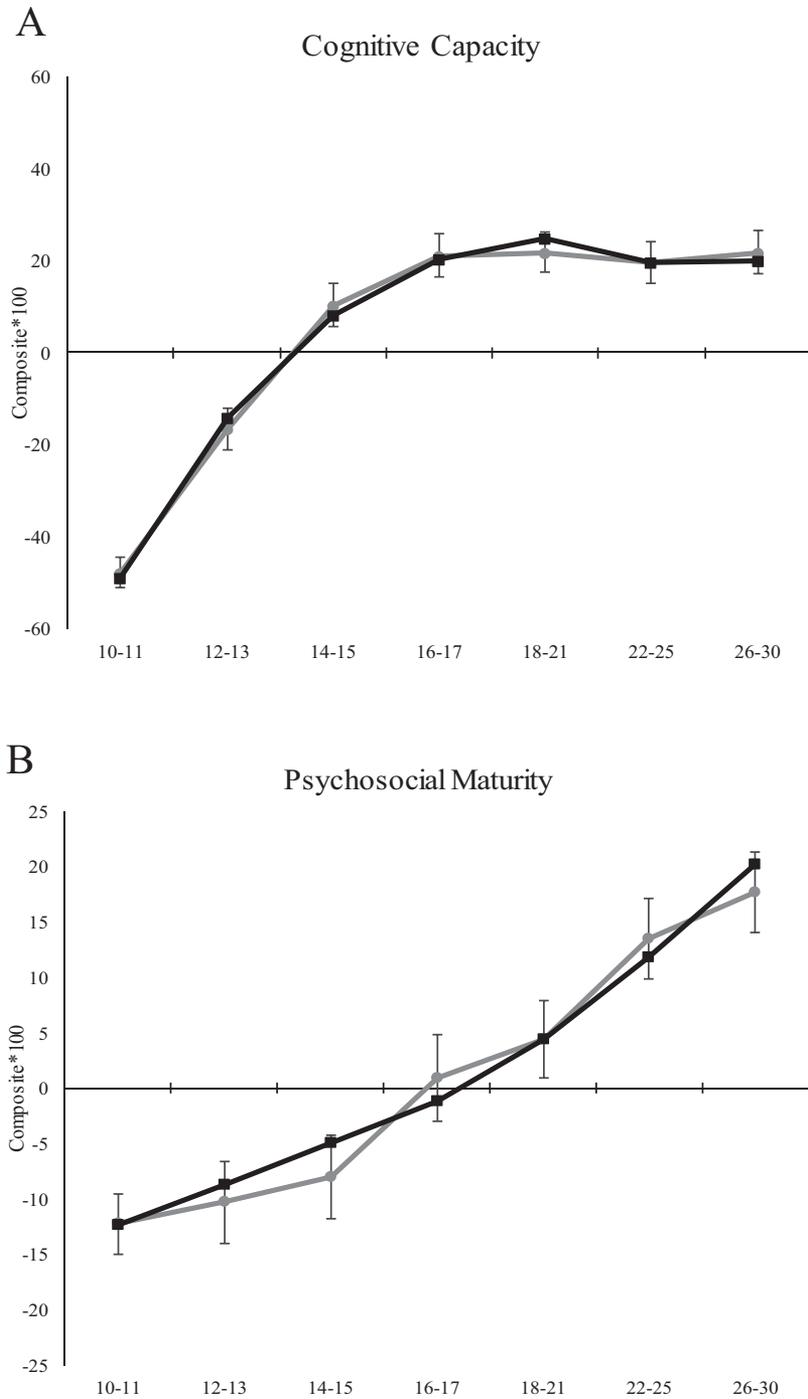


Figure 1. Age patterns in cognitive capacity (top) and psychosocial maturity (bottom) in the aggregated sample. Values of these composites were multiplied by 100. Gray lines denote estimated marginal means for each age group (error bars indicate 95% confidence intervals). Black lines denote estimated regression value.

in these two countries suggests that cognitive capacity reaches adult levels prior to psychosocial maturity. To statistically determine which construct reaches a plateau first, we examined the instantaneous rate of change in each variable, which is equal to the

slope of a tangent line drawn at a given point along the curve of a line. With this technique, we are able to determine the magnitude and significance of a tangent line drawn at each discrete age. Accordingly, the age at which this tangent slope is no longer

Table 4
Regression Results for Cognitive Capacity

Country		<i>b</i> (SE)	95% Confidence Interval		<i>p</i> -value	<i>R</i> ² Adjusted	<i>p</i> -value
			LB	UB			
China <i>n</i> = 489	Age	22.02 (3.48)	15.20	28.84	<.001	.88	<.001
	Age ²	-1.70 (.45)	-2.59	-.81	<.001		
	Age ³	.05 (.02)	.02	.08	.003		
Colombia <i>n</i> = 498	Age	37.00 (2.76)	31.59	42.41	<.001	.97	<.001
	Age ²	-3.58 (.40)	-4.36	-2.81	<.001		
	Age ³	.11 (.02)	.08	.13	<.001		
Cyprus <i>n</i> = 364	Age	15.11 (1.97)	11.25	18.98	<.001	.80	<.001
	Age ²	-.56 (.10)	-.76	-.36	<.001		
	Age ³	—	—	—	—		
India <i>n</i> = 417	Age	19.19 (4.18)	11.00	27.39	<.001	.86	<.001
	Age ²	-1.54 (.52)	-2.57	-.53	.003		
	Age ³	.04 (.02)	.01	.08	.02		
Italy <i>n</i> = 547	Age	28.76 (3.08)	22.73	34.80	<.001	.95	<.001
	Age ²	-2.27 (.42)	-3.10	-1.44	<.001		
	Age ³	.06 (.02)	.03	.09	<.001		
Jordan <i>n</i> = 450	Age	14.90 (3.65)	7.74	22.06	<.001	.84	<.001
	Age ²	-1.82 (.47)	-2.75	-.91	<.001		
	Age ³	.06 (.02)	.03	.09	<.001		
Kenya <i>n</i> = 483	Age	27.13 (3.62)	20.03	34.23	<.001	.94	<.001
	Age ²	-2.48 (.46)	-3.40	-1.57	<.001		
	Age ³	.07 (.02)	.04	.10	<.001		
Philippines <i>n</i> = 505	Age	27.80 (2.89)	22.15	33.45	<.001	.95	<.001
	Age ²	-2.01 (.39)	-2.77	-1.25	<.001		
	Age ³	.04 (.01)	.02	.07	.002		
Sweden <i>n</i> = 416	Age	13.61 (1.72)	10.25	16.99	<.001	.75	<.001
	Age ²	-.42 (.09)	-.61	-.25	<.001		
	Age ³	—	—	—	—		
Thailand <i>n</i> = 502	Age	28.29 (3.72)	21.00	35.58	<.001	.93	<.001
	Age ²	-2.46 (.51)	-3.45	-1.47	<.001		
	Age ³	.07 (.02)	.03	.11	<.001		
U.S. <i>n</i> = 556	Age	30.94 (3.18)	24.70	37.17	<.001	.95	<.001
	Age ²	-2.47 (.42)	-3.29	-1.64	<.001		
	Age ³	.06 (.01)	.03	.09	<.001		

Note. Composite values were multiplied by 100. Analyses control for parental education and intellectual functioning (each centered at their mean). Age was centered at 10. Reported coefficients were derived from a single model with the highest-order significant age term.

significantly different from zero indicates the beginning of a plateau in the estimated regression line. Consistent with visual inspection, cognitive capacity reaches a plateau prior to psychosocial maturity in both Colombia (where cognitive capacity peaks at 18 and psychosocial maturity at 24) and the U.S. (where cognitive capacity peaks at 19 and psychosocial maturity at 22).

In China and Colombia, cognitive capacity appears to increase near the end of the age range. To determine whether these increases are significant, we identified the age at which cognitive capacity reaches a peak according to the instantaneous rate of change in all 11 countries, and reassessed age patterns from this peak through age 30. According to these analyses, there is no growth in cognitive capacity after the beginning of the plateau in any country except China, where cognitive capacity increases linearly from age 20 to age 30 ($b = 5.16$, $SE = 1.37$, $p < .001$), and in the Philippines, cognitive capacity increases during early and middle adolescence, but decreases between 19 and 30 ($b = -3.19$, $SE = 1.04$, $p = .002$). Results for all analyses of the instantaneous rate of change are listed in Table S12.

Lastly, it is important to caution the reader that the instantaneous rate of change approach, while useful to compare the *relative* age patterns between psychosocial maturity and cognitive capacity,

does not tell us absolute age at which these constructs reaches adult levels because this test is highly sensitive to very small changes in slopes. Thus, we caution the reader not to overinterpret the implications of these analyses.

Discussion

The age of majority, when citizens become legal adults, is set at 18 in most countries, but this boundary is an imperfect divider separating mature from immature individuals. Rather, research suggests that some aspects of psychological development reaches adult levels prior to 18, whereas others reach adult levels later. Findings from the present study are consistent with previous reports that cognitive capacity (cold cognition), the ability of an individual to reason and consider alternative courses of action—undergirded by executive functions—reaches adult levels during the midteen years, whereas other elements of maturity, specifically those indexing aspects of psychosocial functioning (hot cognition), such as self-restraint, tend to reach adult levels into adulthood. That these constructs reach adult levels on different timetables suggests a “maturity gap” between these elements of psychological development. To our knowledge, this is the first study to measure

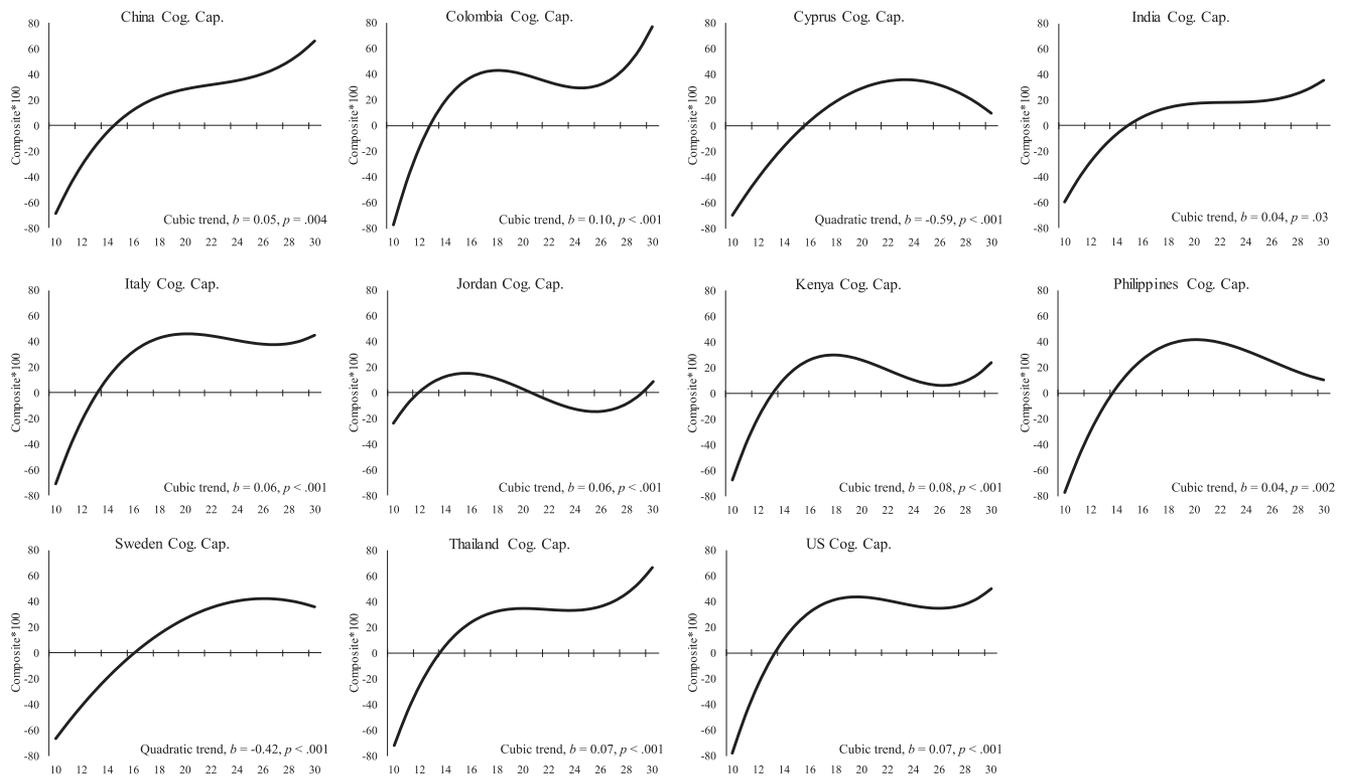


Figure 2. Age patterns in cognitive capacity for each country. Values of the composite were multiplied by 100. Coefficients indicate the highest-order significant age term.

both cognitive capacity and psychosocial maturity within a single sample with a sufficiently wide age range (10–30) across so many diverse countries.

The age patterns of cognitive capacity and psychosocial maturity evinced in the international sample in the aggregate strongly resemble those reported by Steinberg et al. (2009a) in their exclusively U.S. study. Specifically, post hoc analyses indicate that in nine of 11 countries, cognitive capacity does not change during adulthood. This age pattern is also consistent with previous studies of working memory, inhibition, and verbal fluency, where adult-like performance is generally reached around age 15 or 16 (e.g., Huizinga et al., 2006; Linares, Bajo, & Pelegrina, 2016). Further, consistent with Steinberg et al. (2009a), who reported that adults in their late 20s evince higher psychosocial maturity than young adults (ages 18–21), we note the same pattern in eight of the 11 countries studied (the exceptions are Colombia, Jordan, and Kenya). It is notable that the age pattern of psychosocial maturity using primarily behavioral assessments replicates the age pattern reported by Steinberg et al. (2009a) using self-report measures. Our results are also consistent with Rossier et al. (2007), who reported that sensation seeking (an aspect of immaturity) decreased between 18 and 25 years in a sample drawn from China, Germany, Italy, Spain, Switzerland, and the U.S. However, these investigators found that impulsivity did not change during this same age period (Rossier et al., 2007). The age pattern of psychosocial maturity found in the current study is also consistent with studies (largely conducted in Western countries) documenting

improvements during adulthood with respect to declines in sensation seeking (Quinn & Harden, 2013) and increases in impulse control (Shulman et al., 2014), future orientation (Steinberg et al., 2009c), and resistance to peer influence (Chein et al., 2011). Our results also align with neuroscientific evidence indicating that the brain continues to develop during the early 20s, especially with regard to connectivity among brain regions in ways that improve self-regulation (Casey, 2015). The relative immaturity in functional connectivity in late adolescence, compared to the mid-20s, is reflected in part in the findings on psychosocial maturity, of which self-restraint is a part.

Although many of our findings are consistent with our hypotheses—specifically, that cognitive capacity would reach adult levels prior to age 18, but psychosocial maturity not until the 20s—there were several unanticipated results. First, a few countries exhibited either no age differences in psychosocial maturity or a pattern inconsistent with developmental theories. Neither Jordan nor Kenya evinced significant age patterns. There is no obvious factor distinguishing countries that did and did not show the expected increase in psychosocial functioning into the adult years. The countries in which psychosocial maturity evinced age differences into adulthood are diverse (e.g., a mix of Western and Asian, and individualistic and collectivistic countries), as is the group in which this pattern was not seen. Thus, although cultural norms likely influence the development and expression of self-regulation (Chen & French, 2008; Matsumoto et al., 2008), in our sample they did not do so in an easily interpretable way. Furthermore,

Table 5
Regression Results for Psychosocial Maturity

Country		<i>b</i> (SE)	95% Confidence Interval		<i>p</i> -value	<i>R</i> ² Adjusted	<i>p</i> -value
			LB	UB			
China <i>n</i> = 489	Age	2.1 (.40)	1.34	2.89	<.001	.09	<.001
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
Colombia <i>n</i> = 498	Age	-.17 (2.23)	-4.56	4.22	.94	.17	.26
	Age ²	.64 (.32)	.02	1.28	.04	—	—
	Age ³	-.03 (.01)	-.05	-.01	.01	—	—
Cyprus <i>n</i> = 364	Age	1.64 (.46)	.74	2.54	<.001	.11	<.001
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
India <i>n</i> = 417	Age	1.29 (.42)	.47	2.11	.002	.02	.06
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
Italy <i>n</i> = 547	Age	2.92 (.36)	2.21	3.63	<.001	.15	<.001
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
Jordan <i>n</i> = 450	Age	.03 (.44)	-.82	.89	.94	.01	.13
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
Kenya <i>n</i> = 483	Age	.27 (.36)	-.44	.97	.46	.004	.24
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
Philippines <i>n</i> = 505	Age	2.17 (.38)	1.44	2.91	<.001	.12	<.001
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
Sweden <i>n</i> = 416	Age	3.18 (.41)	2.38	3.99	<.001	.22	<.001
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
Thailand <i>n</i> = 502	Age	.93 (.37)	.21	1.66	.01	.02	.05
	Age ²	—	—	—	—	—	—
	Age ³	—	—	—	—	—	—
U.S. <i>n</i> = 556	Age	4.43 (1.21)	2.06	6.80	<.001	.38	.001
	Age ²	-.13 (.07)	-.26	-.003	.04	—	—
	Age ³	—	—	—	—	—	—

Note. Composite values were multiplied by 100. Analyses control for parental education and intellectual functioning (each centered at their mean). Age was centered at 10. Reported coefficients were derived from a single model with the highest-order significant age term.

given the relative absence of prior studies using these measures in many non-Western countries, we do not know whether cross-cultural differences in participants' responses to elements of the test battery account for differences in their performance on various tasks.

Second, although we anticipated few changes in cognitive capacity during the adult years, we found continued improvement during the late 20s in China and a modest decline during the late 20s in the Philippines. Nevertheless, even in these countries the majority of growth in cognitive capacity occurred prior to adulthood, consistent with past research (Huijzinga et al., 2006; Linares et al., 2016), followed by modest changes thereafter. There is no obvious reason why cognitive capacity increases in adulthood only in China and decreases in adulthood only in the Philippines. Further cross-cultural research on age differences in executive function would be useful in determining whether these patterns are robust or idiosyncratic to the present study. In the absence of more research, we caution against generating post hoc explanations for these patterns.

Third, contrary to our hypothesis, we did not find more consistency in age patterns of cognitive capacity compared with psychosocial maturity across countries. Eight countries followed qualita-

tively similar patterns of cognitive capacity (i.e., increasing from childhood to adolescence, then plateauing), while seven countries followed qualitatively similar patterns of psychosocial maturity (i.e., increasing linearly with age). Thus, it does not appear that age patterns are more similar in one domain than the other, at least with respect to the measures employed in this study.

The current study has a few limitations, some of which limit its utility as a guide for the law. First, our measures do not assess real-world behaviors or explicitly test decision-making capacities (e.g., by using decision-making vignettes), and therefore do not assess actual decision-making competence. However, Steinberg et al. (2009a) found that cognitive capacity (as assessed in this study) and performance on a standardized assessment of competence to stand trial develop nearly in lockstep. Thus, our assessment of cognitive capacity may speak to decision-making competency, albeit indirectly. Second, not all countries evinced the expected age pattern of psychosocial maturity, and other relevant aspects of psychosocial maturity not captured by our measure likely do develop with age in these societies. Third, the reliability of self-reported resistance to peer influence was low in some countries. Although sensitivity analyses indicate the results with respect to age patterns in psychosocial maturity are largely unchanged when

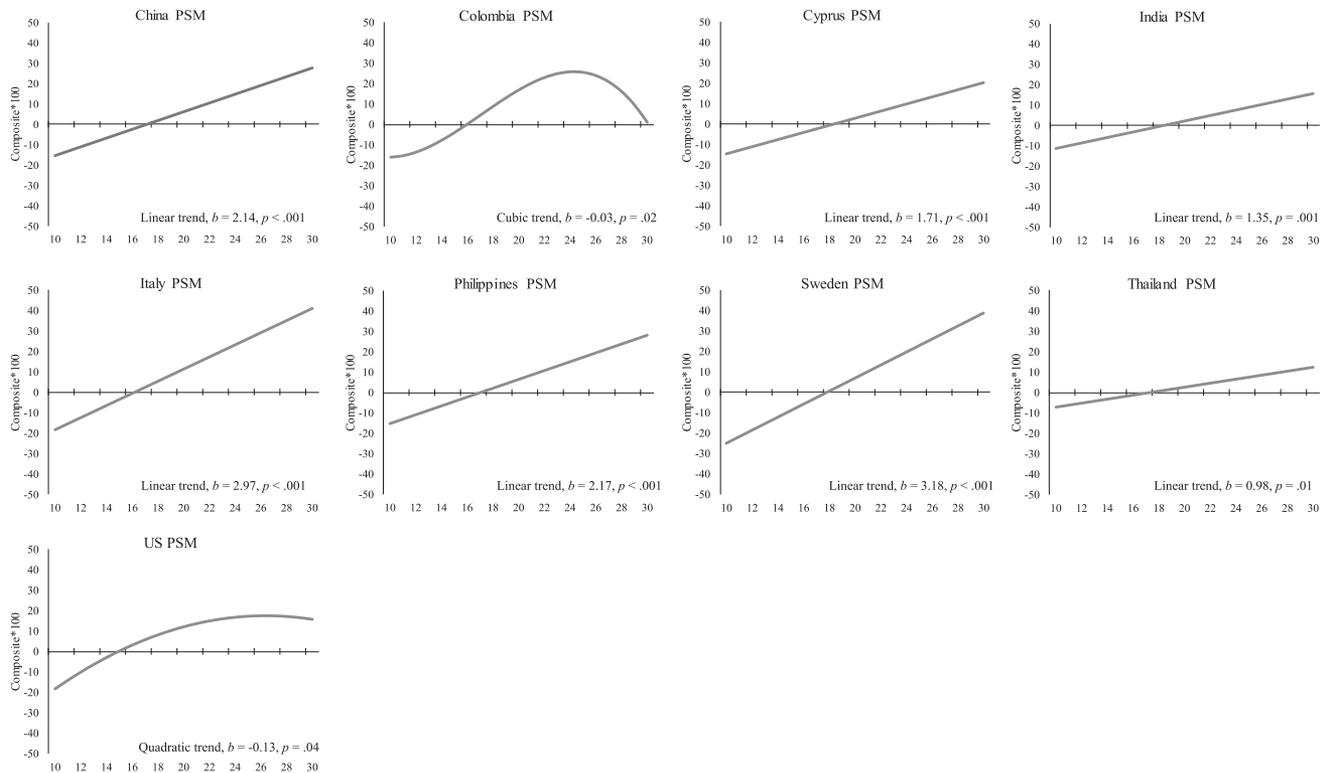


Figure 3. Age patterns in psychosocial maturity for each country. Values of the composite were multiplied by 100. Coefficients indicate the highest-order significant age term. Only significant age patterns are shown.

this measure is excluded, caution is needed when interpreting our analyses, especially in Thailand. More generally, the reliability and validity of some of our measures in non-Western societies are not known. For example, although some of our measures have been used cross-culturally (e.g., executive functioning measures in Kenya; Alcock et al., 2008), others have not (e.g., the stoplight task). Lastly, despite our wide age range, this study relies on cross-sectional data, which limits our ability to draw conclusions about developmental changes. That is, we are able to study age differences, but cannot directly study development and maturity.

With these caveats in mind, we can draw several conclusions from our findings. In agreement with Steinberg et al. (2009a), the clear answer to the question, “When do individuals become mature?” is that it depends on the component of maturity in question. Our findings provide evidence that basic cognitive processes undergirding higher-order, goal-directed behavior (cold cognition) reach adult levels relatively early—around age 16. To the extent that a situation lends itself to deliberation, 16 might be a reasonable age of majority. Voting (Steinberg, 2014), making decisions in medical contexts (Weithorn & Campbell, 1982), consenting to participate in research (Hein et al., 2015), and participating in legal proceedings (Grisso et al., 2003) constitute situations in which adolescents may be competent. Although all 16-year-olds would not necessarily make “good” decisions in the voting booth or doctor’s office, their decisions in these contexts, on average, would be as logical as adults’ decisions.

Decision making in these contexts is not purely cognitive, of course. Being a defendant in a legal proceeding or deciding

whether to undergo a medical procedure may instill concern or fear. However, given that knowledgeable adults (e.g., doctors and lawyers) typically surround adolescents in these situations, there is opportunity to diminish the emotional intensity of the decision in favor of reflection. For example, pressure to decide quickly intensifies the affective arousal of a situation (Hein et al., 2015), so one easy point of intervention is to ask clinicians and legal professionals to mitigate arousal and facilitate reflection by giving their patients and clients time to consider their options (and be available to discuss them). Such efforts may be especially important during plea negotiations. Ideally, individuals considering a plea bargain have time to contemplate their choices, consult with their attorney about the offer, and deliberate on what is in their best interest. In reality, the context may be considerably less favorable. For instance, the plea bargain may be a one-time offer, and a decision whether to accept may need to be immediate (or nearly so; Malloy et al., 2014; Zottoli, Daftary-Kapur, Winters, & Hogan, 2016). Furthermore, a minor may experience external pressure from his own attorney, parents, or friends to take the deal (Daftary-Kapur & Zottoli, 2014). Thus, depending on the unique situation of the adolescent, the plea bargain context straddles the line between a hot and cold context, which complicates discussions around appropriate age boundaries.

That the age at which psychosocial reaches adult levels is beyond age 18 (and to a striking degree in some countries) suggests that adolescents and young adults are still developing in ways that should influence their culpability in criminal proceedings and, perhaps, some of the privileges we extend to them.

Young adults—like adolescents—are more likely than somewhat older adults to be impulsive, sensation seeking, and sensitive to peer influence in ways that influence their criminal conduct (Scott et al., 2016). This does not mean that no one under 18 is mature enough to drink responsibly or premeditate a serious crime; nor is it to say that all adults are capable of mature self-restraint. It is to posit that *on average*, teens—and young adults—are relatively less likely to have the self-restraint necessary to deserve the privileges and penalties we reserve for people we judge to be fully responsible for their behavior.

The idea that young adults may be worthy of special consideration in criminal cases has circulated for years (e.g., Council of Europe, 2003; Woolard & Scott, 2009), but there is a dearth of research exploring differences between young adults and older adults (e.g., studies often combine all adults 18 and older into a single group). However, recent commentaries have sparked discussions about the differential treatment of young adults in the legal system in the U.S. (Schiraldi et al., 2015). Other countries have implemented policies that extend to young adults some aspects of leniency and protection given to minors (e.g., the Netherlands, Germany, and Sweden), informed partly by evidence of continued brain maturation beyond 18, and because the acquisition of adult roles has been increasingly delayed in many parts of the world (Dünkel, 2014; Scott et al., 2016) leading to a developmental period some writers call “emerging adulthood” (Arnett, 2000).

Conclusions

The present study reaffirms the complexity of defining “maturity” or “adulthood” based on psychological grounds alone. Developmental science ought to inform, but not dictate, where the law sets age boundaries. Having different ages of majority, depending on the legal issue in question, is truer to the science than having a single age for all legal matters. Therefore, we advocate two different boundaries: one that applies to situations in which time pressure, emotional arousal, and coercive influence are not likely to inhibit decision-making capacities—which might be designated at age 16—and a second that applies to situations in which psychosocial immaturity may compromise judgment—which might be designated at 18 or older.

References

- Albert, D., & Steinberg, L. (2011). Peer influences on adolescent risk behavior. In M. Bardo, D. Fishbein, & R. Milich (Eds.), *Inhibitory control and drug abuse prevention: From research to translation* (pp. 211–226). New York, NY: Springer. http://dx.doi.org/10.1007/978-1-4419-1268-8_11
- Alcock, K. J., Holding, P., Mung’ala-Odera, V., & Newton, C. R. J. C. (2008). Constructing tests of cognitive abilities for schooled and unschooled children. *Journal of Cross-Cultural Psychology, 39*, 529–551. <http://dx.doi.org/10.1177/0022022108321176>
- American Psychological Association (APA). (1989). *Amicus curiae brief filed in U.S. Supreme Court in Ohio v. Akron Center for Reproductive Health, Inc.*, 497 U.S. 502 (1990). and *Hodgson v. Minnesota*, 497 U.S. 417 (1990). Retrieved from <http://www.apa.org/about/offices/ogc/amicus/ohio.pdf>
- American Psychological Association (APA). (2004). *Amicus curiae brief filed in U.S. Supreme Court in Roper v. Simmons*, 543 U.S. 551 (2005). Retrieved from <http://www.apa.org/about/offices/ogc/amicus/roper.pdf>
- Arnett, J. J. (2000). Emerging adulthood. A theory of development from the late teens through the twenties. *American Psychologist, 55*, 469–480. <http://dx.doi.org/10.1037/0003-066X.55.5.469>
- Casey, B. J. (2015). Beyond simple models of self-control to circuit-based accounts of adolescent behavior. *Annual Review of Psychology, 66*, 295–319. <http://dx.doi.org/10.1146/annurev-psych-010814-015156>
- Cauffman, E., Shulman, E. P., Steinberg, L., Claus, E., Banich, M. T., Graham, S., & Woolard, J. (2010). Age differences in affective decision making as indexed by performance on the Iowa gambling task. *Developmental Psychology, 46*, 193–207. <http://dx.doi.org/10.1037/a0016128>
- Central Intelligence Agency. (2018). *The world factbook 2018*. Washington, DC: Author. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/index.html>
- Chein, J., Albert, D., O’Brien, L., Uckert, K., & Steinberg, L. (2011). Peers increase adolescent risk taking by enhancing activity in the brain’s reward circuitry. *Developmental Science, 14*, F1–F10. <http://dx.doi.org/10.1111/j.1467-7687.2010.01035.x>
- Chen, X., & French, D. C. (2008). Children’s social competence in cultural context. *Annual Review of Psychology, 59*, 591–616. <http://dx.doi.org/10.1146/annurev.psych.59.103006.093606>
- Cohen, A. O., Breiner, K., Steinberg, L., Bonnie, R. J., Scott, E. S., Taylor-Thompson, K. A., . . . Casey, B. J. (2016). When is an adolescent an adult? Assessing cognitive control in emotional and non-emotional contexts. *Psychological Science, 27*, 549–562. <http://dx.doi.org/10.1177/0956797615627625>
- Cook, P. J., & Tauchen, G. (1984). The effect of minimum drinking age legislation on youthful auto fatalities, 1970–1977. *The Journal of Legal Studies, 13*, 169–190. <http://dx.doi.org/10.1086/467738>
- Council of Europe. (2003). *Recommendation of the Committee of Ministers to member states concerning new ways of dealing with juvenile delinquency and the role of juvenile justice*. Retrieved from <http://www.coe.int/>
- Crone, E. A., Ridderinkhof, K. R., Worm, M., Somsen, R. J. M., & van der Molen, M. W. (2004). Switching between spatial stimulus-response mappings: A developmental study of cognitive flexibility. *Developmental Science, 7*, 443–455. <http://dx.doi.org/10.1111/j.1467-7687.2004.00365.x>
- Daftary-Kapur, T., & Zottoli, T. M. (2014). A first look at the plea deal experiences of juveniles tried in adult court. *International Journal of Forensic Mental Health, 12*, 323–336. <http://dx.doi.org/10.1080/14999013.2014.960983>
- Davis, S. M., Scott, E. S., Wadlington, W., & Whitebread, C. H. (2009). *Children in the legal system: Cases and materials* (4th ed.). New York, NY: Foundation Press.
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology, 64*, 135–168. <http://dx.doi.org/10.1146/annurev-psych-113011-143750>
- Duell, N., Steinberg, L., Icenogle, G., Chein, J., Chaudhary, N., Di Giunta, L., . . . Bacchini, D. (2017). Age patterns in risk taking across the world. *Journal of Youth and Adolescence, 5*, 1052–1072. <http://dx.doi.org/10.1007/s10964-017-0752-y>
- Dünkel, F. (2014). Juvenile justice systems in Europe: Reform developments between justice, welfare and “new punitiveness.” *Criminological Studies, 1*, 31–76.
- Erkut, S. (2010). Developing multiple language versions of instruments for intercultural research. *Child Development Perspectives, 4*, 19–24. <http://dx.doi.org/10.1111/j.1750-8606.2009.00111.x>
- Figner, B., Mackinlay, R. J., Wilkening, F., & Weber, E. U. (2009). Affective and deliberative processes in risky choice: Age differences in risk taking in the Columbia Card Task. *Journal of Experimental Psychology, 35*, 709–730. <http://dx.doi.org/10.1037/a0014983>
- Fischer, K. W., Stein, Z., & Heikkinen, K. (2009). Narrow assessments misrepresent development and misguide policy: Comment on Steinberg, Cauffman, Woolard, Graham, and Banich (2009). *American Psychologist, 64*, 595–600. <http://dx.doi.org/10.1037/a0017105>

- Graham v. Florida*, 130 S. Ct. (2010).
- Grisso, T., Steinberg, L., Woolard, J., Cauffman, E., Scott, E., Graham, S., . . . Schwartz, R. (2003). Juveniles' competence to stand trial: A comparison of adolescents' and adults' capacities as trial defendants. *Law and Human Behavior*, 27, 333–363. <http://dx.doi.org/10.1023/A:1024065015717>
- Harden, K. P., & Tucker-Drob, E. M. (2011). Individual differences in the development of sensation seeking and impulsivity during adolescence: Further evidence for a dual systems model. *Developmental Psychology*, 47, 739–746. <http://dx.doi.org/10.1037/a0023279>
- Hein, I. M., De Vries, M. C., Troost, P. W., Meynen, G., Van Goudoever, J. B., & Lindauer, R. J. L. (2015). Informed consent instead of assent is appropriate in children from the age of twelve: Policy implications of new findings on children's competence to consent to clinical research. *BMC Medical Ethics*. Advance online publication. <http://dx.doi.org/10.1186/s12910-015-0067-z>
- Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, 2, 2. <http://dx.doi.org/10.9707/2307-0919.1014>
- Huizinga, M., Dolan, C. V., & van der Molen, M. W. (2006). Age-related change in executive function: Developmental trends and a latent variable analysis. *Neuropsychologia*, 44, 2017–2036. <http://dx.doi.org/10.1016/j.neuropsychologia.2006.01.010>
- Icenogle, G., Steinberg, L., Olino, T. M., Shulman, E. P., Chein, J., Alampay, L. P., . . . Uribe Tirado, L. M. (2016). Puberty predicts approach but not avoidance on the Iowa gambling task in a multinational sample. *Child Development*, 88, 1598–1614. <http://dx.doi.org/10.1111/cdev.12655>
- Imada, T., Carlson, S. M., & Itakura, S. (2013). East–West cultural differences in context-sensitivity are evident in early childhood. *Developmental Science*, 16, 198–208. <http://dx.doi.org/10.1111/desc.12016>
- J. D. B v. North Carolina*, 564 U.S. 261 (2011).
- Lamm, B., Keller, H., Teiser, J., Gudi, H., Yovsi, R. D., Freitag, C., . . . Lohause, A. (2017). Waiting for the second treat: Developing culture-specific modes of self-regulation. *Child Development*, 89, e261–e277. <http://dx.doi.org/10.1111/cdev.12847>
- Lansford, J. E., & Bornstein, M. H. (2011). Parenting attributions and attitudes in diverse cultural contexts: Introduction to the special issue. *Parenting*, 11, 87–101. <http://dx.doi.org/10.1080/15295192.2011.585552>
- LeCuyer, E. A., & Zhang, Y. (2015). An integrative review of ethnic and cultural variation in socialization and children's self-regulation. *Journal of Advanced Nursing*, 71, 735–750. <http://dx.doi.org/10.1111/jan.12526>
- Linares, R., Bajo, M. T., & Pelegrina, S. (2016). Age-related differences in working memory updating components. *Journal of Experimental Child Psychology*, 147, 39–52. <http://dx.doi.org/10.1016/j.jecp.2016.02.009>
- Luna, B., Garver, K. E., Urban, T. A., Lazar, N. A., & Sweeney, J. A. (2004). Maturation of cognitive processes from late childhood to adulthood. *Child Development*, 75, 1357–1372. <http://dx.doi.org/10.1111/j.1467-8624.2004.00745.x>
- Ma, X., Tamir, M., & Miyamoto, Y. (2018). A socio-cultural instrumental approach to emotion regulation: Culture and the regulation of positive emotions. *Emotion*, 18, 138–152. <http://dx.doi.org/10.1037/emo0000315>
- Malloy, L. C., Shulman, E. P., & Cauffman, E. (2014). Interrogations, confessions, and guilty pleas among serious adolescent offenders. *Law and Human Behavior*, 38, 181–193. <http://dx.doi.org/10.1037/lhb0000065>
- Matsumoto, D., Yoo, S. H., Fontaine, J., Anguas-Wong, A. M., Arriola, M., Ataca, B., . . . Grossi, E. (2008). Mapping expressive differences around the world: The relationship between emotional display rules and individualism versus collectivism. *Journal of Cross-Cultural Psychology*, 39, 55–74. <http://dx.doi.org/10.1177/0022022107311854>
- Mayhew, D. R., Fields, M., & Simpson, H. M. (2000). *Why 16?* Retrieved from <http://www.iihs.org/frontend/iihs/documents/masterfiledocs.ashx?id=1261>
- Migration Policy Institute. (2018). *Frequently requested statistics on immigrants and immigration in the United States*. Retrieved from <https://www.migrationpolicy.org/>
- Miller v. Alabama*, 132 S. Ct. 2455 (2012).
- Miyamoto, Y., & Ma, X. (2011). Dampening or savoring positive emotions: A dialectical cultural script guides emotion regulation. *Emotion*, 11, 1346–1357.
- Muthén, B., & Asparouhov, T. (2014). IRT studies of many groups: The alignment method. *Frontiers in Psychology*, 5, 978.
- Muthén, L. K., & Muthén, B. O. (1998–2010). *Mplus user's guide*. Sixth edition. Los Angeles, CA: Author.
- Ohmura, Y., Takahashi, T., Kitamura, N., & Wehr, P. (2006). Three-month stability of delay and probability discounting measures. *Experimental and Clinical Psychopharmacology*, 14, 318–328. <http://dx.doi.org/10.1037/1064-1297.14.3.318>
- Peters, E., & Slovic, P. (2000). The springs of action: Affective and analytical information processing in choice. *Personality and Social Psychology Bulletin*, 26, 1465–1475. <http://dx.doi.org/10.1177/01461672002612002>
- Prencipe, A., Kesek, A., Cohen, J., Lamm, C., Lewis, M. D., & Zelazo, P. D. (2011). Development of hot and cool executive function during the transition to adolescence. *Journal of Experimental Child Psychology*, 108, 621–637. <http://dx.doi.org/10.1016/j.jecp.2010.09.008>
- Preston, C. B., & Crowther, B. T. (2012). Infancy doctrine inquiries. *Santa Clara Law Review*, 52, 47–80.
- Psychological Corporation. (1999). *Wechsler Abbreviated Scale of Intelligence*. San Antonio, TX: Psychological Corporation.
- Quinn, P. D., & Harden, K. P. (2013). Differential changes in impulsivity and sensation seeking and the escalation of substance use from adolescence to early adulthood. *Development and Psychopathology*, 25, 223–239. <http://dx.doi.org/10.1017/S0954579412000284>
- Redlich, A. D., & Shteynberg, R. V. (2016). To plead or not to plead: A comparison of juvenile and adult true and false plea decisions. *Law and Human Behavior*, 40, 611–625. <http://dx.doi.org/10.1037/lhb0000205>
- Romer, D., Duckworth, A. L., Sznitman, S., & Park, S. (2010). Can adolescents learn self-control? Delay of gratification in the development of control over risk taking. *Prevention Science*, 11, 319–330. <http://dx.doi.org/10.1007/s11121-010-0171-8>
- Roper v. Simmons*, 543 U.S. 551 (2005).
- Rossier, J., Aluja, A., García, L. F., Angleitner, A., De Pascalis, V., Wang, W., . . . Zuckerman, M. (2007). The cross-cultural generalizability of Zuckerman's alternative five-factor model of personality. *Journal of Personality Assessment*, 89, 188–196. <http://dx.doi.org/10.1080/00223890701468618>
- Schiraldi, V., Western, B., & Bradner, K. (2015). Community-based responses to justice-involved young adults. *New Thinking in Community Corrections Bulletin*. Washington: U.S. Department of Justice, National Institute of Justice.
- Scott, E. S. (2000). The legal construction of adolescence. *Hofstra Law Review*, 29, 547–598.
- Scott, E. S., Bonnie, R. J., & Steinberg, L. (2016). Young adulthood as a transitional legal category: Science, social change, and justice policy. *Fordham Law Review*, 85, 101–127.
- Scott, E. S., Reppucci, N. D., & Woolard, J. L. (1995). Evaluating adolescence decision making in legal contexts. *Law and Human Behavior*, 19, 221–244. <http://dx.doi.org/10.1007/BF01501658>
- Scott, E., & Steinberg, L. (2008). *Rethinking juvenile justice*. Cambridge, MA: Harvard University Press.
- Shallice, T. (1982). Specific impairments of planning. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 298, 199–209. <http://dx.doi.org/10.1098/rstb.1982.0082>

- Shulman, E. P., Harden, K. P., Chein, J. M., & Steinberg, L. (2014). The development of impulse control and sensation-seeking in adolescence: Independent or interdependent processes? *Journal of Research on Adolescence*, *26*, 37–44. <http://dx.doi.org/10.1111/jora.12181>
- Steinberg, L. (2014). *Age of opportunity: Lessons from the new science of adolescence*. New York, NY: Houghton Mifflin Harcourt Publishing Company.
- Steinberg, L. (2017). Adolescent brain science and juvenile justice policymaking. *Psychology, Public Policy, and Law*, *23*, 410–420. <http://dx.doi.org/10.1037/law0000128>
- Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Developmental Psychology*, *44*, 1764–1778. <http://dx.doi.org/10.1037/a0012955>
- Steinberg, L., & Cauffman, E. (1996). Maturity of judgment in adolescence: Psychosocial factors in adolescents decision making. *Law and Human Behavior*, *20*, 249–272. <http://dx.doi.org/10.1007/BF01499023>
- Steinberg, L., Cauffman, E., Woolard, J., Graham, S., & Banich, M. (2009a). Are adolescents less mature than adults?: Minors' access to abortion, the juvenile death penalty, and the alleged APA "flip-flop." *American Psychologist*, *64*, 583–594. <http://dx.doi.org/10.1037/a0014763>
- Steinberg, L., Cauffman, E., Woolard, J., Graham, S., & Banich, M. (2009b). Reconciling the complexity of human development with the reality of legal policy: Reply to Fischer, Stein, and Heikkinen (2009b). *American Psychologist*, *64*, 601–604. <http://dx.doi.org/10.1037/a0017246>
- Steinberg, L., Graham, S., O'Brien, L., Woolard, J., Cauffman, E., & Banich, M. (2009c). Age differences in future orientation and delay discounting. *Child Development*, *80*, 28–44. <http://dx.doi.org/10.1111/j.1467-8624.2008.01244.x>
- Steinberg, L., & Monahan, K. C. (2007). Age differences in resistance to peer influence. *Developmental Psychology*, *43*, 1531–1543. <http://dx.doi.org/10.1037/0012-1649.43.6.1531>
- Steinberg, L., Icenogle, G., Shulman, E. P., Breiner, K., Chein, J., Bacchini, D., . . . Takash, H. M. S. (2017). Around the world, adolescence is a time of heightened sensation seeking and immature self-regulation. *Developmental Science*, *21*, e12532. <http://dx.doi.org/10.1111/desc.12532>
- Thompson-Schill, S. L., Jonides, J., Marshuetz, C., Smith, E. E., D'Esposito, M., Kan, I. P., . . . Swick, D. (2002). Effects of frontal lobe damage on interference effects in working memory. *Cognitive, Affective & Behavioral Neuroscience*, *2*, 109–120. <http://dx.doi.org/10.3758/CABN.2.2.109>
- Thorell, L. B., Veleiro, A., Siu, A. F. Y., & Mohammadi, H. (2013). Examining the relation between ratings of executive functioning and academic achievement: Findings from a cross-cultural study. *Child Neuropsychology*, *19*, 630–638. <http://dx.doi.org/10.1080/09297049.2012.727792>
- Vazsonyi, A. T., & Ksinan, A. J. (2017). Understanding deviance through the dual systems model: Converging evidence for criminology and developmental sciences. *Personality and Individual Differences*, *111*, 58–64. <http://dx.doi.org/10.1016/j.paid.2017.01.030>
- Viljoen, J. L., Zapf, P. A., & Roesch, R. (2007). Adjudicative competence and comprehension of Miranda rights in adolescent defendants: A comparison of legal standards. *Behavioral Sciences & The Law*, *25*, 1–19. <http://dx.doi.org/10.1002/bsl.714>
- Wang, Z., Devine, R. T., Wong, K. K., & Hughes, C. (2016). Theory of mind and executive function during middle childhood across cultures. *Journal of Experimental Child Psychology*, *149*, 6–22. <http://dx.doi.org/10.1016/j.jecp.2015.09.028>
- Weithorn, L. A., & Campbell, S. B. (1982). The competency of children and adolescents to make informed treatment decisions. *Child Development*, *53*, 1589–1598. <http://dx.doi.org/10.2307/1130087>
- Williams, A. F. (1999). Graduated licensing comes to the United States. *Injury Prevention*, *5*, 133–135. <http://dx.doi.org/10.1136/ip.5.2.133>
- Woolard, J., & Scott, E. (2009). The legal regulation of adolescence. In R. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (3rd ed., Vol. 2, pp. 345–371). New York, NY: Wiley.
- World Health Organization. (2014). *Considerations regarding consent in vaccinating children and adolescents between 6 and 17 years old*. Retrieved from http://www.who.int/immunization/programmes_systems/policies_strategies/consent_note
- Zottoli, T. M., Daftary-Kapur, T., Winters, G. M., & Hogan, C. (2016). Plea discounts, time pressures, and false-guilty pleas in youth and adults who pleaded guilty to felonies in New York City. *Psychology, Public Policy, and Law*, *22*, 250–259. <http://dx.doi.org/10.1037/law0000095>

Received February 25, 2018

Revision received November 2, 2018

Accepted November 2, 2018 ■

EXHIBIT 31

Juvenile Justice Center

American Bar Association

740 15th Street, NW Washington, DC 20005 • 202.662.1506 • juvjus@abanet.org • www.abanet.org/crimjust/juvjus



January 2004

Cruel and Unusual Punishment: The Juvenile Death Penalty **Adolescence, Brain Development and Legal Culpability**

"[They] frequently know the difference between right and wrong and are competent to stand trial. Because of their impairments, however, by definition they have diminished capacities to understand and process mistakes and learn from experience, to engage in logical reasoning, to control impulses, and to understand the reactions of others.... Their deficiencies do not warrant an exemption from criminal sanctions, but they do diminish their personal culpability."

Atkins v. Virginia, 536 U.S. 304, 318,
 122 S.Ct. 2242, 2250 (2002)

In 2002, the U.S. Supreme Court banned the execution of mentally retarded persons. This decision, *Atkins v. Virginia*, cited the underdeveloped mental capacities of those with mental retardation as a major factor behind the Justices' decision.

Adolescence is a transitional period during which a child is becoming, but is not yet, an adult. An adolescent is at a crossroads of changes where emotions, hormones, judgment, identity and the physical body are so in flux that parents and even experts struggle to fully understand.

As a society, we recognize the limitations of adolescents and, therefore, restrict their privileges to vote, serve on a jury, consume alcohol, marry, enter into contracts, and even watch movies with mature content. Each year, the United States spends billions of dollars to promote drug use prevention and sex education to protect youth at this vulnerable stage of life. When it comes to the death penalty, however, we treat them as fully functioning adults.

The Basics of the Human Brain

The human brain has been called the most complex three-pound mass in the known universe. This is a well deserved reputation, for this organ contains billions of connections among its parts and governs countless actions, involuntary and voluntary, physical, mental and emotional.

The largest part of the brain is the *frontal lobe*. A small area of the frontal lobe located behind the forehead, called the *prefrontal cortex*, controls the brain's most advanced functions. This

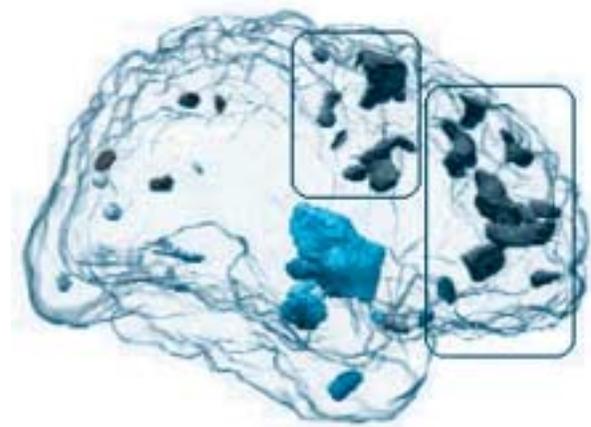
part, often referred to as the "CEO" of the body, provides humans with advanced cognition. It allows us to prioritize thoughts, imagine, think in the abstract, anticipate consequences, plan, and control impulses.

Along with everything else in the body, the brain changes significantly during adolescence. In the last five years, scientists, using new technologies, have discovered that adolescent brains are far less developed than previously believed.

New Technology, New Discoveries

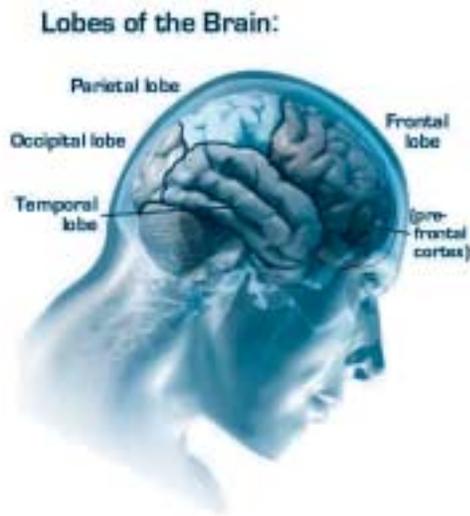
Scientists are now utilizing advances in magnetic resonance imaging (MRI) to create and study three-dimensional images of the brain without the use of radiation (as in an x-ray). This breakthrough allows scientists to safely scan children over many years, tracking the development of their brains.¹

Researchers at Harvard Medical School, the National Institute of Mental Health, UCLA, and others, are collaborating to "map" the development of the brain from childhood to adulthood and examine its implications.



A three dimensional "map" showing portions of gray matter "pruned" from the brain between adolescence and adulthood. The dark portions in the two boxes indicate sections that will be discarded from the **frontal lobe**. The box on the far right indicates the **prefrontal cortex**, a subsection of the frontal lobe that controls judgment.

Image adapted from *Nature Neuroscience*.



©2002 Hybrid Medical Animation

The scientists, to their surprise, discovered that the teenage brain undergoes an intense overproduction of *gray matter* (the brain tissue that does the “thinking”). Then a period of “pruning” takes over, during which the brain discards gray matter at a rapid rate.² This process is similar to pruning a tree: cutting back branches stimulates health and growth.

In the brain, pruning is accompanied by *myelination*, a process in which *white matter* develops. White matter is fatty tissue that serves as insulation for the brain’s circuitry, making the brain’s operation more precise and efficient.³

Researchers have carefully scrutinized the pace and severity of these changes and have learned that they continue into a person’s early 20s. Dr. Elizabeth Sowell, a member of the UCLA brain research team, has led studies of brain development from adolescence to adulthood. She and her colleagues found that the frontal lobe undergoes far more change during adolescence than at any other stage of life.⁴ It is also the last part of the brain to develop, which means that even as they become fully capable in other areas, adolescents cannot reason as well as adults: “[m]aturation, particularly in the frontal lobes, has been shown to correlate with measures of cognitive functioning.”⁵

Biology and Behavior

Jay Giedd, a researcher at the National Institute of Mental Health, explains that during adolescence the “part of the brain that is helping organization, planning and strategizing is not done being built yet.... It’s sort of unfair to expect [adolescents] to have adult levels of organizational skills or decision making before their brain is finished being built.”⁶

Dr. Deborah Yurgelun-Todd of Harvard Medical School has studied the relation between these new findings and teen behavior and concluded that adolescents often rely on emotional parts

of the brain, rather than the frontal lobe. She explains, “one of the things that teenagers seem to do is to respond more strongly with gut response than they do with evaluating the consequences of what they’re doing.”⁷

Also, appearances may be deceiving: “Just because they’re physically mature, they may not appreciate the consequences or weigh information the same way as adults do. So we may be mistaken if we think that [although] somebody looks physically mature, their brain may in fact not be mature.”⁸

This discovery gives us a new understanding into juvenile delinquency. The frontal lobe is “involved in behavioral facets germane to many aspects of criminal culpability,”⁹ explains Dr. Ruben C. Gur, neuropsychologist and Director of the Brain Behavior Laboratory at the University of Pennsylvania. “Perhaps most relevant is the involvement of these brain regions in the control of aggression and other impulses.... If the neural substrates of these behaviors have not reached maturity before adulthood, it is unreasonable to expect the behaviors themselves to reflect mature thought processes.

“The evidence now is strong that the brain does not cease to mature until the early 20s in those relevant parts that govern impulsivity, judgment, planning for the future, foresight of consequences, and other characteristics that make people morally culpable.... Indeed, age 21 or 22 would be closer to the ‘biological’ age of maturity.”¹⁰

Other Changes in the Body

In addition to the profound physical changes of the brain, adolescents also undergo dramatic hormonal and emotional changes. One of the hormones which has the most dramatic effect on the body is testosterone. Testosterone, which is closely associated with aggression, increases tenfold in adolescent boys.¹¹

“Just because they’re physically mature, they may not appreciate the consequences or weigh information the same way as adults do. So, [although] somebody looks physically mature, their brain may in fact not be mature.”

Deborah Yurgelun-Todd, PhD
Brain Imaging Laboratory,
McClean Hospital
Harvard University Medical School

Emotionally, an adolescent “is really both part child and part adult,”¹² explains Melvin Lewis, an expert in child psychiatry and pediatrics at Yale University School of Medicine. Normal development at this time includes self-searching, during which the adolescent tries to grow out of his or her childlike self. This change is complicated by the conflict between an adolescent’s new sense of adult identity and remaining juvenile insecurities.

The behaviors associated with this process include self-absorption, a need for privacy, mood swings, unique dress, and escapism, such as video games, music, and talking on the phone, as well as riskier behaviors, such as drug use or sexual activity.¹³

Childhood Abuse and Violence

In addition to this context of change and volatility, research shows that abusive childhood experiences can trigger violent behavior. The American Academy of Pediatrics has identified several risk factors that can spark violence in adolescents, including being witness to domestic violence or substance abuse within the family, being poorly or inappropriately supervised, and being the victim of physical or sexual assault.¹⁴

Researcher Phyllis L. Crocker of Cleveland-Marshall College of Law has written that “the nexus between poverty, childhood abuse and neglect, social and emotional dysfunction, alcohol and drug abuse and crime is so tight in the lives of many capital defendants as to form a kind of social historical profile.”¹⁵

“The evidence now is strong that the brain does not cease to mature until the early 20s in those relevant parts that govern impulsivity, judgment, planning for the future, foresight of consequences, and other characteristics that make people morally culpable....”

Ruben Gur, MD, PhD
Director, University of
Pennsylvania Medical Center

Dr. Chris Mallett, Public Policy Director at Bellefaire Jewish Children’s Bureau in Ohio, recently completed the most comprehensive study of traumatic experiences in the lives of death row juvenile offenders to date.¹⁶ He found that:

- 74% experienced family dysfunction¹⁷
- 60% were victims of abuse and/or neglect¹⁸
- 43% had a diagnosed psychiatric disorder¹⁹
- 38% suffered from substance addictions²⁰
- 38% lived in poverty²¹

More than 30% of death row juvenile offenders had experienced six or more distinct areas of childhood trauma with an overall average of four such experiences per offender. Most children and adolescents do not face even one of these defined areas of difficulty.²² Mallett also found that such mitigating evidence was presented to juries in fewer than half of the offenders’ trials.²³

Mallett’s research confirmed findings in previous studies. In 1992, researchers found that two-thirds of all juveniles sentenced to death had backgrounds of abuse, psychological disorders, low IQ, indigence, and/or substance abuse.²⁴



Dr. Jay Giedd of the National Institute of Mental Health. Image courtesy of PBS Frontline report *Inside the Teenage Brain*.

In 1987, an investigation into 14 juveniles on death row²⁵ (40% of the total at the time) revealed that nine had major neuropsychological disorders²⁶ and seven had psychotic disorders since early childhood.²⁷ All but two had IQ scores under 90.²⁸ Only three had average reading abilities, and another three had learned to read only after arriving on death row.²⁹ Twelve reported having been physically or sexually abused, including five who were sodomized by relatives.³⁰

Delinquency Link

The turmoil often associated with adolescence can result in poor decisions and desperate behaviors. For example, studies have found that 20 to 30% of high school students consider suicide. Suicide is the third-leading cause of death among teenagers, occurring once every two hours, or over 4,000 times a year, according to the U.S. Surgeon General.³¹ Approximately 30% of youths reported using an illicit drug at least once during their lifetime, and 22.2% reported using an illicit drug within the past year.³²

Conclusion

New discoveries provide scientific confirmation that the teen years are a time of significant transition. They shed light on the mysteries of adolescence and demonstrate that adolescents have significant neurological deficiencies that result in stark limitations of judgment. Research suggests that when compounded with risk factors (neglect, abuse, poverty, etc.), these limitations can set the psychological stage for violence.

These discoveries support the assertion that adolescents are less morally culpable for their actions than competent adults and are more capable of change and rehabilitation. The ultimate punishment for minors is contrary to the idea of fairness in our justice system, which accords the greatest punishments to the most blameworthy.

This fresh understanding of adolescence does not excuse juvenile offenders from punishment for violent crime, but it clearly lessens their culpability. This concept is not new; it is why we refer to those under 18 as “minors” and “juveniles”—because, in so many respects, they are *less than adult*.

American Bar Association Juvenile Justice Center

Notes

¹ For an excellent overview, see Elkhonon Goldberg, *The Executive Brain: Frontal Lobes and the Civilized Mind*, Oxford University Press (2001).

² Sowell, Elizabeth R, Paul M. Thompson, Colin J. Holems, Terry L. Jernigan and Arthur W. Toga. *In vivo evidence for post-adolescent brain maturation in frontal and striatal regions*. 2 *Nature Neuroscience* 10 (1999), also Paus, Tomas, Jay Giedd, et. al. *Structural maturation of neural pathways in children and adolescents: in vivo study*. *Science*, 283 (1999).

³ *Id.*

⁴ *Id.*

⁵ Sowell, Elizabeth R, Paul M. Thompson, Kevin D. Tessner and Arthur W. Toga. *Mapping continued brain growth and gray matter density reduction in dorsal frontal cortex: inverse relationships during postadolescent brain maturation*, 21 *Journal of Neuroscience* 22 (2001), at 8819, also Reiss, A.L., et. al., *Brain development, gender and IQ in children, a volumetric imaging study*. *Brain*, 119 (1996).

⁶ PBS Frontline, *Inside the Teen Brain*. See *Interview with Jay Giedd*, online at www.pbs.org/wgbh/pages/frontline/shows/teenbrain/.

⁷ *Id.*, at *Interview with Deborah Yurgelun-Todd*.

⁸ *Id.*

⁹ Gur, Ruben C. Declaration of Ruben C. Gur., PhD, *Patterson v. Texas*. Petition for Writ of Certiorari to US Supreme Court, J. Gary Hart, Counsel. (Online at: www.abanet.org/crimjust/juvjus/patterson.html)

¹⁰ *Id.*

¹¹ See Adams, Gerald R., Raymond Montemayor, and Thomas P. Gullota, eds. *Psychosocial Development during Adolescence*. Thousand Oaks, CA, Sage Publications (1996).

¹² Lewis, Melvin. *Child and Adolescent Psychiatry: A comprehensive textbook*, Lippincott Williams and Wilkins (2002).

¹³ See *id.*, and Cobb, Nancy J. *Adolescence: Continuity, Change and Diversity*. Mayfield Publishing, CA (1998).

¹⁴ American Society of Pediatrics, *Policy Statement*, 1 *Pediatrics*, 103 (1999).

¹⁵ Phyllis L. Crocker. *Childhood Abuse and Adult Murder: Implications for the Death Penalty*, 77 *NC L. Rev.* 1143 (1999).

¹⁶ Mallett, Chris. *Socio-Historical Analysis of Juvenile Offenders on Death Row*, 3 *Juv. Corr. Mental Health Report* 65 (2003).

¹⁷ *Id.*, at 77.

¹⁸ *Id.*, at 78.

¹⁹ *Id.*, at 77.

²⁰ *Id.*, at 78.

²¹ *Id.*

²² *Id.*

²³ *Id.*

²⁴ Robinson, DA and Stephens, OH; *Patterns of mitigating factors in juvenile death penalty cases*, 3 *Criminal Law Bulletin* 28 (1992).

²⁵ Lewis, DO, Pincus, Bard, Richardson, Prichep, Feldman, Yeager. *Neuropsychiatric, psychoeducational, and family characteristics of 14 juveniles condemned to death in the United States*, 5 *Am. J. of Psychiatry* 145 (1988).

²⁶ *Id.*

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.*

³¹ Office of the U.S. Surgeon General, *At a Glance, Suicide Among the Young*: Online at www.surgeongeneral.gov/library/calltoaction/fact3.htm

³² White House Office of National Drug Control Policy, *Juveniles and Drugs*, at www.whitehousedrugpolicy.gov/drugfact/juveniles/index.html

This publication was supported in part by a grant from the Soros Justice Fellowship of the Open Society Institute. By Adam Ortiz.



EXHIBIT 32



Firearms on College Campuses: Research Evidence and Policy Implications

Prepared by

Daniel W. Webster, ScD, MPH

John J. Donohue III, PhD, JD

Louis Klarevas, PhD

Cassandra K. Crifasi, PhD, MPH

Jon S. Vernick, JD, MPH

David Jernigan, PhD

Holly C. Wilcox, PhD

Sara B. Johnson, PhD, MPH

Sheldon Greenberg, PhD

Emma E. McGinty, PhD, MS

October 15, 2016

Corresponding Author:

Daniel W. Webster, ScD, MPH

Johns Hopkins Center for Gun Policy and Research

Johns Hopkins Bloomberg School of Public Health

624 N. Broadway, Rm. 593

Baltimore, MD 21205

410-955-0440

dwebster@jhu.edu

Executive Summary

Restrictions on legal gun owners carrying firearms in public places have been removed or greatly weakened in most states over the past three decades. Colleges and universities, however, have been locations that have commonly been allowed to prohibit otherwise legal gun carriers from bringing guns onto campuses. This exception, however, has recently begun to change. Eight states now have laws that, generally, allow individuals who can legally carry guns elsewhere to bring guns onto college campuses. In 24 states, colleges and universities have the authority to allow or forbid civilians from having firearms on their campuses. A number of additional states considered new laws relevant to carrying firearms on college campuses during their 2015-2016 legislative sessions.

This report reviews the evidence surrounding the relationship between civilian gun carrying and violent crime and mass shootings and factors that are unique to public safety on college campuses. Policies removing restrictions on civilian gun carrying are based on claims or assumptions about civilian gun use, the impact of state Right-to-Carry (RTC) laws, and the nature of mass shootings that are not supported by or are contrary to the best available research. The incidence of civilian self-defensive gun use (SDGU) is difficult to discern as available data are based on self-report, and distinguishing aggressor from victim in interpersonal altercations can be highly subjective. Nonetheless, data from the National Crime Victimization Survey indicate that SDGU is relatively rare (about 102,000 self-reported incidents per year affecting 0.9% of all violent crime victimizations) and is no more effective in reducing victims' risk of injury than other victim responses to attempted violent crimes. Research led by John Lott, author of *More Guns, Less Crime*, suggesting that RTC laws prevent violent crime has important flaws that biased his findings. The most recent and rigorous research on RTC laws that corrects for these flaws consistently finds that RTC laws are associated with *more* violent crime. These findings may seem counterintuitive because concealed-carry permit holders have, as a group, low rates of criminal offending and must pass a background check to ensure that they do not have any condition, such as a felony conviction, that prohibits firearm ownership. But, in states with low standards for legal gun ownership, legal gun owners account for the majority of persons incarcerated for committing violent crimes with firearms.

As mass shootings and casualties from those shootings have risen sharply over the past decade, one rationale for allowing more civilians to carry firearms, both on and off college campuses, is to avert rampage shootings or stop rampage shooters before additional victims are shot. Central to these arguments are the notions that "gun-free" zones attract individuals set on mass murder and that armed civilians frequently thwart or interrupt such shootings. New research on mass shootings involving six or more victims murdered that occurred in the United States from 1966 to through June 2016 contradicts these claims. Only 12% of these shootings took place, in whole or in part, in a truly gun-free zone (no armed security or police or armed civilians) and 5% in a gun-restricting zone (civilian gun possession prohibited). A separate study of mass shootings involving four or more fatalities, that included domestic incidents during 2009-2015, found that only 13% occurred in a gun-free or gun-restricting zone. Successful civilian uses of guns to stop a mass shooting were incredibly rare and about as common as armed civilians being shot while attempting to respond to mass shooting incidents. Furthermore, the data show no evidence that RTC laws – which, it is argued, lead to more armed citizens ready to defend against a mass shooting – reduce mass shootings or the number of people shot in those incidents.

This report also reviews research relevant to the unique context of college campuses, especially student demographics and characteristics, and the implications for increased access to firearms among college students. Late adolescence and early adulthood is marked by increases in a variety of risky behaviors including violence, binge drinking, and drug abuse. Binge drinking, a common behavior among college students, especially elevates risks for involvement in violent altercations. Risky decision-making in adolescence and early adulthood is due, in part, to on-going brain development during that stage of life that can compromise emotional and behavioral regulation, impulse control, and judgment – all of which are essential for avoiding the circumstances in which firearm access leads to tragedy. Age-specific homicide offending peaks around the age when youth reach the minimum legal age for purchasing, possessing, and carrying handguns (19-21 years).

Suicidal behavior that leads to death or hospital treatment peaks at age 16, but remains high through age 25, covering the age span of most college students. Mental illnesses, such as depression, that commonly emerge during adolescence and young adulthood, coupled with restricted impulse control and the stressors that many college students experience, increases the risk of suicidal behavior among college students. Research demonstrates that access to firearms substantially increases suicide risks, especially among adolescents and young adults, as firearms are the most common method of lethal self-harm.

Proposals to allow guns on college campuses must consider the fact that serious assaults and suicide attempts – which are more likely to be lethal when firearms are present – are far more common than are the rampage shooting incidents that the policies are purported to prevent. Inserting more firearms into those assaults and suicide attempts by allowing more people to have firearms on campuses is likely to lead to more deaths and serious injuries. A recent study identified 85 incidents of shootings or undesirable discharges of firearms on college campuses in the U.S. from January 2013 through June 2016. Only two of these 85 incidents (2.4%) involved a shooter on a rampage. The most common incidents were interpersonal disputes that escalated into gun violence (45%), premeditated acts of violence against an individual (12%), suicides or murder/suicides (12%), and unintentional shootings or discharges (9%). Campus police much more commonly respond to a variety of violent and non-violent incidents than to rampage shootings. If those campus officers must assume that any given student is armed, this may compromise their ability to effectively respond to, and de-escalate, these incidents.

In summary, available data indicate that policies that allow individuals to bring firearms onto college campuses are unlikely to lead to fewer mass shootings or fewer casualties from those shootings. Mass shootings are a growing concern, but are still very rare events. Increasing gun availability in campus environments could make far more common acts of aggression, recklessness, or self-harm more deadly and, thus, have a deleterious impact on the safety of students, faculty, and staff.

Aims of this Report

The purpose of this report is to review relevant research and implications associated with policies that allow the carrying of firearms on college and university campuses. During the past 30 years, a growing number of states have passed laws that make it easier for civilians to legally carry loaded firearms in public places. However, even as more states adopted so-called right-to-carry (RTC) laws, these laws generally set aside certain places such as bars, courthouses, schools, and college campuses where gun carrying is prohibited or that allowed businesses or institutions to declare that civilians are not allowed to bring firearms onto their premises. Deregulation of civilian gun carrying has accelerated in recent years in many states including new laws that allow or require state colleges and universities to allow those who can legally carry firearms in public to bring guns onto college campuses.

Policies that allow civilians who are not explicitly prohibited from carrying firearms in public to carry concealed loaded firearms onto college campuses are based, in part, on beliefs that such policies with enhance campus safety including reducing risks of mass shootings. Because there have been no formal evaluations of policies to allow guns on college campuses – many of these policies are relatively new – we sought to summarize research relevant to civilian use of guns, the impact of RTC laws on violent crime and mass shootings, and common patterns in public mass shootings to determine how well available research aligns with the assumptions underlying policies to allow civilians to bring guns onto college and university campuses. We also sought to summarize research that is relevant to the potential increased firearm access among college students and the college campus environment.

Relevant Law Governing Guns on College Campuses

In the United States, laws regulating the purchase, possession, and carrying of firearms -- including on college or university campuses -- may originate at the federal, state, or local levels. Federal law is primarily codified as part of the Gun Control Act of 1968 and its amendments.¹ The Gun Control Act specifically includes language stating that Congress does not intend the Act to preclude state gun laws unless there is a "direct and positive conflict" between federal and state law. As a result, federal law acts as a "floor" -- imposing minimum standards applicable everywhere -- rather than as a ceiling for U.S. gun laws.²

One federal law, the Gun Free School Zones Act, forbids the carrying of firearms in school zones -- subject to certain exceptions.³ A "school," however, is defined as one "which provides elementary or secondary education, as determined under state law."⁴ As a result, colleges and universities are not covered by this federal law.

Most U.S. law regulating the carrying of firearms originates at the state level. Every U.S. state permits the carrying of weapons, either concealed or open, under some circumstances. These laws establish the terms under which a lawful gun owner may obtain a carry permit as well as the places and circumstances in which the gun may be carried. For example, these laws may allow or forbid carrying of firearms in places that serve alcohol, churches, or college and university campuses. (See the section of this report devoted to concealed carrying permit research for more information about these laws).

Localities within a state may sometimes also enact their own gun laws. However, since the late 1980s, many states have enacted firearm preemption laws forbidding localities from enacting some or all types of gun laws. Today, more than 40 states forbid localities from enacting most types of gun laws.

In fact, just five states generally allow local regulation of guns: Connecticut, Hawaii, Massachusetts, Illinois, and New York.⁵ Even in these states which lack express preemption of local firearm laws, some local laws may nevertheless be deemed subject to implied preemption if a court determines that existing state law evidences an intent by the legislature to occupy the field of regulation or if the local law would otherwise conflict with state law. Therefore, local law plays little role in regulating carrying of firearms on college or university campuses.

According to the National Conference of State Legislatures, eighteen states currently ban carrying a concealed weapon on campus. In twenty-four states, individual institutions have the power to allow or forbid firearm carrying on campus. In the remaining eight states, firearms must generally be allowed on campus. In addition, during the 2015-2016 state legislative sessions, similar laws were considered in other states. None have yet been enacted.⁶

College and university firearm restrictions have been the subject of several recent lawsuits brought by individuals or groups seeking the ability to carry guns on campus. The results of the lawsuits have been mixed, often based on the specific language of state law. In *Regents of the University of Colorado v. Students for Concealed Carry on Campus*, a student group brought a complaint in 2008 alleging that a University of Colorado policy forbidding the possession of firearms on campus violated a Colorado state law, the Concealed Carry Act (CCA) enacted in 2003.⁷ The CCA preempts localities from enacting their own laws regarding concealed carrying of handguns and allows concealed permit holders to carry their handgun anywhere not specifically excluded by the law. Public elementary, middle, and high schools are excluded but universities are not. In *Regents*, the Colorado Supreme Court concluded that the 2003 state law "divested the Board of Regents of its authority to regulate concealed handgun possession on campus."⁸

Similarly, in 2011 in *Oregon Firearms Educational Foundation v. Board of Education and Oregon University System*, the Oregon Court of Appeals concluded that an administrative rule promulgated by the State Board of Higher Education forbidding the possession of firearms on campus was preempted by a prior Oregon state law.⁹ The Oregon preemption law states, in part, that "the authority to regulate in any manner whatsoever the sale, acquisition, transfer, ownership, possession, storage, or use of firearms ... is vested solely in the Legislative Assembly." Because the carrying rule promulgated by the Board of Education had the force of administrative law, it was preempted by this language.

In 2006, the Supreme Court of Utah also struck down a University of Utah policy prohibiting students, faculty, and staff from carrying guns on campus. In *University of Utah v. Shurtleff*, the Court held that Utah's firearm preemption statute -- which specifically applied to "state institutions of higher education" -- was constitutional within the meaning of the Utah state constitution and prevented the University from enforcing its policy.¹⁰

By contrast, in at least two cases, courts have upheld a college or university's ability to ban the carrying or possession of firearms on campus. In *Florida Carry, Inc. v. University of Florida*, the plaintiffs argued that a Florida law permitting the possession of firearms in a person's home or business should supersede a different Florida law prohibiting firearms on school property (including colleges and universities). The plaintiffs argued that university dormitories were essentially the students' homes. The Court concluded that the law forbidding guns on university property should prevail despite a state preemption law.¹¹ In a related Florida case, however, a court concluded that a state university could not forbid the possession of a firearm in a vehicle parked on school property, as long as the gun was securely encased in the vehicle.¹² Finally, in *Digiacinto v. The Rector and Visitors of George Mason University*, a non-student but frequent visitor to the George Mason University campus challenged a

University rule forbidding firearms in campus buildings or at campus events. The Virginia Supreme Court concluded that the University policy violated neither state law nor the federal constitution.¹³

As these cases demonstrate, the outcomes are very fact and state law dependent. In addition, the case law may or may not address whether the campus or university policies violate the Second Amendment to the U.S. Constitution. In 2008, the U.S. Supreme Court, in *District of Columbia v. Heller*,¹⁴ concluded that a Washington, D.C. law essentially banning the possession of handguns by civilians in their homes violated the Second Amendment.¹⁵ However, the Supreme Court has yet to determine whether this right extends to carrying firearms in public.¹⁶

Table 1: Status of State Campus Carry Laws as of May 2016

STATE	BANS CONCEALED CARRY ON CAMPUS	ALLOWS CONCEALED CARRY ON CAMPUS	DECISION LEFT TO INSTITUTION
Alabama			√
Alaska			√
Arizona			√
Arkansas			√*
California	√		
Colorado		√	
Connecticut			√
Delaware			√
Florida	√		
Georgia	√		
Hawaii			√
Idaho		√	
Illinois	√		
Indiana			√
Iowa			√
Kansas		√****	
Kentucky			√
Louisiana	√		
Maine			√
Maryland			√
Massachusetts	√		
Michigan	√		
Minnesota			√
Mississippi		√	
Missouri	√		
Montana			√
Nebraska	√		
Nevada	√		
New Hampshire			√
New Jersey	√		
New Mexico	√		

STATE	BANS CONCEALED CARRY ON CAMPUS	ALLOWS CONCEALED CARRY ON CAMPUS	DECISION LEFT TO INSTITUTION
New York	√		
North Carolina	√		
North Dakota			√
Ohio	√		
Oklahoma			√
Oregon		√	
Pennsylvania			√
Rhode Island			√
South Carolina	√		
South Dakota			√
Tennessee	√*		
Texas		√**	
Utah		√	
Vermont			√
Virginia			√
Washington			√
West Virginia			√
Wisconsin		√***	
Wyoming	√		

Adapted from information provided by National Conference of State Legislatures, Guns on Campus: Overview. Available at: <http://www.ncsl.org/research/education/guns-on-campus-overview.aspx>.

* Certain faculty members may carry weapons on campus but not students or the public.

** Effective August 2016. Private institutions may still choose to ban concealed carry.

*** May prohibit weapons in specific buildings if appropriate signs are posted at every entrance.

**** Law takes effect in July 2017. Institutions may prohibit carrying in a campus building if all entrances have adequate security measures

Legal Context and the Potential for Armed Citizens to Reduce Casualties from Mass Shootings

John Lott, author of the book *More Guns, Less Crime*, popularized the notion that “gun free zones” invite mass shootings and contribute to the number of casualties from those events because there are no armed defenders to interrupt rampage shootings. Specifically, Lott purports that perpetrators of mass shootings intentionally seek out places where people are barred from carrying firearms in order to maximize casualties and minimize their risk of being shot. He claims that allowing civilians to legally carry loaded guns in public places increases the odds that an attempted rampage shooting will be interrupted and the number of casualties reduced; however, Lott’s claims are inconsistent with available evidence.¹⁷

The most prominent justification in support of campus-carry policies relates to the potential for armed civilians to intervene to reduce the carnage of active shootings. According to the advocates of allowing civilians to carry firearms on college campuses, some individuals considering perpetrating a mass shooting will be deterred from attacking places where they stand a likelihood of being confronted by private citizens carrying firearms. In instances when deterrence fails and attacks are initiated, campus-carry advocates claim that armed students and staff will be able to intervene and halt gun rampages and thereby minimize the number of victims killed or wounded in the attack.¹⁸

Below, we assess the evidence of the three underlying arguments for the campus-carry movement relevant to mass shootings. First, the occurrence and lethality of mass shootings is drastically reduced in so-called Right-to-Carry (RTC) jurisdictions.¹ Second, mass shootings occur almost exclusively in “gun-free zones,” where civilians are prohibited from carrying loaded firearms on their person. Third, when shooting rampages do occur, the active shooters are often stopped by armed civilians who confront the perpetrators.

As campus-carry is a relatively new phenomenon, there is little evidence that confirms or refutes the thesis specifically in the context of college campuses. However, there are several studies that assess the three underlying propositions that form the foundation of the campus-carry thesis. Examining each tenet individually offers valuable insights.

Right-to-Carry Firearm Laws Do Not Reduce Mass Shootings or Casualties from Such Shootings

Advocates for allowing civilians to bring guns onto college campuses and to deregulate carrying of guns in public places in general commonly cite research and statements by John Lott, an economist widely known for his claims that deregulating gun possession reaps significant reductions in violent crime.^{17,19} Lott supports his claims with data and analytic methods that others have consistently found to have important flaws. In the 2nd edition of *More Guns, Less Crime*, Lott reported to have assembled a dataset of all mass shootings in the United States from 1977 to 1997. He found that the adoption of RTC laws was associated with a 67% reduction in mass shootings, completely eliminating mass shootings within five years of enactment. He also claimed RTC laws led to a 75% reduction in deaths from such shootings and an 81% reduction in persons injured in these shootings. However, an independent team of researchers tried to reproduce Lott’s findings on RTC laws and mass shootings, and found no association between such laws and such shootings.²⁰

Lott’s claims pertaining to mass shootings and RTC laws are also inconsistent with evidence about mass shootings assembled in Louis Klarevas’s forthcoming book on the topic.²¹ Klarevas collected data on 111 high-fatality mass shootings (6 or more people murdered with a gun) from 1966 through 2015. He found that in the 41 states that currently have RTC laws or no regulation of concealed carrying of firearms for legal gun owners, the average death toll in high-fatality mass shootings *increased* following the implementation of a RTC law from a mean of 7.5 before to 8.4 after the law. Moreover, this pattern of over eight fatalities per incident, on average, held well after five years, contradicting Lott’s assertion that mass shootings stop occurring within five years of the enactment of RTC laws. When Klarevas expanded his data set to include all 50 states and the District of Columbia, the average death toll in gun massacres was slightly higher in states and years where RTC laws were in place (8.4) than in states and years where there were no RTC laws in place (8.0).

¹ Right-to-Carry (RTC) laws are those that remove discretion from law enforcement in issuing licenses to carry concealed firearms, provided that applicants are legally permitted to possess guns in their homes and meet any additional conditions, such as safety training. Laws of this type are also referred to as “Shall Issue” laws because law enforcement discretion is removed from the decision to issue the permits.

There is No Evidence that “Gun-Free Zones” Facilitate Mass Shootings

When John Lott’s book was reissued in its 3rd edition in 2010, he introduced a new concept that characterized places “where private citizens are not allowed to carry guns”: gun-free zones. He maintained that in locations where someone is bound to be armed, rampage gunmen will be thwarted. Further, he claimed that mass shooters—knowing they will face far less resistance in places where their potential victims are unarmed—consciously target gun-free zones. Unfortunately, the concept of a gun-free zone has never been properly defined. Initially, Lott described gun-free zones as locales “where private citizens are not allowed to carry guns.” Subsequently, Lott began embracing a looser conceptualization that deemed entire cities and counties to be gun-free zones, if they were extremely restrictive in issuing concealed-carry permits.²²

Another problem with the term “gun-free zone” relates to how proponents of unrestricted gun carrying define areas as gun free when there are law enforcement officers and armed security guards on the premises, though civilians are prohibited from carrying their personal firearms on site. Lott characterized military installations like Fort Hood and the Washington Navy Yard, which have been attacked by rampage gunmen, as gun free despite the presence of significant armed security personnel. The implication of this notion of “gun free” is that rampage shooters are only deterred by armed civilians, not by armed guards and law enforcement. But a bullet fired from a police officer’s firearm has similar stopping power to a bullet from a civilian’s firearm, and it is probably more likely to hit its intended target since security and law enforcement personnel are likely to be better trained and prepared to respond to a rampage shooting than is the average civilian gun carrier.

Sharpening definitions can alleviate the ambiguities and inconsistencies surrounding gun-free zones and their relationship to mass shootings. In Klarevas’s study of rampage shootings, he argues that it makes more sense to distinguish between truly gun-free zones – places where there are never armed personnel stationed on the property *and* private citizens are prohibited from being armed with personal firearms by law or appropriate notice – and “gun-restricting zones” – places where private citizens are barred from carrying personal firearms by law or appropriate notice, yet armed security is routinely present. Most military bases and college campuses are gun restricting, as they typically have armed guards and/or armed police on regular patrol, but prohibit civilians from bearing arms. To round out the possibilities, Klarevas identified “gun-allowing zones” as places where private civilians are not legally prohibited from carrying personal firearms.²¹

A review conducted by Klarevas of the 111 high-fatality mass shootings (six or more victims murdered) that occurred in the U.S. since 1966 found that only eighteen have taken place, in whole or in part, in a gun-free zone or gun-restricting zone. (Three of these eighteen incidents occurred, in part, in gun-allowing zones.) Of these eighteen high-fatality mass shootings in gun-free or gun-restricting zones, thirteen took place in bona fide gun-free zones. The remaining five incidents occurred in gun-restricting zones. Contrary to what Lott argues, 84% of all gun massacres occurred in whole or in part where there is no evidence that civilian guns were prohibited, and nearly 90% occurred in whole or in part in locations where civilian guns were allowed or there was armed security or law enforcement. These 111 incidents did not include the mass shooting of police officers in Dallas on July 7 that obviously occurred in a gun-allowing zone where there were numerous Dallas police officers, campus police, and civilians

openly carrying firearms. Among the wounded were two El Centro College police officers. These data do not suggest that gun-allowing zones deter gun massacres.ⁱⁱ

There is also little evidence that perpetrators of mass shootings intentionally seek out their targets based on whether or not civilians are prohibited from having guns. Most targets of mass shootings are directed at a specific person, group, or institution with whom the perpetrator has a grievance.²¹ Everytown for Gun Safety analyzed data on mass shootings using a slightly less conservative definition than that employed by Klarevas – four persons killed with a firearm, not including the shooter – for the period 2009-2015 and found that the majority (57%) of the incidents involved a shooter’s current or former intimate partner or family member. Seventy-one percent of the incidents occurred in a private dwelling and only 13% occurred in a public location that could qualify as a gun free or gun restricting zone.²³

Effective Neutralization of Active Shooters Requires Skills and Experience that Most Civilians Lack

There is an unsupported assumption of campus carry advocates that armed students or staff on campus will shoot accurately enough to stop the shooter in an active shooting incident without wounding or killing innocent victims. Shooting accurately and making appropriate judgments about when and how to shoot in chaotic, high-stress situations requires a high level of familiarity with tactics and the ability to manage stress under intense pressure. Shooting accuracy in such situations is influenced by distance, the opponent shooter’s actions, lighting, use of cover, type of gun, and more.²⁴ Ability to shoot accurately are also affected by heart rate, breathing, fatigue, and mental stress.²⁵

Effective and responsible use of a firearm under the conditions of an active shooting requires significant training. Yet most RTC laws require only that carry permit holders have weapon familiarity, perform basic range shooting and, in some cases, minimal crisis-shooting training to qualify to legally carry a gun. Of course, there are no training or performance requirements in states that do not require civilians to obtain a permit to carry concealed firearms. There is well-documented research citing the inaccuracy of police officers who use firearms in crisis encounters, although they receive extensive training and readiness preparation.²⁶ There is no reason to believe that college students, faculty and civilian staff will shoot accurately in active shooter situations when they have only passed minimal training requirements for a permit to carry. Generally, college and university students function at a high rate of mental and emotional stress, with over 50% reporting that they feel so depressed that it is difficult for them to function.²⁷

ⁱⁱ In addition to the July 7, 2016, mass shooting in Dallas, since January 1, 2015, there have been at least four mass public shootings (as defined by Lott) that occurred in gun-allowing zones: Christopher Harper-Mercer’s shooting spree that claimed nine lives at Umpqua Community College in Roseburg, Oregon; William Hudson’s rampage that claimed six lives at the Tennessee Colony campsite near Palestine, Texas; Syed Rizwan Farook and Tashfeen Malik’s attack that claimed fourteen lives at a holiday party being held at the Inland Regional Center in San Bernardino, California; and Jason Dalton’s murder spree that left six dead in Kalamazoo, Michigan. At two of the four locations (Umpqua and Inland)—and possibly at the other two locations—there were armed civilians present at the time of the shootings.

Legally Armed Citizens Very Rarely Successfully Intervene to Prevent or Interrupt Mass Shootings

One rationale for allowing guns on campus is that by increasing the number of armed civilians, you increase the ability of someone to effectively intervene with a gun to stop someone engaging in or attempting a mass shooting. Opponents of gun-free zones do not just argue that civilians carrying firearms can prevent mass shootings from occurring in the first place. They also maintain that, should deterrence fail, armed people will help reduce the bloodshed by neutralizing perpetrators before they can complete their rampages. In theory, this too sounds logical. Again, Lott is the source of this thesis. In particular, his central contribution to this debate is his effort to assemble an anecdotal compilation of thirty-one shootings since 1990 that involved armed civilians intervening and halting rampage gunmen from completing their objective of killing as many people as possible. Others have seized on his initiative, and the list of incidents now numbers 39.¹⁹

But there is one substantial problem with this list. When Klarevas scrutinized the specific instances where armed civilians purportedly intervened to end a mass shooting in progress, he found that, in reality, rarely did private citizens with personal guns stop rampages. Of the 39 incidents, the majority—22 incidents—did not involve mass-shooting scenarios. Instead, they were knife attacks, gun-brandishing episodes where the weapon was never fired, armed robberies where the criminals never tried to execute the customers present, and shootings that did not involve enough targeted victims to constitute a mass shooting. Seventeen of the 39 were actual mass-shooting situations. Out of this subset, the armed intervenor in six of these incidents was a law enforcement officer or armed security guard (not a private citizen). In two cases, armed civilians drew their weapons and helped detain the perpetrators, but only after the shootings had concluded. (Neither defender in these two incidents actually used his weapon to end the rampage.) In five shootings, the attempted defensive gun uses failed to stop the attacks, with the armed intervenors shot in three of these instances.^{28, 18, 29} Over a 26-year period, only four incidents that were actual rampage shootings in progress were terminated by the actions of an armed civilian.

An FBI study that examined 160 active shootings in the United States during 2000-2013 also provides reason to be suspect of claims that civilian defensive gun uses figure prominently in terminating ongoing gun rampages. FBI researchers found only one incident that involved an armed civilian intervening to end an attack in progress. The civilian in that incident (which is also one of the interventions cited by Klarevas) involved a U.S. Marine with a concealed-firearms license shooting a man attacking patrons in a Nevada bar. In another four incidents, the attacks were brought to an end when armed security guards shot the perpetrators. By contrast, the FBI found that 21 of the 160 active shooting incidents were interrupted when unarmed civilians confronted and restrained the gunmen. The FBI's data suggest that unarmed civilians are more than twenty times likely to successfully end an active shooting than are armed civilians.³⁰

Of course, some incidents could potentially have led to mass shootings had an armed civilian not intervened quickly to prevent more casualties. Klarevas's review of civilian-interrupted mass shootings would miss some instances of this sort. However, allowing more civilians to carry firearms into more public places could also facilitate more mass shootings. The Violence Policy Center has tracked incidents in which a concealed carry weapon (CCW) permit holder was alleged to have committed various crimes of violence and unintentional shootings. They identified 29 CCW holders who perpetrated non-defensive shootings that involved three or more deaths not including the shooter during the period 2007-2015.³¹

Defensive and Hostile Gun Use by Civilians

Debates surrounding policies about guns on college campuses hinge on differing views about civilian use of firearms including the likelihood that a person can successfully use a firearm to ward off a criminal assailant in comparison to the likelihood that a person carrying a gun might be prompted to use his or her gun in hostile or even criminal ways. Unfortunately, there are no surveillance systems designed to identify and verify acts of self-defense with guns. The best available data on the phenomena come from the National Crime Victimization Survey (NCVS) which interviews a nationally representative sample (after weighting) of approximately 90,000 households and over 158,000 individuals age 12 years and older. Households remain in the NCVS sample for three years and eligible individuals are interviewed every six months about their experiences in which they were a victim of crime, any actions that they took in response to the attempted or actual crime, and outcomes such as whether or not they were injured in the crime. Response rates for households and individuals within those households are typically around 85%, an exceptional rate for survey research.

David Hemenway and Sara Solnick recently published a study based on data from the NCVS for the five-year period 2007-2011 to examine the use of guns by crime victims and estimate the effects of victims using a gun in response to a crime versus others actions commonly taken by crime victims.³² During the study period, there were 62 cases in which a NCVS respondent reported being a victim of a violent crimeⁱⁱⁱ and used a gun in self-defense and an additional 65 who used a gun in property crimes or situations involving only verbal threat to the victim. These 62 incidents represented 0.9% of all violent crimes reported (6,663) and accounted for 8.1 incidents per 100,000 population per year or a total of 102,478 self-defense gun uses (SDGUs) against violent crimes annually. In less than one fifth of the incidents of reported SDGU, the offender was also armed with a gun. Seventy-three percent of SDGUs reported by men and 48% of SDGUs reported by women occurred away from their homes. None of the SDGUs over the five-year period involved sexual assaults.

Victim Gun Use in Response to Criminal Acts Do Not Affect Victims' Risk of Injury

In this study, Hemenway and Solnick also examined victims' risk of being injured after taking any of thirteen specific actions volunteered by NCVS respondents when asked what they did or tried to do about the incident while it was going on. Four percent of those who reported a SDGU reported being injured after attempting to protect themselves with a gun; a virtually identical odds of injury among all victims who took *any* act of self-protection. **After controlling for a host of contextual factors, self-defensive gun use did not significantly affect victims' risk of being injured in the criminal act.** Most victims who are injured in crimes are injured before they can take any protective action. Prior studies suggesting SDGU reduces victims' injury risk used NCVS data that did not distinguish victim injuries that occurred before versus after protective actions such as SDGU took place and, thus, could not ascertain causal connections between SDGU and injury risks.^{33,34}

The NCVS does not ask respondents whether they used a gun in a hostile or unlawful manner. Drawing upon NCVS victimization data for the five years studied by Hemenway and Solnick (2007-2011)

ⁱⁱⁱ Violent crimes examined include physical assaults, both sexual and non-sexual, and robberies.

and including firearm homicides for those years, there were 3.6 victimizations involving firearms for every self-reported SDGU in response to a violent crime.^{iv} It is unknown what percentage of the criminal uses of guns nationally were committed by individuals who owned guns legally. **However, data from a nationally representative survey of state prison inmates and determined that of those who were incarcerated for committing a violent crime with a firearm in the thirteen states with the lowest legal standards, 60 percent legally possessed the firearms when they committed the crime.**³⁵

The true incidence of SDGU may be significantly lower than indicated by the NCVS because the data are based on self-reports and determining who is the aggressor and who is the victim in interpersonal altercations can be highly subjective. Hemenway and colleagues fielded two surveys of a nationally representative sample of gun owners to ascertain gun owners' reports of both defensive uses of guns and hostile uses of guns against respondents. Respondents were asked to describe these incidents in some detail and five criminal court judges were asked to review the narratives and assess the probably legality of self-reported use of guns.³⁶ **In the majority of the self-reported SDGUs, most criminal court judges considered the actions taken by the respondent with their guns to be "probably illegal" due to inadequate justification for using deadly force.** The judges' were told to assume that the respondent had a valid permit to own and carry the gun, and that the respondent had described the event honestly.

An alternative source of data on SDGU to the NCVS is a national phone survey of 4,977 gun owners directed by criminologist Gary Kleck in the early 1990s. In this survey, 56 (1.1%) respondents reported having used defensively used a gun within the past 12 months in situations in which they report being the would-be victim of a crime. Kleck used these data to make a projection that 2.5 million times per year a U.S. citizen used a firearm defensively in situations when someone was committing or attempting to commit a crime – about 22 times higher than the estimate from the NCVS.³⁷ The projections from Kleck's survey are discordant with data from other sources relevant to crime and violence, calling into question the validity of the data. For example, Kleck's survey data extrapolate to over 200,000 assailants shot by civilians defending themselves against crime each year. During the early 1990s when the survey was conducted there were approximately 300 deaths per year that were recorded as justifiable homicides committed by civilians using firearms.³⁸ There is no direct measure of criminals suffering nonfatal wounds as a result of being shot by civilians defending themselves, but the CDC's surveillance systems for tracking all deaths and a nationally representative sample of nonfatal injuries treated in hospitals indicates that there are roughly four to five persons suffering nonfatal gunshot wounds in assaults or incidents of undetermined intent for every fatal gunshot wound with the same external cause. That would suggest that about no more than 1,800 persons shot by civilians defending themselves against criminal attacks for the period that Kleck's survey projects 200,000 – a wounding rate more than 100 times higher than indicated in hospital surveillance systems.

The Impact of Laws Expanding Civilians Ability to Carry Firearms in Public Places

In 2005 the National Research Council reviewed the then-current information with data through 2000 concerning the impact of state laws allowing citizens to carry concealed weapons.³⁹ Noting that the estimated effects of so-called right to carry (RTC) laws were highly sensitive to the particular choice of

^{iv} The NCVS reported a total of 1,784,547 incidents in which respondents reported crime victimization by assailants wielding firearms and the CDC's vital records indicate a total of 58,450 homicides with firearms for an average of 368,599 victimizations per year over the five-year period.

explanatory variables, the report concluded that the evidence was too uncertain to determine the impact of RTC laws on crime.

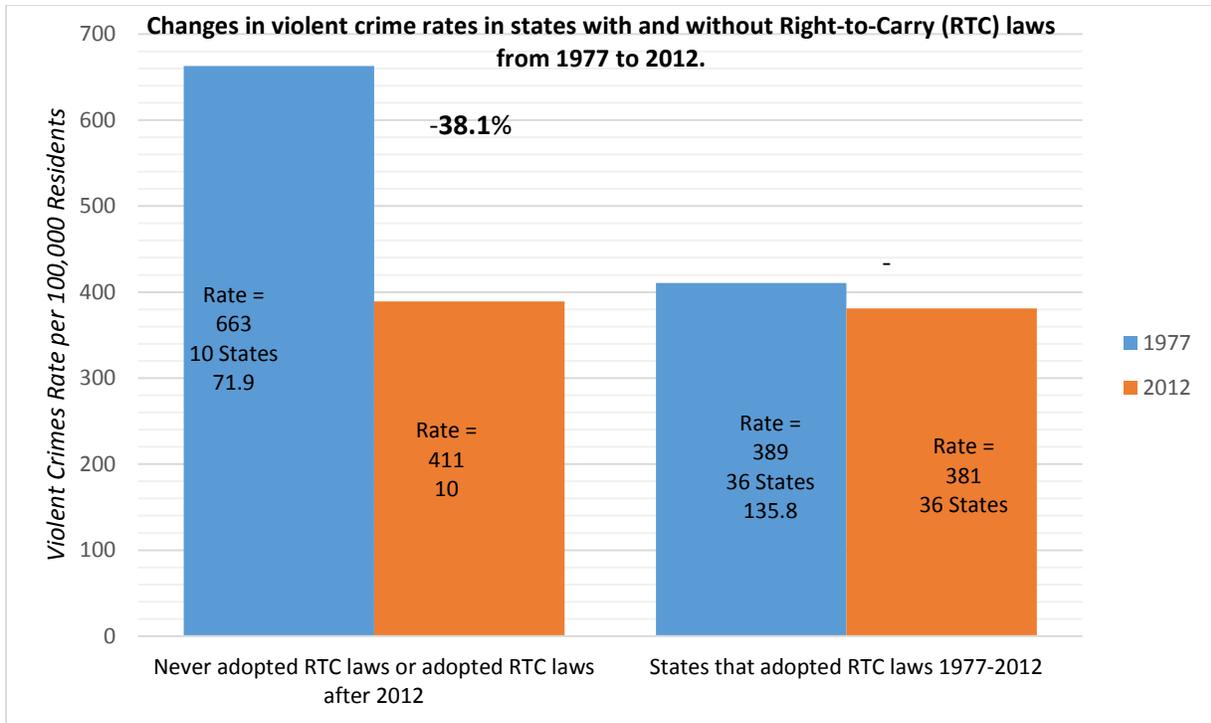
A major obstacle to generating a valid estimate of this impact was that most of the studies looking at this question included data for the period from 1985 through the early 1990s when violent crime rose sharply in certain areas, such as California, New York, and the District of Columbia, owing principally to the introduction of crack cocaine. Since all three of those jurisdictions and a number of other states with the worst crack problems (e.g., Maryland, New Jersey) also did not adopt RTC laws, any panel data analysis that did not control for the criminogenic influence of crack would necessarily generate a biased estimate of the impact of RTC laws that would make them appear to be either less harmful or more beneficial than they actually were in influencing crime. This was a major problem for the original study of RTC laws by John Lott and David Mustard and subsequent analyses by Lott.^{17,19,40} But this problem plagues every panel data analysis of RTC laws, except for those that started *after* the impact of crack had been full dissipated in the very late 1990s or early 2000s.^v

A quick but admittedly crude way to address this problem is to present a difference-in-differences comparison between the 36 states that adopted RTC laws over the period 1977-2012 and the ten states that did not adopt these laws. By comparing the change in crime from a period before crack emerged to a year well after its impact had dissipated, one can eliminate the impact of crack on crime (although of course this simple comparison does not control for other influences on crime that differed over this period for the two sets of states). Figure 1 shows that the ten non-RTC states enjoyed a 38.1% drop in their violent crime rate from 1977 to 2012, while the 36 adopting states had almost no change in violent crime over this period (a decline of 2% over a 35-year period).

This simple evidence is suggestive that RTC laws tend to exacerbate violent crime (controlling for the influence of crack but not for other explanatory variables). Obviously, this chart would overstate the harm of RTC laws if, say, the non-adopting states had increased their per capita rates of incarceration or police personnel more than the adopting states, thereby suppressing violent crime through those mechanisms (which could then potentially explain the relatively better experience with violent crime over the 1977-2012 period in the non-adopting states). In fact, the opposite is true. The adopting states had considerably larger percentage increases relative to the non-adopting states over this time period in their rates of incarceration (262% vs. 221%) and police staffing (61% vs. 26%). The relatively better crime performance of non-RTC-adopting states in the raw comparison of in the figure below could be even greater if one were to control for the influence on violent crime of police and incarceration.

Of course, many factors in addition to police, incarceration, and crack influence crime and the challenge for researchers who seek to find the impact of a single factor such as RTC laws is to account for those factors that may also be correlated with RTC adoption in an appropriately specified statistical model. A number of panel data analyses conducted since the publication of the NRC report have tried to control for a host of explanatory variables. These models, however, have not adequately controlled for the criminogenic influence of crack (thereby making RTC laws look better) as well as other factors that are likely to bias the estimated effects of RTC laws.

^v See the discussion of Zimmerman (2015) below.



The Most Recent Rigorous Research Studies Find RTC Laws Linked to Increased Violence

Donohue, Aneja, and Webber attempted to address these deficiencies with state panel data analyses that extended the NRC data by twelve years, during which time eleven additional states adopted RTC laws, to 1979-2012. Two models were used to explore the relationship between RTC laws and crime. Model 1 estimated shifts in the level of crime after RTC adoption and model 2 estimated RTC laws’ association with changes in crime trends or slopes. Both models indicated that violent and property crime both increased in response to the adoption of RTC laws. Specifically, violent crime was 12.3% higher after adoption of RTC laws and violent crime increases about 1.1% more for each year RTC laws are in effect.

New and sophisticated techniques are being employed to assist researchers in finding the best set of control states that have violent crime patterns most similar to the states adopting new laws. Research by Durlauf, Navarro, and Rivers attempts to sort out the different specification choices between Aneja, Donohue, and Zhang, and Lott and Mustard, using a Bayesian model averaging approach.⁴¹ Applying this technique to analyze the impact of RTC laws using county data from 1979-2000, the authors find that in their preferred spline (trend) model, RTC laws *elevate* violent crime rates by 6.5% in the three years after RTC adoption, with the effects growing over time. A recent report from the Brennan Center based on state-level data for 1979-2012 indicates that violent crime increased, on average, 10% following RTC law adoption.⁴² Zimmerman (2015) examined the impact of various crime prevention measures on crime using a state panel data set from 1999-2010. The findings from this study revealed statistically significant increases in murder, robbery and assault associated with RTC law adoption. Estimating so-called synthetic controls for states that adopt new policies is a relatively new technique to evaluate the impact of state policy changes on violent crime and other outcomes. This

approach addresses some of the challenges posed by regression analyses with panel data from 50 very disparate states. Webber, Donohue, and Aneja used this approach and found evidence that RTC laws increase violent crime by 12% to 18% over the ten years after adoption. These results are broadly consistent with the bulk of the panel data estimates cited above and are inconsistent with the outlier results generated using the Lott's model specifications. One difference between the two analytic approaches is that the panel data estimates typically found that RTC laws were associated with increases in both violent and property crime, while the synthetic controls estimates only found evidence that RTC laws increase violent crime.

Some final comments should be made about the likely mechanisms between adoption of RTC laws and increased crime, which the statistical studies do not directly address. First, the supporters of RTC laws frequently cite evidence that permit holders, as a group, are arrested for violent crimes at relatively low rates.⁴³ But the important policy question is whether having a CCW (and carrying a gun on one's person or in one's vehicle) affects CCW holders' risk of committing acts of violence and whether having more people carrying firearms will increase or decrease the incidents of violent crime and the lethality of those incidents. Ready access to a loaded firearm is likely to have a greater impact on risk of committing serious acts of violence among individuals with a history of violence, recklessness, substance abuse, or those prone to impulsivity or angry outbursts. Passing a background check when the principal criteria for denial are a convictions for either a felony crime or misdemeanor domestic battery, having a current domestic violence restraining order, or having been adjudicated mentally incompetent or a serious threat to self or others due to mental illness is no guarantee that a person is not prone to violence and can be trusted to carry a loaded concealed firearm in public places.^{44,35} CCW holders do commit serious crimes with guns including murder and mass shootings.³¹

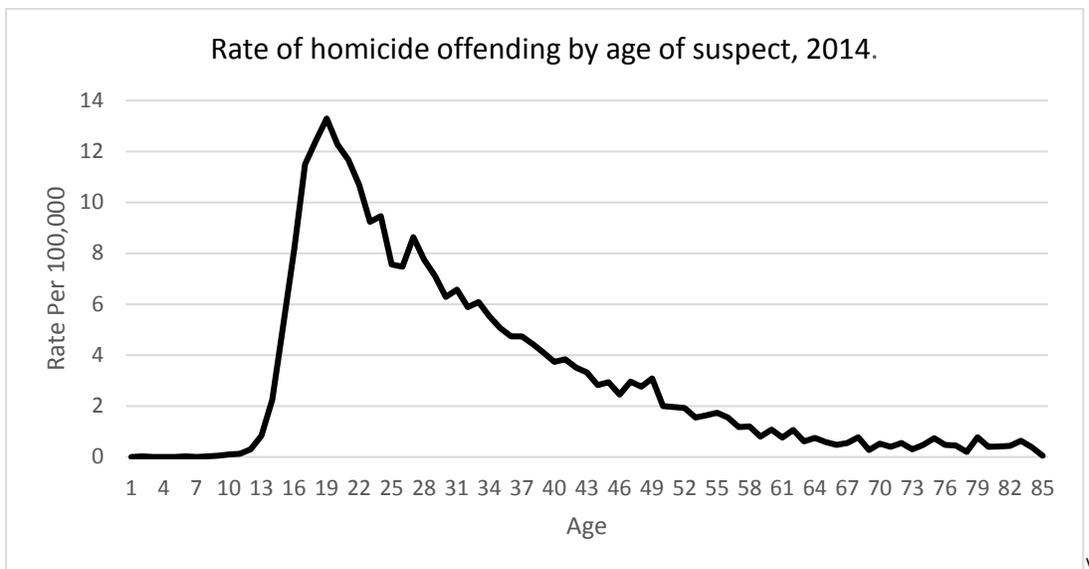
Second, RTC laws can increase crime in many ways even if the permit holders are not committing it. The ability to carry a gun may embolden some permit holders to incite criminal responses to their provocative behavior, as some have alleged in the George Zimmerman case leading to the death of Trayvon Martin. Criminals may also be more likely to carry weapons in response to RTC adoption and more likely to be aggressive towards their victims if they fear armed opposition. Guns carried outside the home because of RTC laws are potentially more likely to be lost or stolen, especially when left in motor vehicles, which can expand criminals' access to guns. Finally, the presence of more guns can complicate the job of police and simply take up more police time as they process applications and check for permit validity when they confront armed citizens. The recent July 2016 shooting by police of concealed carry permit holder Philando Castile in Minnesota underscores how the introduction of a gun by a law-abiding citizen can end in tragedy.

Why the College Campus Environment is Ill-Suited for the Civilian Gun Possession

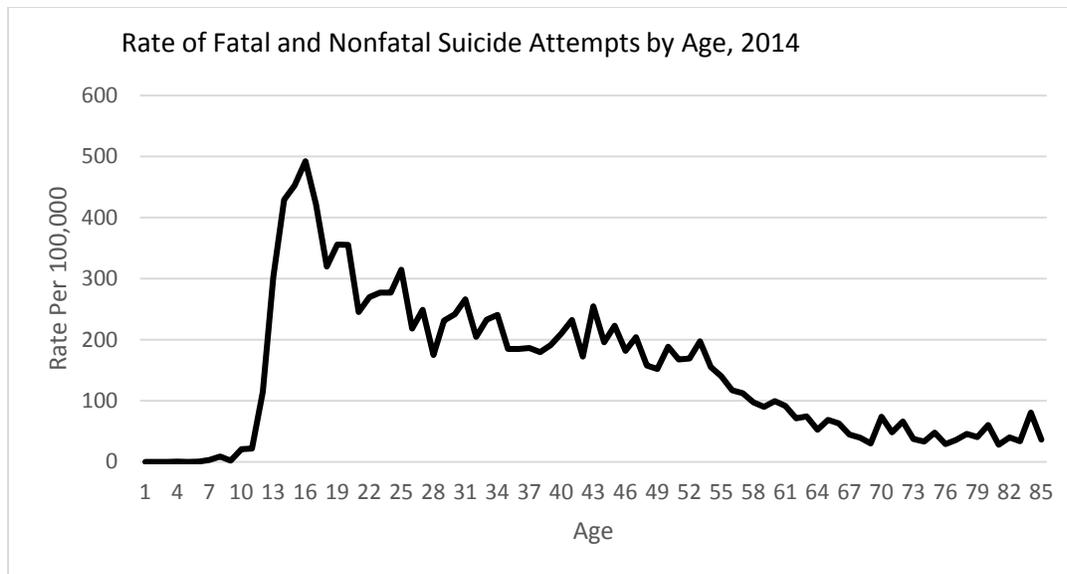
The broader research literature on civilian gun use and policies that allow civilians to carry concealed firearms has not examined the experience or implications of policies that allow students, staff, faculty, or visitors to carry firearms onto college campuses. Relevant to this discussion is the frequency and nature of events where civilians might use firearms at their disposal, the capacity and proclivities of adolescents and young adults of typical college age to make prudent decisions about when or how to use firearms, the onset of severe mental illness during young adulthood, the frequency of binge drinking of alcoholic beverages among college students and the violence that stems from that drinking. In addition, suicidal ideation and behavior is common during late adolescence and early adulthood and increasing access to firearms through policies that allow guns onto college campuses

could increase risk of suicide among college students. Due to a variety of developmental, psychological, and sociological reasons, age-specific homicide offending rates increase dramatically during adolescence, peaking at age nineteen, and are highest during the age span of most college students (18-24 years). Suicide attempts that lead to hospital treatment or death also rise dramatically and peak during the years that most youth enter college.

A recent study identified 85 incidents of shootings or undesirable discharges of firearms on college campuses in the U.S. from January 2013 through June 2016. Only two of these 85 incidents (2.4%) involved a shooter on a rampage. The most common incidents were interpersonal disputes that escalated into gun violence (45%), premeditated acts of violence against an individual (12%), suicides or murder/suicides (12%), and unintentional shootings or discharges (9%).⁴⁵



Homicide data obtained from the FBI's, Uniform Crime Reporting Program, Supplemental Homicide Reports, 2014. Data on age-specific population estimates were obtained from the Centers for Disease Control and Prevention and generated by US Census Bureau. <https://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm>



Data obtained from the Centers for Disease Control and Prevention's Web-based Injury Statistics Query and Reporting System (WISQARS), Fatal and Nonfatal Injury Reports, 2014. <https://www.cdc.gov/injury/wisqars/>

Brain and Cognitive Development in Adolescence and Emerging Adulthood

Adolescence and emerging adulthood is a time of tremendous change in the biological systems that support decision-making, emotional and behavioral regulation, and motivation. As has been widely documented in the lay press and in the scientific literature, the brain's higher association areas (e.g., prefrontal cortex or PFC), among other areas, continue to change well into the third decade of life.⁴⁶⁻⁴⁸ Areas of the PFC are part of the circuitry that supports self-control, including impulse control and inhibition, judgment, and long-range planning.^{47,49} These skills are essential for safe firearm storage and use, and for appreciating and avoiding the circumstances in which firearm use is likely to lead to tragedy.

Risky decision-making in adolescence/early adulthood is due, in part, to changes in both frontal/limbic balance in the developing brain and changes in the connections between the PFC and limbic subcortical structures that support emotional and behavioral regulation.⁴⁹ While the PFC and other higher order association areas mature relatively late, limbic areas are dense with hormone receptors that are awakened during puberty.⁵⁰ Limbic areas play a key role in the circuitry that supports emotions, reward systems, and drives. When limbic influences predominate, drives toward sex aggression are heightened, and social relationships become particularly important.⁵¹ Similarly, dopamine receptors proliferate in the striatum--part of the brain's motivational circuitry--before they proliferate in the PFC, which may also help explain why adolescent behavior is biased toward motivation rather than inhibition.⁴⁹

Compared with adults and younger children, adolescent decision-makers are particularly sensitive to social and emotional cues in the environment, and are more sensitive to stress, both psychologically and biophysically.⁵²⁻⁵⁵ A number of studies demonstrate that adolescents' self-control is vulnerable in the face of potential rewards (e.g., peer approval and acceptance).^{56,57} Similarly, in laboratory studies, adolescents have been shown to demonstrate poorer emotional regulation in the context of threat than other age groups. For example, in a self-control task, Dreyfuss et al. found that compared to their older and younger peers, adolescents, particularly males, were more likely to react

impulsively to threat cues (compared to neutral cues); a finding that was mediated by differences in limbic activation in brain areas that support emotion regulation.⁵⁸

In summary, typical developmental processes in adolescence are associated with more risk-taking, and poorer self-control in the transition to adulthood. Guns may be called on in the very situations in which adolescents are most developmentally vulnerable: in the context of high emotional arousal, situations that require rapid, complex social information processing, those that involve reinforcing or establishing peer relationships (i.e., showing off), or in conditions of perceived threat.

Onset of Mental Illness, Youth Suicide and Access to Firearms

College students are vulnerable to a range of mental health issues. The stress associated with the life transitions inherent in college attendance – leaving home, exploring new social identities, developing new peer groups, managing challenging coursework and extracurricular activities – place students at risk of conditions like depression and anxiety.⁵⁹ The majority of mental disorders have their onset by age 24.⁶⁰ Studies have demonstrated high prevalence of clinical depression and anxiety among college students: one study found that 14% of undergraduate students and 11% of graduate students at a large public University with a demographic profile similar to the overall U.S. student population screened positive for depression, and 4% of undergraduates and 5% of graduates met criteria for anxiety.^{61,62} Despite the high burden of mental illness among college students, many go untreated. While mental illness treatment rates vary across campuses, one study of students on 26 campuses across the U.S. found that on average, only 36% of students who screened positive for mental illness had received treatment in the past year.⁶³

Of particular concern in the context of proposals to allow students to carry firearms on campus is the risk of suicide associated with mental illnesses, especially depression, among this group. In a national survey of undergraduates conducted in 2015 about events within the past 12 months, 8.9% reported “seriously considering attempting suicide” and 1.4% had attempted suicide.⁶⁴ A study of students from 645 U.S. college campuses found increased rates of suicide among college students in 2008-2009 compared to 2004-2005: the suicide rate increased from 6.5 to 7.7 per 100,000 students.⁶⁵ **Importantly, a firearm was the leading method for suicide among males, accounting for nearly a third (31%) of all suicides among male college students.**⁶⁵ For females, firearms were the third leading cause of suicide (10% of all suicides in this group), behind hanging (29%) and poison (16%).⁶⁵ This gender differential in firearm suicide on college campuses mirrors the differential in the overall U.S. population.⁶⁶ **A large body of literature clearly shows that firearm access is associated with increased rates of suicide, suggesting that increased access to firearms on college campuses could significantly increase suicide in this vulnerable group.**^{67,68}

The combination of challenges with impulse control, emotional regulation, and onset of mental illness contribute to high rates of suicide and suicide attempts among adolescents and young adults. In 2014, suicide was the second leading cause of death in the U.S. among college age youth 17-24 years old.⁶⁹ Between 1999 and 2014, the suicide rate in this age group increased 12% from 11.3 to 12.7 per 100,000.⁶⁹ Firearms represent an extremely lethal means of intentional self-harm; approximately 90% of suicide attempts with a firearm resulted in a fatality compared to 3% for poisoning attempts.⁷⁰ In 2014 among males age 17-24 who died by suicide, 49% used a firearm.⁶⁹

Some suicide risk factors differ among those under age 25 compared to older populations. Emotional control, impulsivity, and decision making continue to develop into the mid-20s, which can put youth at higher risk for suicide.⁷¹ In addition to being more impulsive, young individuals tend to be more vulnerable to a contagion effect after exposure to suicide within their community.⁷² Suicide risk is often highest in the early stages of the onset of major psychiatric conditions and these symptoms often first develop in childhood or early adolescence.^{60,73} The risk of suicide among youth also increases with age; 2.6 per 100,000 among boys age 10-14 compared to 22.9 per 100,000 among young men age 20-24.⁶⁹

Suicide attempts (whether fatal or nonfatal) may occur in the context of an underlying mental health condition such as depression and/or alcohol or drug misuse.^{74,75} Many suicides also have an impulsive quality and are often precipitated by an acute stressor (e.g. loss of a relationship, trouble with the law or school, humiliation, job loss).⁶⁷ The majority of those who survive an attempt do not go on to die by suicide; a suicide prevented is a life saved.

The lethality of a given means or method of suicide attempt accounts for a substantial portion of the variation observed in suicide mortality and points to the unrealized potential for means restrictions strategies to reduce suicide. The method used for a suicide attempt depends on availability; there is a strong association between the availability of firearms in households and death by suicide. Having ready access to firearms is linked with suicide not only for the gun owner but for all members of the household, especially for children and adolescents.⁷⁶⁻⁷⁸

Studies of the relationship between the presence of guns in the home and risk for suicide among younger populations have found that the risk of suicide is two- to five-fold higher for all household members in homes with firearms.^{76,77,79,80} These studies have reported limited evidence of substitution of methods; restricting access to firearms did not lead to increased use of other methods of suicide attempt. An analysis of changes to Connecticut and Missouri's permit to purchase handgun purchaser licensing laws also indicate that these laws – which both screen out some individuals at high risk of suicide and reduce guns purchased in response to a suicidal impulse – play a role in reducing firearm suicide risk.⁸¹ Reducing the availability of highly lethal and commonly used suicide methods has been associated with declines in suicide rates of as much as 30%–50% in other countries and can be especially influential in younger populations.⁸²

Safe gun storage practices (e.g., using a gun safe or storing ammunition separate from an unloaded gun), which can be required by state law, are associated with a decreased risk for adolescent suicide.^{78,83} This association is especially strong in the 15-19 year old age group, which implies that restricting access to a firearm is likely to have the biggest impact during the age characterized by higher impulsivity.⁸⁴ The potential for unsafe storage of firearms, if firearms were permitted in college dorms, is a concern and could elevate suicide risks to anyone who has access to a firearm owner's room.

Alcohol Abuse and Violence on College Campuses

A large international literature has established a close association between alcohol use and violence.⁸⁵ Culture can structure and determine the strength of this relationship through such variables as frequency of drinking to intoxication or consumption of high-alcohol beverages, and expectations about drinking behavior or the situational appropriateness of aggression.⁸⁶ College drinking cultures possess all of these attributes. U.S. college students drink frequently and at high levels: nearly 60% of 18-22 year-old college students reported drinking the past month; 37.9% reported binge drinking (defined as five or more drinks within two hours).⁸⁷ Among young men in particular, research has found

that expectations about the acceptability of violent action while intoxicated may precede actual acts of violence while drinking.⁸⁸ Among college students, there appears to be a normative belief that abusive behavior is more common and less abusive when alcohol is involved for psychological and moderately severe physically abusive behaviors.⁸⁹

The interaction between college drinking cultures and violent behavior helps to explain the high prevalence of alcohol-related violence in college populations. In the general population, CDC estimates that every year, there are 7,756 homicides attributable to alcohol use; 1,269 of these happen to persons younger than 21.⁹⁰ Hingson et al. have estimated that 600,000 college students annually are assaulted by another student who has been drinking.⁹¹ The Bureau of Justice Statistics reported that alcohol was involved in 41% of on-campus violence and 37% of off-campus violence for students who lived on campus, and 18% of on-campus violence and 31% of off-campus violence for students living off campus.⁹²

Sexual violence is another significant risk when alcohol is in the mix. On college campuses, 88% of male college rapists who used force to commit the rape also used alcohol or drugs, and college males who rape incapacitated women are more likely to drink right before the rape.⁹³ Alcohol use also increases the likelihood of assault occurring for women. A meta-analysis and systematic review have concluded there is a clear positive association between alcohol consumption and physical and sexual violence for women. Longitudinal data suggests this relationship is bidirectional, meaning that women who are victims of interpersonal violence tend to drink more and women who drink more are more likely to be victims of interpersonal violence.⁹⁴

One factor that can moderate the relationship between alcohol use and violence on campus is the density of alcohol outlets around a college campus. According to one study of 32 colleges, on- and off-premise outlet densities were associated with campus rape-offense rates. Student drinking level was associated with both campus rape and assault rates, and mediated the effects of on- and off-campus alcohol outlet density. Campuses with greater densities of alcohol outlets had higher drinking levels, which in turn explained higher rates of violence on those campuses.⁹⁵

Thus both culturally and ecologically, college campuses can present a “lit fire” in which interpersonal violence is prevalent (according to the Bureau of Justice Statistics, one in 10 college students has experienced a violent crime⁹²), and worsened by the addition of alcohol use. To this potentially incendiary situation should be added data on the relationship between gun ownership on college campuses and alcohol use. Two studies from the 1990s looked at this relationship. **One found that students with guns were more likely to be binge drinkers and to need to start the day with alcohol;**⁹⁶ **the other revealed that those who self-reported binge drinking or engaging in risky or aggressive behavior after drinking were not only more likely to have guns at college but also more likely to be threatened by a gun while at college.**⁹⁷

Implications of Guns on Campus for Campus Security and Law Enforcement

For a police officer, the decision to apply deadly force is taken seriously and discussed in training throughout his or her career.⁹⁸ The decision in a crisis, such as an active shooter event, occurs in an atmosphere of chaos and panic, and is often over in a matter of minutes, if not seconds.⁹⁹ Like police officers, students or faculty attempting to use a gun to end an active shooter situation would be expected to assess the situation, ensure a clear line of fire, shoot well, minimize loss, and bring the

situation to closure. While an entire active shooter situation may last longer, the actual shooting and opportunity to stop the suspect may be momentary.²⁴

Police officers routinely experience high anxiety/high threat situations – including home invasions, intrusion alarms, armed robberies, suspicious circumstances, traffic stops, and prowlers – and are prepared to take whatever action is necessary to safely end these incidents. Despite their training and frequent exposure to high-risk and life-threatening events, evidence shows that police officers do not shoot accurately in a crisis encounter; though officers who participate in simulation or other high-stress training tend to shoot somewhat more accurately in a crisis than those who do not.^{24,100-103} The idea that students or faculty could shoot as well as trained police officers in an active shooter situation is highly questionable given what we know about police performance in high stress situations. Additionally, consideration must be given to the possibility of police officers not being able to differentiate a student or faculty member with a gun from the perpetrator during the response to an active shooter situation. There are numerous examples of this happening, creating confusion and, in some instances, resulting in civilians being unintentionally shot by law enforcement.

Much of the discussion and debate about allowing the carrying of guns on campus revolves around this concern over active shooters; however, the issue is more extensive.¹⁰⁴ While active shooter situations are rare, colleges and universities have responded well to this threat by establishing policies and plans, conducting training and drills, implementing threat assessment teams, and embracing the national Incident Command System.¹⁰⁵⁻¹⁰⁷ There are other situations that occur far more frequently on college campuses, such as disorderly conduct, abuse of alcohol and dangerous substances, intimate partner violence, suicide threat, faculty-student disputes, fights, and trespass. These types of incidents deserve more attention because response to these incidents will change based on the potential increase in the presence of guns due to laws allowing the right to carry on campus.

While there is no evidence to aid in predicting how many students will carry guns on campus if bans are lifted, campus police and security officers must assume that weapons may be present in many situations, especially those involving groups and crowds.¹⁰⁸ Most campus officers routinely respond to situations in which information is sparse. They respond to calls such as “suspicious person,” “suspicious circumstance,” “911- hang up,” and “alarm sounding” often with no additional information. If the presence of guns must be assumed, the level of seriousness, tactics used, and necessary precautions taken in response to such calls are elevated. Tactical changes may include greater reliance on back up officers, assessing and questioning individuals about the presence of weapons, scanning the environment for protective cover, and moving quickly to resolve aggression and threat without limiting the time spent to de-escalate. Local and state police who are called to assist in campus situations will implement similar precautions and changes in approach. The perception of increased likelihood of situations in which there may be a gun present could simultaneously increase the risk of shooting, intentional or otherwise, by police or campus security while responding to calls.

Conclusion

The best available research contradicts many claims and assumptions that underlie policies to allow civilians to bring firearms onto college campuses. Gun ownership and gun carrying in many states is common, but successful and warranted civilian defensive gun use is relatively rare. Concealed carry permit holders have passed criminal background checks and, as a group, commit crimes at a relatively low rate. But, in states with the most lax standards for legal gun ownership, 60% of individuals incarcerated for committing crimes with guns were legal gun owners when they committed their crimes.

Some who are legally allowed to own and carry firearms in public places have histories of violence and recklessness. Many states relaxed restrictions on concealed and open carrying of firearms based on claims that such policies reduced violent crime. But the best available evaluations of these policies indicate that these right-to-carry laws increase violence.

Some have blamed rampage shootings, including those on college campuses, on “gun free zones,” and they have claimed that the best deterrent to such shootings is to remove virtually all restrictions on civilian gun carrying. Indeed, much of the impetus for policies to allow guns on college campuses has been to reduce mass shootings or the number of casualties from those shootings by enabling armed civilians to intervene. Yet the number of people shot in mass shootings in the U.S. has increased dramatically during the past decade – a period that coincides with the removal of restrictions on public gun carrying and a push to make gun carrying in public more normative. New research on fatal mass shootings demonstrates that: 1) right-to-carry laws do not decrease mass shootings or the average number of people shot in those incidents; 2) the overwhelming majority of fatal mass shootings occur in places where guns are allowed; and 3) when rampage shootings do occur, very rarely are they stopped by gun-wielding civilians.

While the net effect of right-to-carry gun policies have negatively impacted public safety broadly, their effects are likely to be far more deleterious when extended to college campuses. Risks for violence, suicide attempts, alcohol abuse, and risky behavior are greatly elevated among college-age youth and in the campus environment. The presence of firearms greatly increases the risk of lethal and near-lethal outcomes from these behaviors and in this context. Even if allowing more guns on college campuses did have some protective effect against rare mass shootings on campuses – and available evidence suggests that this is not the case – the net effect on the safety of college students, faculty, and staff is likely to be more deaths, more nonfatal gunshot wounds, and more threats with a firearm that are traumatizing to victims.

Author Bios

Daniel W. Webster, ScD, MPH

Daniel W. Webster, ScD, MPH, is a Professor of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health, where he serves as Director of the Center for Gun Policy and Research and Deputy Director of Research for the Center for the Prevention of Youth Violence. He is one of the nation's leading researchers studying gun policy and has published numerous articles on the prevention of gun violence, firearm policy, youth gun acquisition and carrying, intimate partner violence, and the prevention of youth violence. He is co-editor and contributor to *Reducing Gun Violence in America: Informing Policy with Evidence and Analysis* (Johns Hopkins University Press, 2013). Dr. Webster helps lead the Johns Hopkins-Baltimore Collaborative for Violence Reduction and conducting studies evaluating the effects of various efforts to reduce violence, including state gun policies, policing strategies focused on deterring gun violence, drug law enforcement practices on gun violence, and a community gun violence prevention initiative. He is also leading a study of Baltimore's underground gun market. Dr. Webster teaches courses in violence prevention at Johns Hopkins Bloomberg School of Public Health. He has advised the White House, Congressional leaders, state and local officials on policies to reduce gun violence. In 2015, Dr. Webster received the American Public Health Association's David Rall Award for Science-Based Advocacy.

John J. Donohue, III, PhD, JD

John J. Donohue III is the C. Wendell and Edith M. Carlsmith professor of law at Stanford University. He is well known for using empirical analysis to determine the impact of law and public policy in a wide range of areas, including examinations of the impact on crime of the death penalty, incarceration, guns, and the legalization of abortion. Other work by Donohue has explored the benefits from stronger efforts to fight racial discrimination in employment and in school funding, and examined the issues involved in the regulation of illegal substances. Before rejoining the Stanford Law School faculty in 2010, Professor Donohue was the Leighton Homer Surbeck professor of law at Yale Law School. Earlier in his career, he was a law professor at Northwestern University as well as a research fellow with the American Bar Association. Additionally, he clerked with Chief Justice T. Emmet Clarie, of the U.S. District Court of Hartford, Connecticut. He is a member of the American Academy of Arts and Sciences, the former empirical editor of the *American Law and Economics Review*, and the former president of the American Law and Economics Association. He received his B.A. from Hamilton College, his J.D. from Harvard University, and his Ph.D. in economics from Yale University.

Louis Klarevas, PhD

Dr. Louis Klarevas is Associate Lecturer in the Department of Global Affairs at the University of Massachusetts – Boston. He is the author of *Rampage Nation: Securing America from Mass Shootings* (Prometheus Books, forthcoming in 2016). A former Senior Fulbright Scholar in Security Studies, he has also taught at American University, George Washington University, the City University of New York, and New York University. During the early phases of the Iraq War, he served as the Defense Analysis Research Fellow at the London School of Economics. Before joining the ranks of academia, he served as a research associate at the United States Institute of Peace. His articles and commentaries have appeared in a variety of prominent news outlets, including *The Atlantic*, *Forbes*, *The New Republic*, *The*

Huffington Post, The New York Daily News, New York Newsday, The Washington Post, The Washington Times, and Vice. He has also appeared as an expert on numerous news networks, including ABC, BBC, CBS, CNN, and NPR. Dr. Klarevas holds a B.A. from the University of Pennsylvania and a Ph.D. in International Relations from the School of International Service at American University.

Cassandra K. Crifasi, PhD, MPH

Dr. Crifasi is an Assistant Professor in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health and a core faculty member in the Center for Gun Policy and Research and the Center for Injury Research and Policy. Her research focuses on injury epidemiology and prevention, firearm policy, and the development, implementation and evaluation of policies, practices, and procedures on public safety and first responders. She teaches courses in research and evaluation methods for health policy and currently serves as the Deputy Director of the Johns Hopkins-Baltimore Collaborative for Violence reduction. Dr. Crifasi's recent research examined the affect changing state policies have on the assault and homicide of law enforcement officers in the United States. She received her PhD in Health Policy and Management in 2014 from the Johns Hopkins Bloomberg School of Public Health and an MPH in Environmental and Occupational Health from the Drexel University School of Public Health in 2010.

Jon S. Vernick, JD, MPH

Jon S. Vernick, JD, MPH, is an Associate Professor of Health Policy and Management at The Johns Hopkins Bloomberg School of Public Health and Co-Director of the Johns Hopkins Center for Gun Policy and Research. Jon Vernick is the primary instructor for courses on Issues in Injury and Violence Prevention, and Public Health and the Law. He is also Co-Director of the MPH/JD Program at Johns Hopkins. Jon Vernick's research has concentrated on ways in which the law and legal interventions can improve the public's health. He is particularly interested in epidemiologic, policy, legal, and ethical issues associated with the prevention of firearm and other injuries. He has also studied legal aspects of motor vehicle safety, tobacco control, public health preparedness, and obesity prevention, having published more than 75 scholarly articles and reports on these and other topics. Prof. Vernick is committed to translating research findings into policy change, regularly working with legislators, media, courts, and advocates to provide information about effective policies. Jon Vernick earned his BA from the Johns Hopkins University, a JD with honors from the George Washington University, and an MPH from the Johns Hopkins Bloomberg School of Public Health.

David Jernigan, PhD

David Jernigan, PhD, directs the Center on Alcohol Marketing and Youth (CAMY) and is an Associate Professor in the Department of Health, Behavior and Society at the Johns Hopkins Bloomberg School of Public Health, where he teaches courses on media advocacy, alcohol policy, and campaigning and organizing for public health. He is also co-director of the Maryland Collaborative to Reduce College Drinking and Related Problems, a statewide effort involving 14 institutions of higher education committed to reducing alcohol-related problems on campus and in the surrounding communities. Dr. Jernigan serves on the boards of Behavioral Health System Baltimore and the Global Alcohol Policy

Alliance, and on advisory boards for Cancer Research UK and the UK Center for Tobacco and Alcohol Studies. He has written more than 90 peer-reviewed journal articles, co-authored three books and monographs, and contributed chapters to six books on alcohol issues. He has served as an advisor to the World Bank and the World Health Organization (WHO) and was the principal author of WHO's first Global Status Report on Alcohol and Global Status Report on Alcohol and Youth, and co-author of *Alcohol in the Developing World: A Public Health Perspective* and *Media Advocacy and Public Health: Power for Prevention*. He has also trained thousands of students and public health advocates in media advocacy, the strategic use of the mass media to influence public health policy.

Holly C. Wilcox, PhD

Holly C. Wilcox, Ph.D is an Associate Professor in the Johns Hopkins School of Medicine Department of Psychiatry and the Bloomberg School of Public Health Department of Mental Health. Dr. Wilcox has spent the past 25 years actively engaged in suicide prevention in schools, universities, emergency departments, and with the United States Marine Corps. Dr. Wilcox's most significant contributions have been in three areas: 1) large population-based, prospective cohort studies of youth suicidal behaviors; 2) the evaluation of impact of community-based universal prevention programs targeting youth suicidal behaviors; 3) the identification of biomarkers to inform suicide prevention. Dr. Wilcox led a national project to identify research needs for data linkage and analyses of linked data to serve as the foundation for a National Institutes of Health Pathway to Prevention workshop on suicide prevention. She is the co-chair of the Suicide Prevention Task Group of the National Network of Depression Centers, a non-profit 501(c)(3) network of 23 leading academic medical [center](#)s. She has offered since 2005 a course at Johns Hopkins entitled ***Suicide as a Public Health Problem***.

Sara B. Johnson, PhD, MPH

Sara Johnson is Associate Professor of Pediatrics at the Johns Hopkins School of Medicine, with a joint appointment in the Johns Hopkins Bloomberg School of Public Health's Department of Population, Family, and Reproductive Health. She also serves the Director of the Rales Center for the Integration of Health and Education, which is focused on reducing health and educational disparities in children and adolescents using school-based health care and wellness programs. Her research is broadly focused in two areas: 1) how early adversity such as poverty and trauma impacts brain, cognitive, and neuroendocrine system development from the prenatal period to adolescence; and 2) translating developmental science to inform evidence-based health and social policies.

Sheldon Greenberg, PhD

Sheldon Greenberg, Ph.D., is Professor of Management in School of Education, Division of Public Safety Leadership. He served as Associate Dean for more than a decade, during which time he led the Police Executive Leadership Program and established University partnerships with the U.S. Secret Service and U.S. Immigration and Customs Enforcement (ICE). His primary research interests are police patrol, the relationship between police and public health, police organizational structure, highway safety, campus and school safety, the role of the police in community development, and community organizing. Prior to

joining Johns Hopkins, Dr. Greenberg served as Associate Director of the Police Executive Research Forum, the nation's largest law enforcement think tank and center for research. He began his career with the Howard County, MD, Police Department, where he served as a patrol officer, supervisor, and director of the police academy, director of research and planning, and commander of the administrative services bureau. He worked with the U.S. Marshals Service, U.S. Border Patrol, Department of Justice, and Department of State, as well as with police agencies in Cyprus, Jordan, Kenya, Panama, Hungary, Pakistan, and the Czech Republic. Dr. Greenberg served on national commissions and task forces on violence in schools, race-based profiling, and police response to people who have mental illness, police recruiting, highway safety, military deployment, and homeland defense. He serves as a member of the Federal Law Enforcement Training Accreditation Board.

Emma E. McGinty, PhD

Dr. McGinty is an Assistant Professor in the Department of Health Policy and Management at JHSPH, and a core faculty member of both the Center for Gun Policy and Research and the Center for Mental Health and Addiction Policy Research. Her research focuses on how public policies affect mental health, substance use, and gun violence. Dr. McGinty's recent research examined the effects of news media coverage of mass shootings by persons with mental illness on Americans' support for gun policies and attitudes toward individuals with serious mental illnesses. At the Center for Gun Policy and Research, Dr. McGinty uses public opinion surveys and message framing experiments to assess public support for gun violence prevention policies and collaborates on studies of the effects of youth-focused firearm restrictions and policies designed to prevent the diversion of guns to criminals. She received her PhD in Health Policy and Management in 2013 from the JHSPH where she was a Sommer Scholar and received an MS in Health and Behavior Studies from Columbia University in 2006.

References

1. 18 U.S.C. § 921 et seq.
2. 18 U.S.C. § 927.
3. 18 U.S.C. § 922 (q).
4. 18 U.S.C. § 921 (a) (26).
5. Law Center to Prevent Gun Violence. Local Authority to Regulate Firearms: Policy Summary. 2016; <http://smartgunlaws.org/local-authority-to-regulate-firearms-policy-summary/>. Accessed June 28, 2016.
6. National Conference of State Legislatures. Guns on Campus Overview. 2016; <http://www.ncsl.org/research/education/guns-on-campus-overview.aspx>. Accessed June 28, 2016.
7. Max W, Rice DP, Finkelstein E, Bardwell RA, Leadbetter S. The economic toll of intimate partner violence against women in the United States. *Violence Vict.* 2004;19(3):259-272.
8. Regents of the University of Colorado v. Students for Concealed Carry on Campus, 271 P.2d 496 at 502 (Colorado 2012).
9. Oregon Firearms Educational Foundation v. Board of Higher Education and Oregon University System, 245 Or. App. 713 (Court of Appeals of Oregon 2011).
10. University of Utah v. Shurtleff, 144 P.3d 1109 (Utah 2006).
11. Florida Carry, Inc. v. University of Florida 190 So. 3d (District Court of Appeal of Florida 2015).
12. Florida Carry, Inc. v. University of North Florida 133 So.3d 966 (District Court of Appeal of Florida 2013).
13. DiGiacinto v. The Rector and Visitors of the George Mason University 704 S.E. 2d 365 (Virginia 2011).
14. District of Columbia v. Heller 554 U.S. 570 (2008).
15. Vernick JS, Rutkow L, Webster DW, Teret SP. Changing the constitutional landscape for firearms: the US Supreme Court's recent Second Amendment decisions. *American journal of public health.* 2011;101(11):2021-2026.
16. Vernick JS. Carrying guns in public: legal and public health implications. *The Journal of Law, Medicine & Ethics.* 2013;41(s1):84-87.
17. Lott Jr JR. More guns, less crime. *University of Chicago Press Economics Books.* 2010.
18. Roosevelt H. 12 Times Mass Shootings Were Stopped by Good Guys with Guns 2015; <http://controversialtimes.com/issues/constitutional-rights/12-times-mass-shootings-were-stopped-by-good-guys-with-guns>.
19. Lott J. More Guns, Less Crime. Vol 340: Mass Medical Soc; 1999:1599-1600.
20. Duwe G, Kovandzic T, Moody CE. The impact of right-to-carry concealed firearm laws on mass public shootings. *Homicide Studies.* 2002;6(4):271-296.
21. Klarevas L. *RAMPAGE NATION Securing America from Mass Shootings.* Prometheus Books; 2016.
22. Reason Aw. 2016; <http://www.armedwithreason.com/>. Accessed June 28, 2016.
23. Everytown for Gun Safety. *Analysis of Mass Shootings.* New York, NY, 2015.
24. White MD. Hitting the target (or not): Comparing characteristics of fatal, injurious, and noninjurious police shootings. *Police quarterly.* 2006;9(3):303-330.
25. Thompson A, Price JH, Mrdjenovich AJ, Khubchandani J. Reducing firearm-related violence on college campuses—Police chiefs' perceptions and practices. *Journal of American College Health.* 2009;58(3):247-254.
26. Morrison GB. Police department and instructor perspectives on pre-service firearm and deadly force training. *Policing: An International Journal of Police Strategies & Management.* 2006;29(2):226-245.

27. Kadison R, DiGeronimo TF. *College of the overwhelmed: The campus mental health crisis and what to do about it*. Jossey-Bass; 2004.
28. Compiling Cases Where Concealed Handgun Permit Holders Have Stopped Mass Public Shootings. 2016; <http://crimeresearch.org/2015/04/uber-driver-in-chicago-stops-mass-public-shooting/>. Accessed July 12, 2016.
29. Volokh E. Do Citizens (Not Police Officers) with Guns Ever Stop Mass Shootings? *Washington Post*, 2015.
30. Blair JP, Schweit K. A study of active shooter incidents, 2000-2013. Texas State University and Federal Bureau of Investigation, US Department of Justice. *Washington DC: US Department of Justice*. 2014.
31. Violence Policy Center. *Mass Shootings Involving Concealed Carry Killers*. Washington, DC2016.
32. Hemenway D, Solnick SJ. The epidemiology of self-defense gun use: Evidence from the National Crime Victimization Surveys 2007–2011. *Preventive medicine*. 2015;79:22-27.
33. Kleck G, DeLone MA. Victim resistance and offender weapon effects in robbery. *Journal of Quantitative Criminology*. 1993;9(1):55-81.
34. Schnebly SM. An examination of the impact of victim, offender, and situational attributes on the deterrent effect of defensive gun use: A research note. *Justice Quarterly*. 2002;19(2):377-398.
35. Vittes KA, Vernick JS, Webster DW. Legal status and source of offenders' firearms in states with the least stringent criteria for gun ownership. *Injury Prevention*. 2013;19(1):26-31.
36. Hemenway D, Azrael D, Miller M. Gun use in the United States: results from two national surveys. *Injury Prevention*. 2000;6(4):263-267.
37. Kleck G, Gertz M. Armed resistance to crime: the prevalence and nature of self-defense with a gun. *J Crim L & Criminology*. 1995;86:150.
38. Crime in the United States, 1995. In: Justice UDo, ed. Washington, DC1996.
39. Wellford CF, Pepper JV, Petrie CV. Firearms and violence: A critical review. Committee to Improve Research Information and Data on Firearms. Washington, DC: The National Academies Press; 2005.
40. Lott J, John R, Mustard DB. Crime, deterrence, and right-to-carry concealed handguns. *The Journal of Legal Studies*. 1997;26(1):1-68.
41. Durlauf SN, Navarro S, Rivers DA. *Model Uncertainty and the Effect of Shall-issue Right-to-carry Laws on Crime*. National Bureau of Economic Research;2015.
42. Roeder OK, Eisen L-B, Bowling J, Stiglitz JE, Chettiar IM. What caused the crime decline? *Columbia Business School Research Paper*. 2015(15-28).
43. Phillips CD, Nwaiwu O, McMaughan Moudouni DK, Edwards R, Lin S-h. When Concealed Handgun Licensees Break Bad: Criminal Convictions of Concealed Handgun Licensees in Texas, 2001–2009. *American journal of public health*. 2013;103(1):86-91.
44. Swanson JW, Sampson NA, Petukhova MV, et al. Guns, Impulsive Angry Behavior, and Mental Disorders: Results from the National Comorbidity Survey Replication (NCS-R). *Behavioral sciences & the law*. 2015;33(2-3):199-212.
45. Everytown for Gun Safety. *Analysis of School Shootings - Appendix: School Shootings in America 2013-2015*. 2016.
46. Giedd J, Blumenthal J, Jeffries N, et al. Brain development during childhood and adolescence: a longitudinal MRI study. *Nat Neurosci*. 1999;2(10):861-863.
47. Giedd JN. The teen brain: insights from neuroimaging. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine*. 2008;42(4):335-343.
48. Johnson SB, Blum RW, Giedd JN. Adolescent maturity and the brain: the promise and pitfalls of neuroscience research in adolescent health policy. *J Adolesc Health*. 2009;45(3):216-221.

49. Casey BJ. Beyond simple models of self-control to circuit-based accounts of adolescent behavior. *Annual review of psychology*. 2015;66:295-319.
50. Johnson S, Giedd J. Normal brain development and child/adolescent policy. In: N. Levy JC, M Farah (Eds). ed. *Springer Handbook of Neuroethics*. New York: Springer; 2015.
51. Sisk CL, Zehr JL. Pubertal hormones organize the adolescent brain and behavior. *Frontiers in Neuroendocrinology*. 2005;26(3-4):163-174.
52. Casey BJ, Getz S, Galvan A. The adolescent brain. *Dev Rev*. 2008;28(1):62-77.
53. Somerville L, Jones R, Casey B. A time of change: Behavioral and neural correlates of adolescent sensitivity to appetitive and aversive environmental cues. *Brain Cogn*. 2010;72(1):124-133.
54. Lupien S, McEwen B, Gunnar M, Heim C. Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nat Rev Neurosci*. 2009;10(6):434-445.
55. Dreyfuss M, Caudle K, Drysdale AT, et al. Teens Impulsively React rather than Retreat from Threat. *Developmental Neuroscience*. 2014;36(3-4):220-227.
56. Chein J, Albert D, O'Brien L, Uckert K, Steinberg L. Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry. *Developmental science*. 2011;14(2):F1-10.
57. Sebastian C, Viding E, Williams KD, Blakemore S-J. Social brain development and the affective consequences of ostracism in adolescence. *Brain and Cognition*. 2010;72(1):134-145.
58. Dreyfuss M, Caudle K, Drysdale AT, et al. Teens Impulsively React rather than Retreat from Threat. *Developmental Neuroscience*. 2014;36(3-4):220-227.
59. Hunt J, Eisenberg D. Mental health problems and help-seeking behavior among college students. *Journal of Adolescent Health*. 2010;46(1):3-10.
60. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of general psychiatry*. 2005;62(6):593-602.
61. Kawa I, Carter JD, Joyce PR, et al. Gender differences in bipolar disorder: age of onset, course, comorbidity, and symptom presentation. *Bipolar disorders*. 2005;7(2):119-125.
62. Eisenberg D, Gollust SE, Golberstein E, Hefner JL. Prevalence and correlates of depression, anxiety, and suicidality among university students. *American Journal of Orthopsychiatry*. 2007;77(4):534-542.
63. Eisenberg D, Hunt J, Speer N, Zivin K. Mental health service utilization among college students in the United States. *The Journal of nervous and mental disease*. 2011;199(5):301-308.
64. American College Health Association. *National College Health Assessment: Spring 2015 Reference Group Executive Summary*. American College Health Association;2015.
65. Schwartz AJ. Rate, Relative Risk, and Method of Suicide by Students at 4-Year Colleges and Universities in the United States, 2004–2005 through 2008–2009. *Suicide and life-threatening behavior*. 2011;41(4):353-371.
66. Romero MP, Wintemute GJ. The epidemiology of firearm suicide in the United States. *Journal of Urban Health*. 2002;79(1):39-48.
67. Miller M, Azrael D, Barber C. Suicide mortality in the United States: the importance of attending to method in understanding population-level disparities in the burden of suicide. *Annual review of public health*. 2012;33:393-408.
68. Miller M, Azrael D, Hemenway D. Firearm availability and unintentional firearm deaths, suicide, and homicide among 5–14 year olds. *Journal of Trauma and Acute Care Surgery*. 2002;52(2):267-275.
69. Center for Disease Control and Prevention. WISQARS - Fatal Injury Reports, 2014. 2016; http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html. Accessed June 3, 2016.
70. Spicer RS, Miller TR. Suicide acts in 8 states: incidence and case fatality rates by demographics and method. *American Journal of Public Health*. 2000;90(12):1885.

71. Gogtay N, Giedd JN, Lusk L, et al. Dynamic mapping of human cortical development during childhood through early adulthood. *Proceedings of the National academy of Sciences of the United States of America*. 2004;101(21):8174-8179.
72. Insel BJ, Gould MS. Impact of modeling on adolescent suicidal behavior. *Psychiatric Clinics of North America*. 2008;31(2):293-316.
73. Hawton K. Assessment of suicide risk. *The British Journal of Psychiatry*. 1987.
74. Mann JJ, Waternaux C, Haas GL, Malone KM. Toward a clinical model of suicidal behavior in psychiatric patients. *American Journal of Psychiatry*. 1999;156(2):181-189.
75. Shaffer D, Craft L. Methods of adolescent suicide prevention. *Journal of Clinical Psychiatry*. 1999.
76. Brent DA. Firearms and suicide. *Annals of the New York Academy of Sciences*. 2001;932(1):225-240.
77. Kellermann AL, Rivara FP, Somes G, et al. Suicide in the home in relation to gun ownership. *New England Journal of Medicine*. 1992;327(7):467-472.
78. Grossman DC, Mueller BA, Riedy C, et al. Gun storage practices and risk of youth suicide and unintentional firearm injuries. *Jama*. 2005;293(6):707-714.
79. Arias E, Anderson RN, Kung H-C, Murphy SL, Kochanek KD. Deaths: final data for 2001. *National vital statistics reports*. 2003;52(3):1-116.
80. Brent DA, Perper JA, Allman CJ, Moritz GM, Wartella ME, Zelenak JP. The presence and accessibility of firearms in the homes of adolescent suicides: a case-control study. *Jama*. 1991;266(21):2989-2995.
81. Crifasi CK, Meyers JS, Vernick JS, Webster DW. Effects of changes in permit-to-purchase handgun laws in Connecticut and Missouri on suicide rates. *Preventive medicine*. 2015;79:43-49.
82. Barber CW, Miller MJ. Reducing a suicidal person's access to lethal means of suicide: a research agenda. *American journal of preventive medicine*. 2014;47(3):S264-S272.
83. Webster DW VJ, Zeoli AM, Manganello JA. Effects of youth-focused firearm laws on youth suicides. *JAMA*. 2004;292:594-601.
84. Miller M, Lippmann SJ, Azrael D, Hemenway D. Household firearm ownership and rates of suicide across the 50 United States. *Journal of Trauma and Acute Care Surgery*. 2007;62(4):1029-1035.
85. Pernanen K. *Alcohol in human violence*. New York: The Guilford Press; 1991.
86. Pernanen K. Prevention of alcohol-related violence. *Contemporary Drug Problems*. 1998;25(3):477-509.
87. Substance Abuse and Mental Health Services Administration (SAMHSA). Results from the 2014 National Survey on Drug Use and Health: Detailed Tables. 2015; <http://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs2014/NSDUH-DetTabs2014.htm#tab6-89b>. Accessed June 3, 2016.
88. Zhang L, Welte JW, Wieczorek WW. The role of aggression-related alcohol expectancies in explaining the link between alcohol and violent behavior. *Subst Use Misuse*. 2002;37(4):457-471.
89. Witte TH, Kopkin MR, Hollis SD. Is it dating violence or just "drunken behavior"? Judgments of intimate partner violence when the perpetrator is under the influence of alcohol. *Subst Use Misuse*. 2015;50(11):1421-1426.
90. Centers for Disease Control and Prevention. Alcohol-Related Disease Impact Software. 2015; http://apps.nccd.cdc.gov/DACH_ARDI/Default/Default.aspx. Accessed December 16, 2015.
91. Hingson R, Heeren T, Winter M, Wechsler H. Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18-24: Changes from 1998 to 2001. *Annual Review of Public Health*. 2005;26:259-279.

92. Greenfeld LA. Alcohol and Crime: An Analysis of National Data on the Prevalence of Alcohol Involvement in Crime. 1998; <http://www.bjs.gov/content/pub/pdf/ac.pdf>. Accessed June 3, 2016.
93. Zinzow HM, Thompson M. Factors associated with the use of verbally coercive, incapacitated, and forcible sexual assault tactics in a longitudinal study of college men. *Aggressive Behavior*. 2015;41:34-43.
94. Devries KM, Child JC, Bacchus LJ, et al. Intimate partner violence victimization and alcohol consumption in women: A systematic review and meta-analysis. *Addiction*. 2013;109(3):379-391.
95. Scribner RA, Mason KE, Simonsen NR, et al. An ecological analysis of alcohol-outlet density and campus-reported violence at 32 U.S. colleges. *Journal of Studies on Alcohol and Drugs*. 2010;71(2):184-191.
96. Miller M, Hemenway D, Wechsler H. Guns at college. *Journal of American College Health*. 1999;48(1):7-13.
97. Miller M, Hemenway D, Wechsler H. Guns and gun threats at college. *Journal of American College Health*. 2002;51(2):57-65.
98. Lester D, Geller W, Toch H. Officer attitudes toward police use of force. *Police violence: Understanding and controlling police abuse of force*. 1996:180-190.
99. Engel RS, Smith MR. Perceptual distortion and reasonableness during police shootings: Law, legitimacy, and future research. *Criminology & Public Policy*. 2009;8(1):141-151.
100. Nieuwenhuys A, Oudejans R. Effects of anxiety on handgun shooting behavior of police officers: A pilot study. *Anxiety, Stress, & Coping*. 2010;23(2):225-233.
101. Doerner WG, Ho T. SHOOT--DON'T SHOOT: POLICE USE OF DEADLY FORCE UNDER SIMULATED FIELD CONDITIONS. *Journal of Crime and Justice*. 1994;17(2):49-68.
102. Vila BJ, Morrison GB. Biological limits to police combat handgun shooting accuracy. *Am J Police*. 1994;13:1.
103. Oudejans R. Reality-based practice under pressure improves handgun shooting performance of police officers. *Ergonomics*. 2008;51(3):261-273.
104. Greenberg SF. State of security at US colleges and universities: A national stakeholder assessment and recommendations. *Disaster medicine and public health preparedness*. 2007;1(S1):S47-S50.
105. Deisinger G, Randazzo M, O'Neill D, Savage J. *The handbook for campus threat assessment & management teams*. Applied Risk Management Stoneham, MA; 2008.
106. Thompson A, Price JH, Mrdjenovich AJ, Khubchandani J. Reducing firearm-related violence on college campuses--Police chiefs' perceptions and practices. *Journal of American College Health*. 2009;58(3):247-254.
107. Griffin OR. Constructing a legal and managerial paradigm applicable to the modern-day safety and security challenge at colleges and universities. *Louis ULJ*. 2009;54:241.
108. Bouffard JA, Nobles MR, Wells W, Cavanaugh MR. How many more guns? Estimating the effect of allowing licensed concealed handguns on a college campus. *Journal of interpersonal violence*. 2012;27(2):316-343.

EXHIBIT 33

**ARRESTED DEVELOPMENT: RETHINKING THE
CONTRACT AGE OF MAJORITY FOR THE
TWENTY-FIRST CENTURY ADOLESCENT**

WAYNE R. BARNES*

ABSTRACT

The contract age of majority is currently age eighteen. Contracts entered into by minors under this age are generally voidable at the minor's option. This contract doctrine of capacity is based on the policy of protecting minors from their own poor financial decisions and lack of adultlike judgment. Conversely, the age of eighteen is currently set as the arbitrary age at which one will be bound to her contract, since this is the current benchmark for becoming an "adult." However, this Article questions the accuracy of age eighteen for this benchmark. Until comparatively recently, the age of contract majority had been twenty-one for centuries. The age was reduced to eighteen in the aftermath of protest over the military draft of eighteen-year-olds during the Vietnam War during the 1960s and 1970s, and the enactment of the Twenty-Sixth Amendment which lowered the voting age from twenty-one to eighteen. However, the appropriate age for the military draft bears little to no relation to the appropriate age for voting, or contracting. Moreover, other evidence points in the direction of age twenty-one as a more appropriate age of majority. First, scientific evidence of brain development has advanced to the point that we now know the brain does not stop developing until well into the twenties, which means the powers of cognition and decision-making are not fully developed until then. Second, sociological evidence suggests that most people do not perceive the full attributes of adulthood as having been reached until at least twenty-one, if not older. Third, other areas of the law have experiences in coming back to age twenty-one as an appropriate marker of adulthood—these include the age for purchasing alcohol, the age for obtaining a credit card, and soon (it appears) the age for purchasing cigarettes. This confluence of evidence suggests that the contract age of majority was always appropriately set at age twenty-one, and a return to that

© 2017 Wayne R. Barnes.

* Professor, Texas A&M University School of Law. I would like to thank Texas A&M University School of Law for its generous research assistance provided for this Article. I would also like to thanks Cheryl Preston for valuable comments on an earlier draft.

age of capacity for contracts will correct a historical misstep in the law.

TABLE OF CONTENTS

INTRODUCTION.....	406
I. MINORS AND CAPACITY TO CONTRACT.....	408
II. THE HISTORY OF THE AGE OF MAJORITY: FROM TWENTY-ONE TO EIGHTEEN	413
III. EMERGING EVIDENCE OF POST-EIGHTEEN ADOLESCENCE.....	418
A. Emerging Scientific Evidence of Adolescent Brain Development	419
B. Sociological Evidence of Delayed or “Emerging” Adulthood.....	423
C. Existing and Developing Recognition of Post-Eighteen Adolescence in the Legal Context	430
1. Legal Drinking Age	430
2. The Federal CARD Act	433
3. Legal Smoking Age	435
IV. A RETURN TO A MAJORITY AGE OF TWENTY-ONE AND SOME OBJECTIONS.....	437
A. Return to a Majority Age of Twenty-One	437
B. Possible Objections	443
V. CONCLUSION	446

INTRODUCTION

In the United States, an individual generally is considered to be an adult for contract purposes when he or she is eighteen years old.¹ Most contracts entered into by a person that is underage (referred to as “minors” or “infants”) are voidable at the minor’s option. On the other hand, contracts entered into by adults are not voidable for reason of capacity because of age.² Making the age of contract “adulthood” age eighteen is a comparatively recent development; the age of majority had, for centuries, been twenty-one.³ However, during a brief but tumultuous time of political and social upheaval in America in the 1960s and 1970s, largely as a result of the Vietnam War and the involuntary military draft that ensued for those eighteen and up, passage of the

1. JOSEPH M. PERILLO, *CONTRACTS* § 8.1 (7th ed. 2014); *see also* Cheryl B. Preston & Brandon T. Crowther, *Infancy Doctrine Inquiries*, 52 SANTA CLARA L. REV. 47, 50 n.8 (2012) (“Under the common law, this line was set as the day before the minor’s twenty-first birthday. Currently, the line is more often set as the minor’s eighteenth birthday rather than the preceding day.” (citing RESTATEMENT (SECOND) OF CONTRACTS § 14 cmt. a (AM. LAW INST. 1981))).

2. Preston & Crowther, *supra* note 1, at 50.

3. 5 SAMUEL WILLISTON, *A TREATISE ON THE LAW OF CONTRACTS* § 9:3 (7th ed. 2009).

Twenty-Sixth Amendment to the United States Constitution resulted in a decrease of the voting age from twenty-one to eighteen.⁴ Once this happened, most states lowered the age of adulthood for most legal categories from twenty-one to eighteen, including the contract age of majority.⁵ It does not appear that a great deal of independent analysis and thought went into lowering the age for each of the various legal categories at this time, but rather something on the order of “an adult for one purpose, an adult for all purposes.”⁶ In other words, if the age of adulthood was eighteen for purposes of serving in the military and voting, then eighteen-year-olds must be sufficiently “adultlike” for all legal purposes, including for purposes of capacity to contract.⁷

Forty years have elapsed since this arbitrary and sudden change, and this article raises the question: with the benefit of hindsight, and upon observing the maturity level of the typical eighteen- to twenty-year-old in the United States today, is the contract majority age of eighteen still warranted? That is, as a normative matter, based on the facts on the ground—rather than arbitrarily marrying the issue to other benchmarks, such as voting age—does it still make sense to say that most eighteen-year-olds possess adultlike judgment with respect to contractual and commercial matters such that the currently prevailing age of majority remains justified and defensible? Several considerations indicate that it may no longer make sense, if it ever did. For one, recent advancements in the knowledge of brain and cognitive development shed more light than has been previously known about the age at which persons become fully mature in a cognitive sense. For another, sociologists are beginning to observe the phenomenon of the increasingly extended nature of the twenty-first century American adolescence. The idea that young people are not fully adults at age eighteen has also been recognized in other comparatively recent developments in the law. Based on these developments, there is some reason to question the continuing validity of setting the contract age of majority at eighteen. This Article poses that question and proposes a solution.

Part I of the Article will discuss the rule of capacity in contract law, and the right of minors to disaffirm their contracts. Part II will discuss the history of the age of majority—originally set at age twenty-one and then lowered to age eighteen—and the historical reasons and context for that change. Part III will collect and discuss several observations with respect to the maturity and

4. See Jennifer Lai, *Old Enough to Vote, Old Enough to Smoke?*, SLATE (Apr. 23, 2013), http://www.slate.com/articles/news_and_politics/explainer/2013/04/new_york_minimum_smoking_age_why_are_young_people_considered_adults_at_18.html (“There’s no clear reason why 18 was chosen for the minimum voting age.”).

5. *Id.*; see WILLISTON, *supra* note 3, § 9:3 (discussing age of majority for contract).

6. Lai, *supra* note 4.

7. *Id.*

cognitive abilities of adolescents and young adults, with the benefit of recent developments in science, sociology, and the law. Part IV will consider whether a return to age twenty-one for the age of majority is warranted and possible objections to such a proposal. Part V will present a conclusion.

I. MINORS AND CAPACITY TO CONTRACT

In order to be able to enter into fully valid contracts, each party must possess, as a threshold matter, a sufficient capacity to contract.⁸ If a person lacks capacity, contract law seeks to give a remedy in order to protect that person against both his own unwise judgment as well as the exploitation of his incapacity by others.⁹ The two main categories of incapacity in contract law are: (1) minors,¹⁰ and (2) mental incapacity.¹¹ The contract doctrine of capacity is, as Farnsworth describes it, a choice between “competing policies—on the one side favoring protection of the party that lacks capacity, and on the other favoring protection of the other party’s expectation, reliance, and restitution interests.”¹² Thus, the contract rule of minors is generally seen as a reconciliation of these policy concerns: protecting the disadvantaged minor on the one hand, but vindicating, to some degree, the expectations of the adult contracting party on the other hand.

At least one additional reason for the minor-capacity rule may exist, which is not as frequently cited. According to Robert Edge in an influential article on the rights of minors:

A father was due the earnings of an unemancipated minor until the latter reached his majority. One way to make certain that the father would not be deprived of this was by allowing disaffirmation of the child’s contract when he spent his earnings on something considered foolish by his father, such as a pair of boots. Also, if a minor sold his father’s cow and took the money to buy something for himself, the father could regain his cow if the minor could disaffirm the contract.¹³

8. 1 E. ALLAN FARNSWORTH, FARNSWORTH ON CONTRACTS § 4.2 (3d ed. 2004).

9. *Id.*

10. PERILLO, *supra* note 1, § 8.1, at 260.

11. FARNSWORTH, *supra* note 8, § 4.2, at 442. Because this Article is only concerned with the rule of minors and strict “age” capacity, I will henceforth limit my focus to that rule. Other types of incapacity have existed in contract law. For instance, at one point, “the common law regarded a woman’s marriage as depriving her for the life of her husband of separate legal identity, including the capacity to contract, but this disability was largely removed by statutes enacted in the nineteenth century, long before women were given the right to vote.” *Id.* at 442–43.

12. *Id.* at 443.

13. Robert G. Edge, *Voidability of Minors’ Contracts: A Feudal Doctrine in a Modern Economy*, 1 GA. L. REV. 205, 221–22 (1967) (footnotes omitted) (citing James L. Sivils, Jr., Comment, *Contracts—Capacity of the Older Minor*, U. KAN. CITY L. REV. 230 (1962); and then citing 2 WILLISTON, CONTRACTS § 245 (3d. ed. 1959)).

In fact, the general rule remains today that a minor's wages belong to the parents; the rule is seen as reciprocal in nature to the corresponding duty of the parents to give support to the child.¹⁴ Seen in this light, the capacity rule is thus also a rule of protection for the parents, as well as the minor.

In any event, the law has always been clear that the rule for age capacity is a bright-line, arbitrary, age-based one. Once a person attains a particular age, she is presumptively an adult and can legally enter into valid contracts.¹⁵ The bright-line rule, however, does not take into account the fact that different people obviously have different levels of maturity at different ages.¹⁶ Moreover, in most jurisdictions it makes no difference if the minor is married or emancipated from her parents—she will be protected by the rule until reaching the age of majority, regardless.¹⁷ As mentioned above, for centuries the age of majority for contract purposes was twenty-one.¹⁸ However, in the 1970s, most states reduced the age of majority to age eighteen in the aftermath of the reduction of the voting age to eighteen by constitutional amendment.¹⁹ The history of the original age of twenty-one as the majority age, as well as the historical reasons and context for lowering it to age eighteen, is of course part and parcel to the thesis of this Article, and will be discussed in much more detail in the next Part and beyond. For now, the point is that the applicability of the rule of age-based capacity in contracts is a very simple one: once one attains the specified age, she attains capacity to contract and is deemed by the law to have sufficient age, maturity, and judgment to safely enter into contracts which are binding and non-voidable.²⁰

The legal effect of a minor entering into a contract is that the contract is voidable at the minor's option.²¹ The reason is that the "law recognizes that [minors] . . . are not fully accountable for their actions because they lack the

14. See 59 AM. JUR. 2D, *Parent and Child* § 39 (2012); see also WILLISTON, *supra* note 3, § 9:4.

15. FARNSWORTH, *supra* note 8, § 4.3, at 443.

16. *Id.*

17. *Id.* at 444 (citing *Kiefer v. Fred Howe Motors*, 158 N.W.2d 288 (Wis. 1968)). But see ALASKA STAT. § 25.20.020 (providing that when a person marries, he or she "arrives at the age of majority"); *Mitchell v. Mitchell*, 963 S.W.2d 222, 223 (Ky. App. 1998) (providing that marriage of a minor "emancipates the minor [but] does not . . . make the minor *sui juris*" and may "be indicative of a lack of wisdom and maturity").

18. WILLISTON, *supra* note 3, § 9:3, at 8 (citing *Jones v. Jones*, 72 F.2d 829 (D.C. Cir. 1934)); see also FARNSWORTH, *supra* note 8, § 4.3, at 443.

19. FARNSWORTH, *supra* note 8, § 4.3, at 445.

20. Of course, reaching the age of majority does not prevent a person from arguing that other problems with the contract exist, such as mistake. RESTATEMENT (SECOND) OF CONTRACTS §§ 153–154 (AM. LAW. INST. 1981). See also *id.* §§ 163–64 (misrepresentations); *id.* §§ 174–75 (duress); *id.* § 177 (undue influence); *id.* § 178 (public policy grounds); *id.* § 208 (unconscionability).

21. FARNSWORTH, *supra* note 8, § 4.4, at 446 (citing 8 W. HOLDSWORTH, HISTORY OF ENGLISH LAW 51 (1926)).

capacity to exercise mature judgment.”²² Farnsworth explains the operation of the rule: “there is a contract if no further action is taken at the minor’s instance, but . . . the effects of the contract can be avoided if appropriate steps are taken on the minor’s behalf.”²³ The “steps” to avoid the contract are known in contract law as *disaffirmance*, and must be undertaken by either the minor or the minor’s legal representatives.²⁴ There is no particular formula or method by which the minor must disaffirm. All that is generally required is some form of communication of an intent to disaffirm, or conduct evidencing such intent, or pleading the defense in a lawsuit regarding the contract.²⁵

The minor is not, of course, required to disaffirm the contract entered into during minority. She may, instead, upon reaching the age of majority, choose to retain its benefits and thereby give up the ability to disaffirm. This is known as *ratification*.²⁶ The steps involved in ratification are similarly straightforward as the steps for disaffirmance: “Any manifestation of an undertaking to be bound by the original transaction will suffice as a ratification.”²⁷ A person may effect ratification verbally, in writing or orally, “or by other conduct such as performance or acceptance of the other party’s performance under the contract.”²⁸ It is worth emphasizing that the power to ratify is limited to those who have reached the age of majority—a minor has no more capacity to irrevocably bind herself to a ratification than she has the ability to irrevocably bind herself to the underlying contract in the first place.²⁹ Most courts state that the person is required to exercise the option of disaffirmance within a reasonable time after reaching the age of majority, or she will lose such option (as a court would deem her to have ratified the contract by her silence).³⁰ However, the ultimate effect of the rule on minority is to give the minor flexibility—she may choose to avoid the contract by disaffirming it, or she may instead choose to keep the contract by ratifying it. It is thus a misnomer to say that the minor’s incapacity removes the ability to

22. *Davis ex rel. LaShonda D. v. Monroe Cty. Bd. of Educ.*, 526 U.S. 629, 672 (1999) (Kennedy, J., dissenting) (citing FARNSWORTH, *supra* note 8, at § 4.4).

23. FARNSWORTH, *supra* note 8, § 4.4, at 446.

24. *Id.* at 447.

25. *Id.*

26. *Id.* at 447

27. *Id.* 447–48.

29. *Id.* at 447 (stating that “[a]n effective ratification cannot be made by one who is not yet of age” (citing *Oubre v. Entergy Operations*, 622 U.S. 422 (1998) (Scalia, J., dissenting))).

29. *Id.* at 447 (stating that “[a]n effective ratification cannot be made by one who is not yet of age” (citing *Oubre v. Entergy Operations*, 622 U.S. 422 (1998) (Scalia, J., dissenting))).

30. *Id.* at 448–49 (discussing *Walker v. Stokes Bros.*, 262 S.W. 158, 160 (Tex. Civ. App. 1924)). Farnsworth observes: “Although it is often said that the minor must act within a reasonable time after coming of age, the minor is rarely precluded from avoidance by delay, as long as there has been no demonstrable reliance on the transaction by the other party.” *Id.* at 449 (citing *Cassella v. Tiberio*, 80 N.E.2d 426 (Ohio 1948)).

contract.³¹ Rather, the minor may contract if she chooses, but the law gives a safety net to the minor who makes an improvident or foolish choice by allowing the minor to choose to disaffirm upon reaching majority.³²

If a minor chooses to disaffirm a contract, she must generally return any goods or items still in her possession. Otherwise, however, the majority rule is that the minor need not pay anything to the other party for use of the items, the value of services received (which cannot be returned), or for damage or depreciation of the item while in her possession and use.³³ The traditional rationale for this position is that, “[e]ven if a minor has squandered or destroyed what has been received, the loss is regarded as ‘the result of the very improvidence and indiscretion of infancy which the law has always in mind.’”³⁴ A tiny minority of jurisdictions has refused to follow the general rule, going so far as to require the minor to make full restitution for all benefits received upon disaffirmance, a quasi-contract recovery.³⁵ Notably, the recently enacted Third Restatement of Restitution and Remedies adopted the minority approach.³⁶ However, most jurisdictions do not follow this rule;

31. Although the rule seemingly gives minors complete flexibility, it must be conceded that the capacity rule may discourage some from entering into contracts with minors. *See id.* § 4.3, at 444 (“[M]iserable must the condition of minors be, excluded from the society and commerce of the world.” (quoting *Zouch v. Parsons*, 97 Eng. Rep. 1103, 1106–07 (K.B. 1765))). *But see id.* at 445 (“[S]ubstantial areas of commercial activity have developed that could scarcely survive without the patronage of those who are known to be minors.” (citing *Edge*, *supra* note 13, at 227–32)). The policy issue of the willingness (or lack thereof) of others to contract with minors will be discussed more in Part IV, *infra*.

32. PERILLO, *supra* note 1, at 261. Perillo points out:

Because of the one-sided power of avoidance held by the infant it might seem anomalous to speak in terms of the limited capacity of infants. To some observers it has seemed that the infant has capacity to contract coupled with an additional power of disaffirmance. It has been said that “the law confers a privilege rather than a disability.”

Id. (quoting LAURENCE P. SIMPSON, *CONTRACTS* 216 (2d ed. 1965)).

33. FARNSWORTH, *supra* note 8, § 4.5, at 450.

34. *Id.* (quoting *Utterstrom v. Myron D. Kidder, Inc.*, 124 A. 725, 726 (Me. 1924)). Farnsworth criticizes the rule, stating: “The law in this area would surely be simpler and arguably fairer if the minor were accountable in full for the benefit received.” *Id.* To bolster his argument, Farnsworth quoted the New York Court of Appeals as stating:

That young men, nearly twenty-one years of age, actively engaged in business, can at will revoke any or all of their business transactions and obligations, thereby causing loss to innocent parties dealing with them, upon the assumption or even the assurance that they were of age, has not appealed to some courts, and has been adopted without much enthusiasm by others.

Id. at 450–51 (quoting *Sternlieb v. Normandie Nat’l Sec. Corp.*, 188 N.E. 726, 726 (N.Y. 1934)).

35. *Id.* at 451; *see also, e.g.*, *Valencia v. White*, 654 P.2d 287 (Ariz. 1982); *Kelly v. Furlong*, 261 N.W. 460 (Minn. 1935); *Porter v. Wilson*, 209 A.2d 730 (N.H. 1965); *Bartlett v. Bailey*, 59 N.H. 408 (1879); *Hall v. Butterfield*, 59 N.H. 354 (1879).

36. RESTATEMENT (THIRD) OF RESTITUTION AND UNJUST ENRICHMENT § 33 (AM. LAW. INST. 2011); *see also* Joseph M. Perillo, *Restitution in a Contractual Context and the Restatement*

rather, they only require the minor to make restitution for the value of benefits received upon disaffirmance when an exception applies, such as the necessities doctrine or misrepresentation of age.³⁷ Such exceptions will be discussed next.

The most-adopted exception is the well-known *necessaries* doctrine, in which the minor will be responsible for paying the reasonable value of any items necessary for her survival.³⁸ The policy behind the necessities rule is “that unless an infant can get credit for necessities he may starve.”³⁹ What items are necessities is generally considered a question of law, and the determination depends on a number of factors including socioeconomic status, as well as the extent to which the minor’s parents or guardians have failed to obtain the items in question.⁴⁰ Items which have typically been upheld as constituting necessities include food, clothing, shelter, medical care, and legal services.⁴¹

Another exception adopted by a “substantial” number of jurisdictions is the *minor-as-plaintiff* rule, whereby “the minor, as plaintiff, seeks recovery of money paid.”⁴² This is to be distinguished from the situation where the minor merely raises her incapacity as a defense to suit brought by the other party to the transaction.⁴³ The jurisdictions that adopt this exception do so based on the admonition that “the privilege of infancy is to be used as a shield and not as a sword.”⁴⁴ As Farnsworth explains the minor-as-plaintiff position:

The result is that one who furnishes goods or services to a minor for cash is entitled to restitution in full in the event of avoidance, while one who furnishes them on credit is not. . . . From the minor’s point of view, to the extent that one pays cash, one is fully accountable for the benefit received, while to the extent that one has used credit, one is not. One is, in short, protected against improvident *commitment* but not the improvident *outlay of cash*.⁴⁵

The third exception that will be mentioned here, adopted by some jurisdictions, is the minor’s *misrepresentation of age*—in other words, the minor

(*Third of Restitution & Unjust Enrichment*, 68 WASH. & LEE L. REV. 1007, 1016–17 (2011) (criticizing the Restatement’s broadening of the circumstances under which a minor may be required to pay restitution).

37. FARNSWORTH, *supra* note 8, § 4.5, at 451.

38. *Id.*

39. *Id.* (quoting *Turner v. Gaither*, 83 N.C. 357, 361 (1879)).

40. *Id.* at 451–52 (citing *Int’l Text-Book Co. v. Connelly*, 99 N.E. 722, 725 (N.Y. 1912)).

41. *Id.* at 452.

42. *Id.* at 453.

43. *Id.* at 453–54.

44. *Id.* at 454 (quoting 2 JAMES KENT, COMMENTARIES ON AMERICAN LAW 240 (3d ed. 1836)).

45. *Id.* (emphasis added).

lies and says that she is an adult.⁴⁶ Not all jurisdictions allow this exception. The ones that do reason that “a minor is liable for torts and a fraudulent misrepresentation of age is actionable as a tort if it induced reliance by the other party.”⁴⁷ However, the jurisdictions that allow the misrepresentation exception generally require an affirmative misrepresentation by the minor—mere recitals in standard form contracts about age of majority have been held insufficient.⁴⁸ Many jurisdictions do not apply this exception, however, reasoning that to do so “would involve indirect enforcement of the contract.”⁴⁹ In any event, the misrepresentation rule appears to only be a minority rule; the prevailing view is that a “minor’s representation of his age does not bar him from disaffirming his contract.”⁵⁰

The rule allowing minors the option of disaffirming their contracts is for their protection. It serves to protect them from unscrupulous adults, as well as their own lack of judgment and poor decisionmaking.⁵¹ As Cheryl Preston and Brandon Crowther have explained, “[t]he doctrine is based on the presumption that minors are generally easily exploitable and less capable of understanding the nature of legal obligations that come with a contract.”⁵² This doctrine is well settled and is designed to “look after the interest of [minors],” who have long been considered worthy of the law’s protection, especially in the area of contracts.⁵³

II. THE HISTORY OF THE AGE OF MAJORITY: FROM TWENTY-ONE TO EIGHTEEN

The age-based capacity rule for contracts is, as discussed above, a bright-line, arbitrary test—a person is presumed to lack capacity to contract

46. *Id.* Examples of this occurring in pop culture are legion, but for some reason the one that sticks with me is the character in the movie *Superbad* that has a fake ID made in order to purchase alcohol—the ID contains the single name “McLovin.” See *SUPERBAD* (Sony Pictures 2007).

47. FARNSWORTH, *supra* note 8, § 4.5, at 454 (citing *Byers v. Lemay Bank & Trust Co.*, 282 S.W.2d 512 (Mo. 1955); *Wisconsin Loan & Fin. Corp. v. Goodnough*, 228 N.W. 484 (Wis. 1930); *Gillis v. Whitley’s Discount Auto Sales*, 319 S.E.2d 661 (N.C. App. 1984)).

48. *Id.* (citing *Kiefer v. Fred Howe Motors*, 158 N.W.2d 288 (Wis. 1968); *Rutherford v. Hughes*, 228 S.W.2d 909 (Tex. Civ. App. 1950)).

49. *Id.* at 455 (citing *Sternlieb v. Normandie Nat’l Sec. Corp.*, 188 N.E. 726, 726 (N.Y. 1934); *Creer v. Active Auto. Exch.*, 121 A. 888 (Conn. 1923); *Slayton v. Barry*, 56 N.E. 574 (Mass. 1900)).

50. *Gillis v. Whitley’s Discount Auto Sales*, 319 S.E.2d 661, 666 (N.C. App. 1984) (citing *Greensboro Morris Plan Co. v. Palmer*, 185 N.C. 109 (1923); *Carolina Interstate Bldg. & Loan Ass’n v. Black*, 119 N.C. 323 (1896)); see also Preston & Crowther, *supra* note 1, at 59–62 (2012) (discussing the misrepresentation exception and its possibly inconsistent application).

51. Preston & Crowther, *supra* note 1, at 50.

52. *Id.* (citing *City of New York v. Stringfellow’s of N.Y., Ltd.*, 684 N.Y.S.2d 544, 550–51 (N.Y. App. Div. 1999); *Loveless v. State*, 896 N.E.2d 918, 920–21 (Ind. Ct. App. 2008)).

53. *Stringfellow’s of N.Y.*, 684 N.Y.S.2d at 551 (“It is the policy of the law to look after the interests of infants, who are considered incapable of looking after their own affairs, to protect them from their own folly and improvidence, and to prevent adults from taking advantage of them.”).

(thereby giving her the power of disaffirmance) up until the moment she reaches the age of majority. Therefore, this area of the law has always operated by selecting a specific age as the benchmark, even though such arbitrary line drawing is imperfect because the actual maturity, wisdom, and judgment of people at various ages differs considerably.⁵⁴ Although the law could instead opt for a more flexible, case-by-case approach to determine the wisdom and maturity of each minor in a dispute, “[t]he costs and uncertainties of distinguishing the capacities of minors . . . preclude any rule except an arbitrary one.”⁵⁵

Williston notes that “[f]or centuries, the age of 21 was fixed by the law as that age at which either a man or a woman was regarded by the law as acquiring full capacity.”⁵⁶ There is nothing magical about the way that the age of twenty-one was historically selected.⁵⁷ Various cultures and civilizations have adopted different ages at different times, sometimes (but not always) coinciding with the age for military service.⁵⁸ One court described some significant historical ages of majority thusly:

The male child of an Athenian citizen reached majority at 18 and was qualified for membership in the assembly at age 20; however, age 30 was a requirement for service on a jury. In ancient Sparta, males did not reach majority until 31. In Rome, increased emphasis on education led to a correlation of understanding of the law to the age of majority, which was eventually set at 14. This prevailed in northern parts of Europe and in England during the ninth, tenth and eleventh centuries. The expanding role of the mounted knight after the Norman Conquest led to heavier mail shirts and coifs, as well as shields and armor. With the advent of knighthood, the age of majority rose to 21; for at that time, young men were first capable of meeting its physical and mental demands. . . .

54. FARNSWORTH, *supra* note 8, § 4.3, at 443.

55. JOHN EDWARD MURRAY, JR., MURRAY ON CONTRACTS § 24, at 46 (4th ed. 2001).

56. WILLISTON, *supra* note 3, § 9:3, at 8.

57. N.J. State Policemen’s Benevolent Ass’n of N.J., Inc. v. Town of Morristown, 320 A.2d 465, 470 (N.J. 1974) (“There is no magic to the age of 21.”). See also NAT’L ASS’N OF SECONDARY SCH. PRINCIPALS, THE CHANGING AGE OF MAJORITY 2 (1974), <http://files.eric.ed.gov/fulltext/ED099996.pdf>. The report stated:

Actually, there was nothing either sacred or inherently logical in establishing 21 as the appropriate age at which the law should recognize a person as being an adult. There was a recognized need to establish some point at which the full rights and responsibilities were extended, and the age of 21 was tacitly agreed upon. This apparently grew out of the Act of Parliament of the Province of Massachusetts Bay, which established 21 as the age for performing certain civic duties back in 1751. But the age of 21 for establishing majority goes back even further in Anglo-American legal history—at least to 1620 when the age for serving in the English Army had reached this level. This age had been rising for several centuries because of the increasing weight of armor.

Id.

58. N.J. State Policemen’s Benevolent Ass’n of N.J., Inc., 320 A.2d at 470.

From this point on, the age of 21 seem [sic] gradually to be accepted, even though the specific reasons for its appearance had long since passed.⁵⁹

Thus, the majority age of twenty-one was settled in England around the fifteenth century.⁶⁰ The point, at present, is that once it was so established, it was accepted and endured as the unquestioned legal age of majority for a period approaching half a millennium. As Andrew Schwartz has noted, “[t]his rule remained remarkably stable from the Middle Ages until well into the twentieth century.”⁶¹

The universal move to lower the age of majority to eighteen arose out of public debate in the 1960s and early 1970s, primarily with respect to the voting age at a time when eighteen-year-olds were being drafted into service in the Vietnam War.⁶² Like the contract age of majority, prior to this time the voting age had always been twenty-one in the United States, as it had been in England before colonization.⁶³ But something changed in the first half of the twentieth century: federal law authorized eighteen-year-old males to be involuntarily called into military service during both World War I and World War II.⁶⁴ The need to draft eighteen-year-olds into military service was obviously related to the exigent national emergency needs of the time.⁶⁵ When the age for eligibility for military service dropped, however, states began discussing lowering the voting age as well. Two states—Georgia and Kentucky—lowered the voting age to eighteen in the 1940s and 1950s, respectively,⁶⁶ and President Eisenhower even expressed support for the change as a matter of federal law.⁶⁷

However, the overall sentiment during and after World War II remained that twenty-one was the appropriate age of majority for voting and other purposes besides the draft. For example, in a 1939 poll, a mere seventeen percent of the American populace was in favor of reducing the voting age.⁶⁸ As

59. *Id.*; see also Note, *Infants' Contractual Disabilities: Do Modern Sociological and Economic Trends Demand a Change in the Law?*, 41 IND. L.J. 140, 143 (1965).

60. Note, *supra* note 59, at 140.

61. Andrew A. Schwartz, *Old Enough to Fight, Old Enough to Swipe: A Critique of the Infancy Rule in the Federal Credit CARD Act*, 2011 UTAH L. REV. 407, 410.

62. *Id.* at 410–15.

63. *Id.* at 410, 411; see also WENDELL W. CULTICE, *YOUTH'S BATTLE FOR THE BALLOT: A HISTORY OF VOTING AGE IN AMERICA* 2–3 (1992).

64. *Id.* at 411 (citing CULTICE, *supra* note 63, at 16, 20).

65. Franklin D. Roosevelt, Statement on Signing the Bill Reducing the Draft Age (Nov. 13, 1942), <http://www.presidency.ucsb.edu/ws/?pid=16198> (“The time has now come when the successful prosecution of the war requires that we call to the colors the men of eighteen and nineteen. Many have already volunteered. Others have been eagerly awaiting the call. All are ready and anxious to serve.”).

66. CULTICE, *supra* note 63, at 206.

67. *Id.* at 51, 56.

68. Schwartz, *supra* note 61, at 411 (citing CULTICE, *supra* note 63, at 53).

Schwartz notes, “[t]he prevailing view of lawmakers and their constituents in the immediate post-war years remained what it had been for centuries, namely that the voting age should be twenty-one.”⁶⁹ Numerous attempts to lower the voting age, both state and federal, in the 1950s and 1960s ended in failure.⁷⁰ The popular opinion seemed to remain that the age to fight had little to nothing to do with the age to vote.⁷¹ Therefore, as of 1970, the voting age remained twenty-one under federal law and in all but four of the states.⁷²

The era of the Vietnam War appears to be what finally turned the tide.⁷³ Eighteen-year-olds were subject to the draft again; “[t]his time, however, the movement to lower the voting age to eighteen was carried along as part of the massive civil rights, antiwar, counterculture, and other social movements of the late 1960s and early 1970s.”⁷⁴ Many youth organizations forcefully advocated for the reduction in voting age, but they were not alone—other groups joined their cause, including the NAACP, the National Education Association, the American Jewish Committee, and the United Auto Workers union.⁷⁵ The oft-used slogan for the cause was “[o]ld enough to fight, old enough to vote.”⁷⁶ The principle argument, in the face of soldiers dying daily in Vietnam, was that it was “surely unjust . . . to command men to sacrifice their lives for a decision which they had no part in making.”⁷⁷

In the face of these youthful protests, and the dynamics at work in sending eighteen-year-olds to war under a political regime they had had no say in selecting, public opinion shifted. Eighteen-year-olds were increasingly seen as adults with greater maturity.⁷⁸ President Nixon at the time argued in favor of lowering the voting age: “The younger generation today is better educated, it knows more about politics, more about the world than many of the older people. That is why I want them to vote, not because they are old enough to

69. *Id.* at 411–12 (citing CULTICE, *supra* note 63, at 44–49).

70. *Id.* at 412; CULTICE, *supra* note 63, at 141–59, 206.

71. See ALEXANDER KEYSSAR, THE RIGHT TO VOTE: THE CONTESTED HISTORY OF DEMOCRACY IN THE UNITED STATES 226 (rev. ed. 2009) (noting New York Congressman Emanuel Celler’s point that “[t]he thing called for in a soldier is uncritical obedience, and that is not what you want in a voter”).

72. See CULTICE, *supra* note 63, at 206 (listing Georgia, Kentucky, Alaska and Hawaii as the four states that successfully lowered the voting age to eighteen prior to 1970).

73. Schwartz, *supra* note 61, at 412.

74. *Id.* (citing KEYSSAR, *supra* note 71, at 279; *Jolicoeur v. Mihaly*, 488 P.2d 1, 7 (Cal. 1971)).

75. *Id.*; CULTICE, *supra* note 63, at 99.

76. Schwartz, *supra* note 61, at 412 (citing CULTICE, *supra* note 63, at 234).

77. *Id.* (citing *Lowering the Voting Age to 18: Hearings Before the Subcomm. on Constitutional Amendments of the S. Comm. on the Judiciary*, 90th Cong. 20–21 (1968) (statement of R. Spencer Oliver, President, Young Democratic Clubs of America); *Oregon v. Mitchell*, 400 U.S. 112, 141–42 (1970) (Douglas, J., dissenting)).

78. *Id.* at 413 (citing CULTICE, *supra* note 63, at 98).

fight but because they are smart enough to vote.”⁷⁹ A court opinion from this same era reflected this view: “[T]oday’s youth is better informed and more mature than any other generation in the nation’s history.”⁸⁰ Even anthropologist Dr. Margaret Mead testified that the eighteen- to twenty-one-year-olds at that time “are not only the best educated generation that we have ever had, and the segment of the population that is better educated than any other group, but also they are more mature than young people in the past.”⁸¹ Therefore, as Andrew Schwartz notes, “[a]ll of this was a sea change from the view of eighteen-year-olds as infants that prevailed from the Middle Ages through the 1950s.”⁸²

And thus, in the onslaught of protest, the dynamics of the Vietnam War, and politicians joining the chorus, public opinion shifted by the end of the 1960s to substantial approval of reducing the voting age to eighteen.⁸³ From there, the political machinations sprang into action. In 1970, with bipartisan support, Congress added an amendment to the Voting Rights Act to lower the voting age to eighteen for all elections at both the state and federal level.⁸⁴ Soon after, the Supreme Court subsequently held in *Oregon v. Mitchell*⁸⁵ that the statutory attempt to set the required state voting age was unconstitutional.⁸⁶ But the political and public desire for a conclusive resolution of the matter was such that mere unconstitutionality was no serious obstacle. In the swiftest amendment process in the history of the United States (about 100 days from congressional approval to requisite state approvals), the Twenty-Sixth Amendment was passed, constitutionally extending the right to vote to all citizens eighteen years of age or older.⁸⁷ In the aftermath of the enactment of the Twenty-Sixth Amendment, all states modified their laws to lower the voting age to eighteen.⁸⁸ The public discussion and changes to the voting

79. Lewis J. Paper, Note, *Legislative History of Title III of the Voting Rights Act of 1970*, 8 HARV. J. ON LEGIS. 123, 136 (1970) (quoting *Hearings on S.J. Res. 147 and Others Before the Subcomm. on Constitutional Amendments of the Senate Comm. on the Judiciary*, 91st Cong. 129, 130 (1970) (unpublished transcripts of hearings)).

80. *Jolicoeur v. Mihaly*, 488 P.2d 1, 5 (Cal. 1971).

81. S. REP. NO. 92-26, at 4 (1971).

82. Schwartz, *supra* note 61, at 413–14.

83. *Id.* at 414; THOMAS H. NEALE, CONG. RESEARCH SERV., REPORT NO. 83-103 GOV, THE EIGHTEEN YEAR OLD VOTE: THE TWENTY-SIXTH AMENDMENT AND SUBSEQUENT VOTING RATES OF NEWLY ENFRANCHISED AGE GROUPS 7 (1983), https://digital.library.unt.edu/ark:/67531/meta-crs8805/m1/1/high_res_d/83-103GOV_1983May20.pdf (noting a sixty-four percent approval rate among Americans for lowering the voting age to eighteen, according to a 1967 Gallup poll).

84. CULTICE, *supra* note 63, at 125, 137.

85. 400 U.S. 112 (1970).

86. *Id.* at 117–18.

87. U.S. CONST. amend XXVI; Schwartz, *supra* note 61, at 414 (citing CULTICE, *supra* note 63, at 214).

88. *See Roper v. Simmons*, 543 U.S. 551, 581–83 (2005) (listing in Appendix B state statutes establishing minimum voting ages).

age, however, had further reverberations. The age of required juror service and the age at which the death penalty could be assessed were also subsequently lowered in most states to eighteen.⁸⁹

This wave of age-reductions in the law also reached the law of contracts. Indeed, during the ongoing national discussion on lowering the voting age in the 1960s and 1970s, reference was also frequently made to the additional benefit of giving American youth “a piece of the action”—in other words, the ability to make contracts and engage in business, commerce, and entrepreneurship.⁹⁰ The longstanding rule of twenty-one as the contract age of majority was seen as a serious impediment to this ideal. Therefore, in a wave of state statutory changes that mirrored the debate and processes of reducing the voting age, the vast majority of states lowered the age of majority for contract purposes from twenty-one to eighteen.⁹¹ At least some commentators expressed confusion: “[p]erhaps less clearly understood than the reason for establishing the age of majority at 21 are the reasons many states began reducing it suddenly after so many years.”⁹² The nationwide change was so complete that when the *Restatement (Second) of Contracts* was promulgated in 1979, it provided that the contract age of majority was eighteen.⁹³ Thus, when the dust of the turbulent 1960s and 1970s had settled, the contract age of majority, along with the military draft age and voting age, came to be fixed at the age of eighteen.

III. EMERGING EVIDENCE OF POST-EIGHTEEN ADOLESCENCE

Since the voting age was lowered to eighteen in the early 1970s, eighteen has also remained as the age of majority for contracting. However, in the decades that have gone by, research and developments in the law have emerged that arguably establish that age eighteen is not the most appropriate legal demarcation between adolescence and adulthood for contract (and perhaps other) purposes. This Part will gather and discuss some of this evidence, which has been developed in the scientific, sociological and legal fields.

89. Schwartz, *supra* note 61, at 415, 416.

90. *Id.* at 417 (quoting CULTICE, *supra* note 63, at 98, 103).

91. See FARNSWORTH, *supra* note 8, § 4.3, at 445; MURRAY, *supra* note 55, § 24, at 45 n.208 (“The twenty-sixth amendment to the U.S. Constitution lowered the voting age to 18. This prompted almost all of the states to enact statutes reducing the age of majority for contracting to 18.” (citing 23 PA. CONS. STAT. § 5101 (2000))); PERILLO, *supra* note 1, § 8.1, at 260 (citing U.S. DEP’T OF HEALTH & HUMAN SERVS., THE LEGAL STATUS OF ADOLESCENTS 1980 (1981)); WILLISTON, *supra* note 3, at § 9:3, at 14–15 (citing state statutes enacting majority age of eighteen).

92. NAT’L ASS’N OF SECONDARY SCH. PRINCIPALS, *supra* note 57, at 2.

93. RESTATEMENT (SECOND) OF CONTRACTS § 14 (AM. LAW INST. 1981) (“Unless a statute provides otherwise, a natural person has the capacity to incur only voidable contractual duties until the beginning of the day before the person’s eighteenth birthday.”).

A. *Emerging Scientific Evidence of Adolescent Brain Development*

Scientific research over the past several decades has confirmed what we have known for centuries: that adolescents lack the sophistication, reasoning ability, and judgment of mature adults. One basis that has led researchers to conclude that adolescents are less mature is their behavior.⁹⁴ Behavior manifests lack of maturity in at least three ways. First, adolescents are bigger risk-takers than adults, because they are more highly driven by the desire for immediate gratification than adults.⁹⁵ Second, minors have less impulse control, and thus are “less able than adults to consistently reflect before they act.”⁹⁶ Gaining the ability to control impulses is critical for effective problem solving, logical thinking, and reliably dependable discernment.⁹⁷ Third, adolescents have a poorer ability to regulate their emotions: “stress can affect adolescents’ ‘ability to effectively regulate behavior as well as . . . to weigh costs and benefits and override impulses with rational thought.’”⁹⁸

While the developmental patterns of adolescent behavioral immaturity have long been known and identified, the increasing role of neuroscience in this area of study has provided new explanations for such behavior.⁹⁹ Specifically, the development of MRI scans in the 1990s yielded revealing new information about the young brain.¹⁰⁰ By using MRI images, researchers are able to observe the level and extent of the growth of total brain mass, as well as subsequent pruning of the mass and eventual myelination of the brain matter—all of which scientists have found is necessary and part of the maturation of the brain.¹⁰¹ Notably, researchers have recently discovered that the prefrontal cortex—associated with impulse control, assessment of risk, determination of advantages and disadvantages, and general decisionmaking—is underdeveloped throughout adolescence as a result of unfinished pruning and incomplete myelination.¹⁰² These two processes—pruning and myelination—operate to simultaneously reduce brain matter, and thicken what

94. Cheryl B. Preston & Brandon T. Crowther, *Legal Osmosis: The Role of Brain Science in Protecting Adolescents*, 43 HOFSTRA L. REV. 447, 454 (2014).

95. *Id.* at 455 (citing Brief for the Am. Med. Ass’n and the Am. Acad. Of Child and Adolescent Psychiatry as Amici Curiae in Support of Neither Party at 7, *Graham v. Florida*, 560 U.S. 48 (2010) (Nos. 08-7412, 08-7621) [hereinafter *Graham AMA Brief*]).

96. *Id.* at 456 (quoting *Graham AMA Brief*, *supra* note 95, at 9).

97. *AMA Brief*, *supra* note 95, at 8–9.

98. Preston & Crowther, *supra* note 95, at 457 (quoting *Graham AMA Brief*, *supra* note 95, at 11); see also Linda Patia Spear, *The Adolescent Brain and Age-Related Behavioral Manifestations*, 24 NEUROSCIENCE & BIOBEHAVIORAL REVS. 417, 422–23 (2000)).

99. Preston & Crowther, *supra* note 94, at 458.

100. *Graham AMA Brief*, *supra* note 95, at 13; MICHAEL S. GAZZANIGA ET AL., *COGNITIVE NEUROSCIENCE: THE BIOLOGY OF THE MIND* 20–21, 138 (2d ed. 2002); Preston & Crowther, *supra* note 94, at 458.

101. Preston & Crowther, *supra* note 94, at 458–59.

102. *Id.*; *Graham AMA Brief*, *supra* note 95, at 16–24.

remains at the same time, in a process which brings the brain to its ultimate maturity. The processes are described more technically as follows:

Pruning involves the “programmed elimination of unused and cumbersome neuronal connections believed to support the ability for the brain to adapt to its environment,” which “enhance[s] the ability to process complex information quickly allowing the brain to make executive plans supporting voluntary control of behavior.” Myelination consists of “the process by which the brain’s axonal connections become progressively insulated with a fatty white matter called myelin,” which “makes communication between different parts of the brain faster and more reliable.”¹⁰³

The rate of this brain developmental process—which generally corresponds to the rate of increasing behavioral maturity—may vary from individual to individual.¹⁰⁴ However, certain patterns have emerged in the recent research. Research conducted at the National Institute of Mental Health, along with several related studies, led to the conclusion that “a number of structural changes occur in the brain *much later in adolescence than anyone had supposed.*”¹⁰⁵ In additional research involving mapping of the development of the brain, scientists at Harvard and UCLA came to similar conclusions and more specifically observed that “*the brain undergoes massive changes between the ages of twelve and twenty-one.*”¹⁰⁶

In another recent study by a team of researchers from the National Institute of Mental Health, the neurodevelopmental trajectories of the human cerebral cortex were analyzed from hundreds of MRI scans from 375 youths and adults.¹⁰⁷ The researchers undertook to study the ages of development of this important part of the brain,¹⁰⁸ which comprises the outer surface of the gray matter of the brain.¹⁰⁹ Various parts of the cortex regulate functions such as sensation and movement, but also higher cognitive functions.¹¹⁰ The researchers identified different cortical portions of the brain.¹¹¹ The ages at

103. *Id.* at 459 (footnotes omitted) (quoting Brief for the Am. Med. Ass’n and the Am. Acad. of Child and Adolescent Psychiatry as Amici Curiae in Support of Neither Party at 21–24, *Miller v. Alabama*, 132 S. Ct. 2455 (2012) (Nos. 10-9646, 10-9647) [hereinafter *Miller AMA Brief*]).

104. Ann MacLean Massie, *Suicide on Campus: The Appropriate Legal Responsibility of College Personnel*, 91 MARQ. L. REV. 625, 660 (2008).

105. *Id.* at 660 (emphasis added).

106. Richard F. Walsh, *Raising the Age for Juvenile Jurisdiction in Illinois: Medical Science, Adolescent Competency, and Cost*, 39 LOY. U. CHI. L.J. 767, 774 (2008) (emphasis added) (citing Adam Caine Ortiz, *Juvenile Death Penalty: Is it “Cruel and Unusual” in Light of Competency Standards?*, CRIM. JUST., Winter 2003, at 23).

107. Philip Shaw et al., *Neurodevelopmental Trajectories of the Human Cerebral Cortex*, 28 J. NEUROSCIENCE 3586, 3586–94 (2008).

108. *Id.*

109. *Cerebral Cortex*, AM. HERITAGE DICTIONARY (New College ed. Rev. 1985).

110. *Id.*

111. Shaw, *supra* note 107, at 3586.

which the MRI scans were taken ranged from age three-and-a-half to thirty-three.¹¹² Measured in several different ways, the results indicated that the peak accumulation of cortical thickness (brain tissue) occurred around ages nine to eleven, but that the crucial cortical thinning (pruning, as described above) critical for brain development continued *through age twenty-five*.¹¹³ The researchers reiterated the implications of cortical thinning: “the age at which the phase of cortical thinning stops . . . is better conceptualized as the points of transition into the essentially stable cortical dimensions of adulthood.”¹¹⁴

That brain development continues much longer than originally believed has come to be a fairly well-recognized conclusion in the literature—another academic article in the field states that:

Total cortical gray matter volume peaks at about age 11 years in girls and age 13 years in boys. . . . Areas such as the prefrontal cortex—a key component of neural circuitry involved in judgment, impulse control, and long-range planning—are particularly late to reach adult morphology, *continuing to undergo dynamic changes well into the 20s*.¹¹⁵

These studies have made their way into lay knowledge as well. For instance, a June 2015 article in *Scientific American* described the emerging research on brain development, and noted: “we now know that the pre-frontal cortex continues to change prominently until well into a person’s 20s.”¹¹⁶ The article observes the clear implication that adolescence may last beyond the teenage years.¹¹⁷ Another article in *National Geographic* offered the view that teenagers “act that way because their brains aren’t done! You can see it right there in the [MRI] scans!”¹¹⁸

One notable dissemination to the general public on the emerging research on adolescent brain development occurred in a relatively recent PBS program on *Frontline*, entitled “Inside the Teenage Brain,” which highlighted the research of Dr. Jay Giedd at the National Institute of Mental Health, along with other researchers at McGill University.¹¹⁹ Dr. Giedd and his colleagues studied the brains of 145 children and performed MRI scans on them at two-

112. *Id.* at 3587.

113. *Id.* at 3588–90, 3593.

114. *Id.* at 3589.

115. Jay N. Giedd, *The Digital Revolution and Adolescent Brain Evolution*, 51 J. ADOLESCENT HEALTH 101, 102 (2012) (emphasis added).

116. Jay N. Giedd, *The Amazing Teen Brain*, SCI. AM., June 2015, at 33, 34.

117. *Id.* at 36.

118. David Dobbs, *Beautiful Brains*, NAT’L GEOGRAPHIC (Oct. 2011), <http://ngm.nationalgeographic.com/print/2011/10/teenage-brains/dobbs-text> (last visited Dec. 20, 2016).

119. Sarah Spinks, *Adolescent Brains Are Works in Process: Here’s Why*, FRONTLINE, <http://www.pbs.org/wgbh/pages/frontline/shows/teenbrain/work/adolescent.html> (last visited Dec. 20, 2016).

year intervals.¹²⁰ Dr. Giedd reported findings, similar to those discussed herein, that the prefrontal cortex is still developing later in adolescence than previously thought. He observed:

[in the teen years, this] part of the brain that is helping organization, planning and strategizing is not done being built yet. . . . It's sort of unfair to expect them to have adult levels of organizational skills or decision making before their brain is finished being built.¹²¹

Dr. Giedd and his colleagues also reported that the cerebellum—a part of the brain which has a number of functions, but assists with high-level thinking, including making decisions—has been found to be changing well into adolescence.¹²² Many factors influence the development of the cerebellum. Dr. Giedd noted:

Traditionally it was thought that physical activity would most influence the cerebellum, and that's still one of the leading thoughts. It actually raises thoughts about, as a society, we're less active than we ever have been in the history of humanity. We're good with our thumbs and video games and such. But . . . children [today] are doing less and less [physical activity], and we wonder, long term, whether that may have an effect on the development of the cerebellum.¹²³

Giedd also said this about the cerebellum: “interestingly, *it's a part of the brain that changes most during the teen years. This part of the brain has not finished growing well into the early 20s, even.*”¹²⁴ As Dr. Giedd later quipped: “In retrospect I wouldn't call it shocking, but it was at the time The only people who got this right were the car-rental companies.”¹²⁵

The scientific evidence that has emerged over the last decade is fairly clear. The human brain is complex, and it develops in ways we did not understand—and could not measure—prior to the twenty-first century. Moreover, the human brain continues to develop well past age eighteen and in most cases into the early twenties and perhaps beyond.

120. *Id.*

121. *Interview: Jay Giedd*, FRONTLINE, <http://www.pbs.org/wgbh/pages/frontline/shows/teen-brain/interviews/giedd.html> (last visited Dec. 20, 2016) (emphasis added).

122. Spinks, *supra* note 119.

123. *Interview: Jay Giedd*, *supra* note 121.

124. *Id.* (emphasis added).

125. Robin Marantz Henig, *What Is It About 20-Somethings?*, N.Y. TIMES (Aug. 18, 2010), http://www.nytimes.com/2010/08/22/magazine/22Adulthood-t.html?pagewanted=all&_r=0. Giedd was referring to car rental companies who sometimes do not rent cars to people under twenty-five, or charge an extra fee for doing so.

B. Sociological Evidence of Delayed or “Emerging” Adulthood

University of Maryland Professor Jeffrey Jensen Arnett has developed and presented a sociological theory of development that lends a large degree of support to the scientific evidence on brain development discussed above. Recently, Arnett coined the term “emerging adulthood” for the age range from eighteen to twenty-five.¹²⁶ Arnett was initially struck by a sense that the behaviors of his college students were different than previous generations, which was corroborated by some observed demographic shifts between 1970 and the late 1990s—including increases in the American ages for marriage and childbirth, as well as a substantial rise in the percentage of the population attending college.¹²⁷ Based on these demographic trends, Arnett observed that traditional adult roles were not being assumed as early as had been typical before this time.¹²⁸

Therefore, Arnett proposed a novel theory of development for ages eighteen to twenty-five, which he has labeled “emerging adulthood.” He noted that this new, culturally constructed, life phase theory was “neither adolescence nor young adulthood but is theoretically and empirically distinct from them both.”¹²⁹

In order to support his theory of emerging adulthood, Arnett looked at several key areas in which people ages eighteen to twenty-five were conceptually distinct demographically, subjectively, and in other ways. With respect to demographic distinctions, Arnett again noted the degree to which demographic indicators changed from the early 1970s to the present.¹³⁰ The fact that people undertake marital and parental roles later in life, Arnett claimed, has “made a period of emerging adulthood typical for young people in industrialized societies.”¹³¹ Interestingly, however, in surveys conducted by Arnett, he discovered that the people in this age range did not necessarily view attaining those and other demographic statuses—setting up a permanent residence, finishing college, beginning a stable career, and marrying—as critical to achieving adulthood. Upon realizing this, Arnett took surveys based on their subjective opinions of adulthood attainment and what was critical to becoming an adult.¹³²

126. Jeffrey Jensen Arnett, *Emerging Adulthood: A Theory of Development from the Late Teens Through the Twenties*, 55 AM. PSYCHOLOGIST 469, 469 (2000).

127. *Id.* at 469 (citing Jeffrey Jensen Arnett & Susan Taber, *Adolescence Terminable and Interminable: When Does Adolescence End?*, 23 J. YOUTH & ADOLESCENCE 517 (1994); Suzanne M. Bianchi & Daphne Spain, *Women, Work, and Family in America*, POPULATION BULL., Dec. 1996, at 1).

128. *Id.*

129. *Id.* at 469–70.

130. *Id.* at 470.

131. *Id.*

132. *Id.* at 471–73.

The subjective qualities that the respondents viewed as the most relevant to whether adulthood had been attained were comprised of three individual characteristics: (1) “accepting responsibility for one’s self”; (2) “making independent decisions”; and (3) “becoming financially independent.”¹³³ In keeping attainment of these characteristics in mind, Arnett surveyed over 500 people from ages twelve through fifty-five, and asked the question: “Do you feel that you have reached adulthood?”¹³⁴ Respondents were allowed three choices: “yes,” “no,” or “yes and no.” For the age group eighteen to twenty-five, nearly sixty percent responded “yes and no” (about forty percent said “yes”).¹³⁵ Only after the three individual characteristics listed above “reached fruition” did the respondents feel that they had fully reached adulthood.¹³⁶ Importantly, Arnett noted that “[f]or most young people in American society, *this occurs some time during the twenties and is usually accomplished by the late twenties.*”¹³⁷

Arnett noted other considerations that supported his theory of emerging adulthood. First, he pointed to the well-researched literature on adolescent risk-taking and compulsive behavior, such as, for example, “unprotected sex, most types of substance use, and risky driving behaviors such as driving at high speeds or while intoxicated.”¹³⁸ As an example, Arnett includes data from a known study on the rates at which various age groups engaged in

133. *Id.* at 473 (citing Jeffrey Jensen Arnett, *Learning to Stand Alone: The Contemporary American Transition to Adulthood in Cultural and Historical Context*, 41 HUM. DEV. 295 (1998) [hereinafter Arnett, *Learning to Stand Alone*]; Jeffrey Jensen Arnett, *Young People’s Conceptions of the Transition to Adulthood*, 29 YOUTH & SOC’Y 1 (1997) [hereinafter Arnett, *Young People’s Conceptions*]; A. L. Greene et al., *Stages on Life’s Way: Adolescents’ Implicit Theories of the Life Course*, 7 J. ADOLESCENT RES. 364 (1992); Scott D. Scheer et al., *Adolescents Becoming Adults: Attributes for Adulthood*, Poster presented at the biennial meeting of the Society for Research on Adolescence, San Diego, CA (Feb. 1994)). Arnett noted that “[p]arenthood ranks low in young people’s views of the essential criteria for adulthood for people in general, but those who have had a child tend to view becoming a parent as the most important marker of the transition to adulthood for themselves.” *Id.*

134. *Id.* at 472 fig.2.

135. *Id.* The other responses were as follows (percentages approximate): (1) 12–17: 18% yes, 38% no, 45% yes and no; (2) 26–35: 65% yes, 2% no, 33% yes and no; (3) 36–55: 90% yes, 2% no, 6% yes and no. *Id.* The “yes and no” category was described as ambiguous: “*in some respects yes, in some respects no.*” *Id.* As Arnett described it:

This reflects a subjective sense on the part of most emerging adults that they have left adolescence but have not yet completely entered young adulthood. They have no name for the period they are in—because the society they live in has no name for it—so they regard themselves as being neither adolescents nor adults, in between the two but not really one or the other.

Id. at 471 (citing Arnett, *Learning to Stand Alone*, *supra* note 133; Arnett, *Young People’s Conceptions*, *supra* note 133; Jeffrey Jensen Arnett, *Are College Students Adults? Their Conceptions of the Transition to Adulthood*, 1 J. ADULT DEV. 213 (1994)).

136. *Id.* at 473.

DEVELOPMENTAL REV139. *Id.* at 475 fig.3 (citing Jerald G. Bachman et al., *supra* note 138, at 118).

DEVELOPMENTAL REV139. *Id.* at 475 fig.3 (citing Jerald G. Bachman et al., *supra* note 138, at 118).

binge drinking, which showed that the percentage of respondents that had engaged in binge drinking steadily increased until the peak ages of twenty-one to twenty-two (where it hit approximately forty percent), and then steadily decreased with age throughout the twenties.¹³⁹ Similar results have been established for substance use, which “rises to a peak in the early twenties during the role hiatus of emerging adulthood, declines steeply and sharply following marriage, and declines further following the entry to parenthood.”¹⁴⁰ According to Arnett, these findings illustrate two factors emerging adults experience, which allow them to more freely pursue their own experiences. First, they are no longer considered adolescents and thus can act without meaningful parental supervision and, second, they are not yet tied down by marital or parental responsibilities.¹⁴¹ In short, they enjoy many of the benefits of traditional adulthood, with few of the responsibilities.

Arnett addresses an interesting historical shift in attitudes and perceptions towards adolescence that occurred over the course of the twentieth century. He cites G. Stanley Hall as the pioneer of the study of adolescence as a scientific endeavor, with the publication of Hall’s two-volume treatise on the subject in 1904, and states that Hall’s role in this regard is “widely known.”¹⁴² Arnett points out, however, that a less known aspect of Hall’s scholarship is that he contended that adolescence endured through age twenty-four (as opposed to the then more traditionally viewed endpoint of age of eighteen or nineteen).¹⁴³ Arnett posits two possible explanations for the change in perception of the end of adolescence to the lower age of eighteen. One explanation is the reduction of the age of the onset of puberty—a century ago, the median age of menarche was around fifteen; it declined steadily through the twentieth century and is now closer to twelve-and-a-half.¹⁴⁴ This potentially explains a different perceived beginning point for adolescence. Additionally, Arnett believes that what may explain a different perceived ending point for adolescence is high school: “[i]n 1900, only 10% of persons ages 14–17 were enrolled in high school. However, this proportion rose steeply and steadily over the course of the 20th century to reach 95% by 1985.”¹⁴⁵ He speculates that it would not have made any sense for Hall to choose age eighteen as the

139. *Id.* at 475 fig.3 (citing Jerald G. Bachman et al., *supra* note 138, at 118).

140. *Id.* at 475.

141. *Id.*

142. *Id.* at 476 (citing G. STANLEY HALL, 1 ADOLESCENCE: ITS PSYCHOLOGY AND ITS RELATION TO PHYSIOLOGY, ANTHROPOLOGY, SOCIOLOGY, SEX, CRIME, RELIGION, AND EDUCATION (1904)).

143. *Id.*

144. *Id.* (citing Jeanne Brooks-Gunn & Roberta Paikoff, *Sexuality and Developmental Transitions During Adolescence*, in HEALTH RISKS AND DEVELOPMENTAL TRANSITIONS DURING ADOLESCENCE 190 (John Schulenberg et al., eds., 1997); PHYLLIS EVELETH & J. TANNER, WORLDWIDE VARIATION IN HUMAN GROWTH (1976)).

145. *Id.* (citing Arnett & Taber, *supra* note 127, at 517–37).

end point of adolescence in 1900, because no particularly important transitions occurred then: “Education ended earlier, work began earlier, and leaving home took place later. Marriage and parenthood did not take place for most people until their early twenties or midtwenties, which may have been why Hall designated age 24 as the end of adolescence.”¹⁴⁶ On the other hand, of course, turning eighteen now signals a significant transition and cessation of the typical presence of several factors—living with parents, experiencing puberty, and attending high school.¹⁴⁷

Finally, Arnett makes the case that emerging adulthood should henceforth be perceived as a separate, conceptually distinct life stage—subsequent to adolescence, but prior to adulthood.¹⁴⁸ He cites several reasons for this conclusion. First, he reiterates the data: “*most* young people in this age period [18-25] would disagree that they have reached adulthood. They see themselves [instead] as gradually making their way into adulthood”¹⁴⁹ Arnett also reasons that it makes no sense to lump ages eighteen through thirty into one age group, “young adulthood,” because the eighteen to twenty-five period is quite distinct from the thirties and beyond. The majority of people ages eighteen to twenty-five are single, childless, and still getting education and training for an eventual career. In contrast, most people in their thirties have settled into a defined career path, married and have at least one child.¹⁵⁰ Although exceptions to these patterns surely exist, Arnett believes that “[e]merging adulthood and young adulthood should be distinguished as separate developmental periods.”¹⁵¹

Other scholars, in addition to Arnett, have identified similar trends. Tom Smith wrote on the gathering and study of age norms for a variety of transitions to adulthood, conducted by the Network on the Transitions to Adulthood of the MacArthur Foundation.¹⁵² The study inquired as to the importance of seven different indicators to becoming an adult (either extremely important, quite important, somewhat important, not too important, or not at

146. *Id.* at 476 (citing Arnett & Taber, *supra* note 127).

147. *Id.*

148. *Id.* at 477. Arnett actually refers here to the distinction between “emerging adulthood” and “*young* adulthood,” but what he means by young adulthood here is the attainment of most of the attributes of full adulthood and responsibility. *Id.* Therefore, for all intents and purposes, he means transcending the “emerging adulthood” label and becoming, simply, an adult.

149. *Id.* (emphasis added).

150. *Id.*

151. *Id.* Arnett also notes that the concept of emerging adulthood can vary considerably by culture or country. *Id.* at 477–78. For instance, he notes that the median age of marriage in women is generally higher (twenty-five to almost twenty-seven) in the Western and industrialized countries, then it is in the developing countries (eighteen to twenty-two). *Id.* at 478.

152. Tom W. Smith, *Coming of Age in Twenty-First Century America: Public Attitudes Towards the Importance and Timing of Transitions to Adulthood*, 29 *AGEING INT’L* 136, 137–38 (2004).

2017]

ARRESTED DEVELOPMENT

427

all important), and by what age the transition should occur. The seven indicators were:

- a. Financially independent from their parents/guardians
- b. No longer living in their parents' household
- c. Completed their formal schooling
- d. To be employed full-time
- e. Be capable of supporting a family financially
- f. Have a child
- g. Get married¹⁵³

The results of Smith's study were as follows¹⁵⁴:

	<i>Mean Age Indicator Should Occur</i>	<i>Extr. Imp.</i>	<i>Quite Imp.</i>	<i>Somewhat Imp.</i>	<i>Not too Imp.</i>	<i>Not at all Imp.</i>
<i>Complete Education</i>	22.3	72.3	17.9	7.0	2.1	0.8
<i>Employed Full-time</i>	21.2	61.0	22.8	11.7	3.8	0.7
<i>Supporting a Family</i>	24.5	60.3	22.0	11.2	4.6	1.8
<i>Financially Independent</i>	20.9	47.4	33.5	16.0	2.1	1.0

153. *Id.* at 138.

154. *Id.* at 139 tbl.1.

<i>Not Living w/ Parents</i>	21.1	29.3	27.9	25.0	13.3	4.4
<i>Married</i>	25.7	19.1	14.1	21.6	24.0	21.1
<i>Have a Child</i>	26.2	15.8	13.2	23.3	25.3	22.4

The results are listed in the order of what percentage believed the factor was “extremely important.” As can be seen, completing an education was the factor most commonly viewed as extremely important, followed by full-time employment, being capable of supporting a family, being financially independent, and not living with parents.¹⁵⁵ All of these factors were seen as either extremely important or quite important (combined) by a substantial majority of the respondents.¹⁵⁶ Moreover, although the mean ages at which the respondents thought each of these transition indicators should occur varied, none of the mean ages were appreciably younger than twenty-one.¹⁵⁷

The survey results discussed by Arnett and Smith above are fully corroborated by actual demographic data. For instance, the Census Bureau has collected data on the median age of first marriages from 1890 to the present. This data shows that the median age of marriage in men was twenty-six years old in 1890 (twenty-two for women), which fell steadily until it reached a low in the 1950s and early 1960s (a little over twenty-two in men and around twenty in women).¹⁵⁸ It rose again throughout the 1970s and beyond, reaching an all-time high in 2010 (28 in men and 26 in women).¹⁵⁹ Similarly, according to data collected by the national birth registration system, the mean age of mothers giving birth to their first child rose from 21.4 in 1970 to 24.9 in 2000—a 3.5-year increase.¹⁶⁰ The percentage of eighteen- to twenty-four-year-olds living with their parents (excluding college dorm inhabitants) is shown to have risen from around 24% in 2000 to over 32% in 2012.¹⁶¹ An inverse relationship has also been noted between the percentage of eighteen- to nineteen-year-olds in the workplace versus those enrolled in school: the

155. *Id.*

156. *Id.*

157. *Id.*

158. U.S. CENSUS BUREAU, FIG. MS-2, MEDIAN AGE AT FIRST MARRIAGE: 1890 TO PRESENT, <https://www.census.gov/hhes/families/files/graphics/MS-2.pdf> (last visited Dec. 21, 2016).

159. *Id.*

160. T.J. Matthews & Brady E. Hamilton, *Mean Age of Mother, 1970–2000*, 51 NAT’L VITAL STAT. REP. 1, 2 (2011), http://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51_01.pdf.

161. David Dayen, *Yes, Millennials Actually Are Living in Their Parents’ Basements*, NEW REPUBLIC (July 9, 2014), <https://newrepublic.com/article/118619/millennials-living-parents-numbers-behind-trend>.

percentage enrolled in school rose from around 48% in 1970 to over 70% in 2012, whereas the percentage in the workplace fell from 60% in 1970 to around 48% in 2012.¹⁶²

These demographic trends have helped demonstrate that the age for achieving adulthood has dramatically changed in the United States and most of the developed world.¹⁶³ Because of a variety of factors, today's young adults are often still fully dependent on their parents while in college and in search of permanent employment; as a result, age eighteen or twenty-one is no longer a clear indication of adulthood.¹⁶⁴ Dr. Giedd concurs, noting that all of this evidence shows that adolescence appears to now extend beyond the teenage years, since traditional adult roles such as marriage, parenthood and home ownership are happening at least five years later than what was normative in the 1970s.¹⁶⁵

These trends have not gone unnoticed by the mass media.¹⁶⁶ The *New York Times* observed that some of the traditional markers of adulthood—finishing education, moving out, becoming economically self-reliant, getting married and becoming a parent—were being realized by substantially fewer thirty-year-olds in 2000 than in 1960, thus observing that “[t]he traditional cycle seems to have gone off course.”¹⁶⁷ This, the article concluded, seems to indicate that people are reaching adulthood later in life than ever in history.¹⁶⁸ Another *New York Times* article, more tongue-in-cheek, bemoans the state of parents who have to deal with a son or daughter who has reached “The Terrible 32s” stage of life:

The Terrible 32s are a perfectly normal stage in your youngish adult's development, characterized by cranky self-pity over the discrepancy between the life she has and the one she feels entitled to based on popular-culture narratives and her peers' achievements, such as those of Laura, who recently landed a big promotion, and maybe it's worth calling her to see if there's an opening at her company?¹⁶⁹

162. *Id.*

163. Gordon Berlin et al., *Introducing the Issue*, 20 *TRANSITION TO ADULTHOOD* 3, 3 (2010), https://www.princeton.edu/futureofchildren/publications/docs/20_01_FullJournal.pdf.

164. *Id.* at 4.

165. Giedd, *supra* note 116, at 36.

166. Berlin et al., *supra* note 163, at 3.

167. Henig, *supra* note 125.

168. *Id.*

169. Kate Greathead & Teddy Wayne, *The Terrible 32s*, N.Y. TIMES (Nov. 1, 2014), <http://www.nytimes.com/2014/11/02/opinion/sunday/the-terrible-32s.html>. Other media articles on the subject abound. *See, e.g.*, Richard Fry, *A Rising Share of Young Adults Live in Their Parents' Home*, PEW RES. CENT. (Aug. 1, 2013), <http://www.pewsocialtrends.org/2013/08/01/a-rising-share-of-young-adults-live-in-their-parents-home/>; Mickey Goodman, *Are We Raising a Generation of Helpless Kids?*, HUFF. POST (Feb. 23, 2012, 6:31 PM), http://www.huffingtonpost.com/Mickey-goodman/are-we-raising-a-generati_b_1249706.html; *Is Today's Generation Less Mature Than the*

Accordingly, the trends described herein are not only well established in the academic literature and demographic data, but are present in the larger media and known by the lay audience, as well. There is broad recognition that young people are maturing into adulthood later than had been previously perceived, certainly later than age eighteen.

C. Existing and Developing Recognition of Post-Eighteen Adolescence in the Legal Context

In order to establish that there is recognition that a person does not automatically reach adulthood upon turning eighteen, the final area to be addressed is legal recognition. A few key areas in the law either recognize a higher age requirement to engage in certain behavior or, when determining liability for potentially unlawful conduct, take maturity into account. In doing so, these areas of legal regulation seemingly recognize and corroborate the realities of brain development and maturity discussed in Part II.A. Although not necessarily exhaustive, the following areas of legal regulation will be discussed for present purposes: the legal drinking age, the federal Credit Card Accountability Responsibility and Disclosure Act, the legal smoking age, and the military service age. Each of these areas helps establish, in different ways, that true adulthood lies beyond one's eighteenth birthday.

1. Legal Drinking Age

The national legal drinking age is twenty-one, not eighteen.¹⁷⁰ This is so, on its face, because policymakers have made qualitative judgments about the requisite maturity level for responsible consumption of alcoholic beverages. A brief review of the history of the drinking age limit, however, is quite illuminating for the subject at hand.

Unlike the contract age of majority, there apparently were no significant age-based restrictions on the purchase or consumption of alcohol until the 1880s.¹⁷¹ These restrictions occurred at a time when governmental paternalism toward adolescents was ascending in general, resulting also in mandatory

Previous?, YAHOO! ANSWERS, <https://answers.yahoo.com/question/index?qid=20121205180301AAzPZ5Y> (last visited Dec. 21, 2016). The issue has even reached the entertainment world—a 2006 movie starring Matthew McConaughey, *Failure to Launch*, is described with the plot summary: “A thirtysomething slacker suspects his parents of setting him up with his dream girl so he’ll finally vacate their home.” *Failure to Launch*, IMDB, <http://www.imdb.com/title/tt0427229/> (last visited Dec. 21, 2016).

170. *21 Is The Legal Drinking Age*, FED. TRADE COMM’N (Sept. 2013), <https://www.consumer.ftc.gov/articles/0386-21-legal-drinking-age>.

171. Michael P. Rosenthal, *The Minimum Drinking Age for Young People: An Observation*, 92 DICK. L. REV. 649, 649–52 (1988).

schooling, juvenile justice, and regulations on child labor.¹⁷² By the late nineteenth to the early twentieth century, many states had implemented legal bans on selling alcohol to minors, with age limits ranging among the states from sixteen to twenty.¹⁷³ The country's experiment with Prohibition, of course, legally banned the sale of alcohol for all ages between 1920 and 1933.¹⁷⁴ In 1933, after the repeal of Prohibition, states reacquired legislative authority over alcohol, and most set twenty-one as the minimum drinking age, which was in line with the then-general age of majority in contract and other adult markers.¹⁷⁵ The minimum drinking age of twenty-one remained unquestioned throughout the next four decades or so.¹⁷⁶

However, during the virulent Vietnam War-era protests,¹⁷⁷ many argued that the drinking age should be lowered to eighteen.¹⁷⁸ The argument was a perceived inconsistency between eighteen-year-olds being subject to the military draft and in peril of death by combat, but not being allowed to vote, drink, or exercise other privileges of adulthood.¹⁷⁹ As a result of the force of these protests, and the perceived unfairness of the scenario in which eighteen-year-old soldiers were placed, twenty-nine states lowered their minimum drinking age to eighteen.¹⁸⁰

But in the immediate aftermath of lowering the drinking age to eighteen, the number of fatal accidents involving drunk driving steadily increased.¹⁸¹ In reaction to this development, some states raised the age back to twenty-one and continued collecting data.¹⁸² A study by the General Accounting Office reviewed several national and state studies on the correlation between driving fatalities and minimum drinking age and concluded that increasing

175. *Id.* at 307–08.

175. *Id.* at 307–08.

175. *Id.* at 307–08.

175. *Id.* at 307–08.

176. Rosenthal, *supra* note 171, at 652.

177. *See supra* Part II.

178. Rosenthal, *supra* note 171, at 652–53.

179. *Id.* at 653 (citing R.L. Douglass, *The Legal Drinking Age and Traffic Casualties: A Special Case of Changing Alcohol Availability in a Public Health Context*, in HENRY WECHSLER, *MINIMUM DRINKING AGE LAWS* 93 (1980)).

180. *See id.* at 653–54. This followed suit after the passage of the Twenty-Sixth Amendment granting suffrage to eighteen-year-olds, lowering the contract age of majority, and other similar changes to the law on “adulthood.” *Id.*

181. *Id.* at 653–54.

182. *Id.* at 654 (citing William Du Mouchel et al., *Raising the Alcohol Purchase Age: Its Effects on Fatal Motor Vehicle Crashes in Twenty-Six States*, 16 J. LEGAL STUD. 249, 249–50 (1987); Allan F. Williams et al., *The Effect of Raising the Legal Minimum Drinking Age on Involvement in Fatal Crashes*, 12 J. LEGAL STUD. 169 (1983)).

the drinking age would result in statistically significant decreases in fatalities on American roadways.¹⁸³

In light of the increasingly clear data on fatalities caused by underage drinking and lobbying by organizations like Mothers Against Drunk Driving,¹⁸⁴ President Reagan created the Presidential Commission on Drunken Driving, which ultimately concluded that all states should increase the legal drinking age to twenty-one.¹⁸⁵ When this recommendation alone did not result in uniform compliance, Congress enacted the National Minimum Drinking Age Act, which conditioned the states' receipt of full federal highway funding on increasing the legal drinking age to twenty-one.¹⁸⁶ Most states followed suit,¹⁸⁷ so that the national minimum drinking age is, effectively, twenty-one.¹⁸⁸

The minimum legal drinking age, therefore, is an interesting national experiment with potential implications for the debate about adulthood and the age of contract majority generally. The minimum drinking age was set at twenty-one in the 1930s based on a legislative assessment of the sufficient degree of maturity required to allow the consumption of alcohol. In the early 1970s, during the wave of Vietnam War-era protest, the age was lowered to age eighteen without much thought or analysis beyond the belief that lowering the legal drinking age was "fair," considering the exigencies of that era.¹⁸⁹ It was, in effect, an experiment, the results of which were quickly revealed: eighteen-year-olds *were not sufficiently mature to handle the responsibilities of drinking*. The statistics bore out the irresponsibility of the policymakers of that time. Even now, the statistics are compelling: "The National Highway Traffic Safety Administration estimates that 21-year-old minimum drinking age laws have reduced alcohol traffic fatalities by 13 percent and have saved an estimated 28,765 lives since 1975."¹⁹⁰ This reflects the idea that drinkers under the age of twenty-one have poor judgment and decisionmaking, and

183. *Id.* at 654–55 (citing *National Minimum Drinking Age Law, Hearing Before the Subcomm. on Investigations and Oversight of the Comm. on Public Works and Transportation*, 99th Cong. 27 (1986) (statement of Eleanor Chelimsky, Director, Program Evaluation and Methodology Division, U.S. General Accounting Office)).

184. *See* Treuthart, *supra* note 172, at 308–09.

185. Rosenthal, *supra* note 171, at 655; *see also* Presidential Commission on Drunk Driving, Exec. Order 12358, 47 Fed. Reg. 16,311 (Apr. 14, 1982); FINAL REPORT, PRESIDENTIAL COMMISSION ON DRUNK DRIVING 10 (1983).

186. Act to Amend the Surface Transportation Assistance Act of 1982, Pub. L. No. 98-363, § 6(a), 98 Stat. 435, 437 (1984) (codified as amended at 23 U.S.C. § 158 (2012)).

187. South Dakota initially resisted, and challenged the constitutionality of the Act; however, it was upheld by the United States Supreme Court. *South Dakota v. Dole*, 483 U.S. 203 (1987).

188. *See* FED. TRADE COMM'N, *supra* note 170.

189. Rosenthal, *supra* note 171, at 653.

190. *Dangers of Teen Drinking*, FED. TRADE COMM'N, (Sept. 2013), <http://www.consumer.ftc.gov/articles/0387-dangers-teen-drinking>.

are bad at assessing risk. Therefore, it would seem that with respect to drinking, the answer is clear—we have decided that a person is not an adult until age twenty-one.¹⁹¹

2. *The Federal CARD Act*

In 2009, Congress passed the Credit Card Accountability Responsibility and Disclosure Act of 2009 (“CARD Act”).¹⁹² The law was designed to provide several types of consumer protections to existing and prospective credit card holders, including banning retroactive rate increases, clear specification and availability of contract terms, limitations and restrictions on the types and amounts of fees that may be charged, and plain language/disclosure requirements.¹⁹³ The provision that attracted the most media attention, however, was the provision aiming to reform credit card companies’ efforts at marketing to students on college and university campuses.¹⁹⁴

The CARD Act accomplished this legislative goal by placing restrictions on the ability to obtain a credit card for people under the age of twenty-one.¹⁹⁵ The original draft of the CARD Act, introduced in the House, did not contain the provision relating to age twenty-one, but instead referred to age eighteen—the same as the current contract age of majority.¹⁹⁶ However, in the Senate version amended in May 2009, the age limit was raised to twenty-one, and this is the version that was approved by both houses the next day and enacted into law.¹⁹⁷ The CARD Act does not actually prevent people under twenty-one from obtaining a credit card in all scenarios; there are two exceptions. The first exception provides that the underage person may obtain a credit card if a cosigner over the age of twenty-one agrees to accept joint liability for debt incurred.¹⁹⁸ The second exception provides that the underage person may be issued a credit card if she “indicat[es] an independent

191. See William DeJong, *POV: Legal Drinking Age of 21 Works. Deal with It.*, BU TODAY (Apr. 8, 2014), <http://www.bu.edu/today/2014/pov-legal-drinking-age-of-21-works-deal-with-it/>.

192. Credit Card Accountability Responsibility and Disclosure Act of 2009, Pub. L. No. 111-24, 123 Stat. 1734 (2009) (codified as amended in scattered sections of Titles 5, 11, 15, 20 & 31 U.S.C.) [hereinafter CARD Act of 2009].

193. *Fact Sheet: Reforms to Protect American Credit Card Holders*, OFFICE OF THE PRESS SECRETARY, THE WHITE HOUSE (May 22, 2009), <https://www.whitehouse.gov/the-press-office/fact-sheet-reforms-protect-american-credit-card-holders>.

194. See *id.*; see also Jennifer Liberto, *Under 21? Getting a Credit Card Just Got Tougher*, CNN MONEY (Feb. 22, 2010, 11:48 AM), http://money.cnn.com/2010/02/19/news/economy/student_credit_cards/.

195. CARD Act of 2009 § 301, 123 Stat. at 1748 (stating “[n]o credit card may be issued to, or open end consumer credit plan established by or on behalf of, a consumer who has not attained the age of 21”).

196. H.R. 627, 111th Cong. § 7 (as introduced in House, Jan. 22, 2009).

197. *Id.* § 301 (as amended in Senate, May 19, 2009); H.R. 627, 111th Cong. § 301 (2009) (enacted).

198. CARD Act of 2009 § 301, 123 Stat. at 1748.

means of repaying any obligation arising from the proposed extension of credit.”¹⁹⁹

The CARD Act provisions have been criticized by some, especially for their contradiction of the present contract age of majority of eighteen. Andrew Schwartz has remarked: “In short, eighteen- to twenty-year-olds are now classified by the law as adults with full capacity to enter into any contract—except a credit card agreement.”²⁰⁰ He rues the passage of the CARD Act because it “reinstates—for credit card contracts—the ancient common-law rule that those under twenty-one are infants lacking capacity to contract.”²⁰¹ However, Congress apparently felt otherwise, and for good reason. Indeed, consumer advocates had long been concerned with what was seen as credit card companies aggressively taking advantage of college-aged consumers’ inexperience and lack of awareness of consumer finance.²⁰² It was well known that credit card companies frequently utilized on-campus recruiting and lures of free food, t-shirts, or other gimmicks to persuade students into signing credit card applications.²⁰³ The legislative history of the CARD Act does not provide additional insight, but the rationale was apparently obvious: to protect young and naïve eighteen-, nineteen-, and twenty-year-olds from aggressive marketing practices of credit card companies.²⁰⁴ It seems that Congress decided that—much like with drinking alcohol—age twenty-one was the more appropriate age at which a sufficient level of adult-like maturity could reliably be employed with respect to credit card accounts. What is notable about the CARD Act provisions is that they relate to the very same issues—financial maturity and sound commercial decision making—that animate the general doctrine on the contract age of majority.

199. *Id.* Under the accompanying federal regulations, this requires that the minor must be able, on her own, “to make the required minimum periodic payments” on the credit card account. 12 C.F.R. §§ 226.51(a)(1)(i), (b)(1)(i) (2016).

200. Schwartz, *supra* note 61, at 424.

201. *Id.* at 423.

202. Eboni S. Nelson, *From the Schoolhouse to the Poorhouse: The Credit Card Act’s Failure to Adequately Protect Young Consumers*, 56 VILL. L. REV. 1, 13 (2011).

203. See CAMPUS CREDIT CARD TRAP: A SURVEY OF COLLEGE STUDENTS AND CREDIT CARD MARKETING, U.S. PUB. INT. RES. GROUP EDUC. FUND (2008), <http://www.studentpirgs.org/reports/sp/campus-credit-card-trap>.

204. See S. REP. NO. 111-16, at 8 (2009) (discussing “[a]ggressive marketing to students” as rationale for the Act’s provisions regarding age 21). Note also that the heading of the relevant provisions of the Act is entitled “Protection of Young Consumers.” *Id.* at 12.

3. *Legal Smoking Age*

The legal minimum age for smoking is currently eighteen in the vast majority of states.²⁰⁵ The legal regulation of smoking has traveled a circuitous route through history. Prior to colonization, there was a fairly large anti-tobacco sentiment. King James I, for example, wrote a treatise in 1604 entitled *Counterblast to Tobacco* and declared an English ban on tobacco.²⁰⁶ Cigarettes nevertheless made their debut in Europe and the United States in the later part of the nineteenth century.²⁰⁷ Beginning in the 1890s and continuing throughout the early part of the twentieth century, a temperance movement swept the United States and several states enacted outright bans on cigarettes. Moreover, by 1940, a majority of states banned the sale of cigarettes to minors (at the time, still defined as those under the age of twenty-one).²⁰⁸ Although the outright bans on cigarette smoking were dropped, the ban on the sale to minors mostly remained, albeit with various state-specific variations.²⁰⁹

The “glamour days” of smoking commenced with the end of World War I and continued throughout World War II and the 1950s and 1960s.²¹⁰ Soon thereafter, the Surgeon General’s “clarion call” in 1964 for action against the dangers of cigarettes initiated the national campaign against smoking.²¹¹ Over the next three decades, multiple state and federal efforts were made to address the health effects of smoking.²¹² Efforts intensified in the 1990s; in 1992, Congress passed the Synar Amendment to the Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act.²¹³ The Synar Amendment conditioned states’ receipt of federal substance abuse grant money on the states’ implementation and effective enforcement of laws banning the sale of tobacco to those under the age of eighteen.²¹⁴ After the Synar

205. RICHARD J. BONNIE ET AL., INST. OF MED. OF THE NAT’L ACADS., PUBLIC HEALTH IMPLICATION OF RAISING THE MINIMUM AGE OF LEGAL ACCESS TO TOBACCO PRODUCTS 3 (2015), <http://iom.nationalacademies.org/Reports/2015/TobaccoMinimumAgeReport.aspx>.

206. Lee J. Alston, et al., *Social Reformers and Regulation: The Prohibition of Cigarettes in the United States and Canada*, 39 EXPLORATIONS IN ECON. HIS. 425, 428 (2002), http://www.colorado.edu/ibs/es/alston/econ8534/SectionIX/Alston,_Dupre_and_Nonnenmacher,_Social_Reformers_and_Regulation.pdf. The treatise described tobacco as “[a] custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs and in the black stinking fume thereof, resembling the horrible Stygian smoke of the pit that is bottomless.” *Id.*

207. *Id.*

208. *Id.* at 431–32.

209. *Id.* at 432.

210. Tad Vezner, *Smokers Have Faced Tougher Bans: Debate Smolders Through Ages*, THE BLADE, Oct. 24, 2004, at B2.

211. See BONNIE ET AL., *supra* note 205, at ix.

212. *Id.*

213. ADAMHA Reorganization Act, Pub. L. No. 102-321, § 1926, 106 Stat. 323, 394 (1992).

214. See BONNIE ET AL., *supra* note 205, at 17–18.

Amendment, forty-six states set the minimum tobacco age at eighteen, and four states put a nineteen-year-old age limit into place.²¹⁵

Today, there is a movement afoot seeking to raise the smoking age to twenty-one. Several cities have recently already done so on a municipal level.²¹⁶ As part of this continuing movement, Congress directed the Food and Drug Administration to commission a report on the potential health effects of increasing the minimum smoking age.²¹⁷ The resulting report, *Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products*, was issued in March 2015 by a committee of the independent Institute of Medicine.²¹⁸ The report “supports increasing the tobacco purchase age to 21 from 18, saying it would decrease early deaths, cut low birth weights and ‘substantially’ reduce the number of 15- to 17-year-olds who begin smoking.”²¹⁹ Over 70% of the American public—including 58% of current smokers—support the proposal to increase the minimum legal smoking age to twenty-one, and most respondents believe it is important to prevent teenagers’ use or experimentation with tobacco products.²²⁰

Notably, the Institute of Medicine cited some of the same emerging evidence of brain and social development, as were referred to in Parts III.A and III.B. Specifically, the report notes that “[t]he development of adult decision-making skills and abilities is a continuous process that begins in early adolescence and continues into and through young adulthood.”²²¹ The study also references the distinct period, from ages eighteen to approximately twenty-six, which is increasingly seen as a distinct developmental phase.²²² The emphasis on this age range, the report contended is due to two categories of factors—one is the current trend of delayed achievement of traditional markers of adulthood (education, marriage, and parenthood), and the other is the newfound scientific discovery that brain development continues well into the twenties.²²³ The report then tied these factors to decisionmaking regarding smoking: “[t]he unique psychosocial maturation of the adolescent and young adult developmental period, coupled with various environmental and social influences, results in a milieu that increases the desire for engaging in health-risk behaviors, including tobacco use.”²²⁴ In short, the findings demonstrated

215. *Id.* at 3.

216. Tripp Mickle, *Study Supports Raising Tobacco-Purchase Age to 21*, WALL ST. J. (Mar. 12, 2015, 7:41 PM), <http://www.wsj.com/articles/study-supports-raising-tobacco-purchase-age-to-21-1426172582>.

217. BONNIE ET AL., *supra* note 205, at x.

218. *Id.*; *see also* Mickle, *supra* note 216.

219. Mickle, *supra* note 216.

220. *Id.*

221. BONNIE ET AL., *supra* note 205, at 63.

222. *Id.*

223. *Id.*

224. *Id.* at 64.

that age eighteen has come to be seen as insufficiently mature, as a generalized matter, to risk granting the power to choose to engage in use of cigarettes or other smoking products. The report considers age twenty-one as a more appropriate milestone to mark the transition to adulthood for this purpose.

Accordingly, in three different legal areas, lawmakers have considered and modified the age of adulthood to age twenty-one. The minimum drinking age was once age eighteen, but for policy reasons it was increased to age twenty-one. Similarly, the age for obtaining a credit card has been set for many purposes to age twenty-one rather than age eighteen. And, at the municipal, state, and federal level, governments have raised or are considering raising the minimum smoking age to twenty-one. What all of these developments have in common is they rely on a comparatively recent recognition that age twenty-one is a more appropriate legal marker for adulthood than age eighteen.

IV. A RETURN TO A MAJORITY AGE OF TWENTY-ONE AND SOME OBJECTIONS

The contract doctrine of incapacity is a well-established tradition of the common law.²²⁵ It serves to protect minors from their own foolish, improvident decisions, and from exploitation by commercial entities and adult contracting partners.²²⁶ There is every reason to continue protecting minors into the twenty-first century because business are targeting minors for profit more than ever before.²²⁷ Section A presents the argument for raising the contract age of majority to twenty-one. Section B outlines possible objections.

A. Return to a Majority Age of Twenty-One

For more than half a millennium, the majority age for contract was twenty-one.²²⁸ While it may be true that this age was set as a result of the weight of medieval English armor²²⁹—a fact seemingly irrelevant to the cognitive capacities of young persons to make contractual decisions—the reality is that the age was set as a matter of contract, and was unquestioned throughout a period exceeding five centuries. There was never any documented objection to the age nor was anyone pointing out the obvious absurdity of the reason for setting an age in the first place; rather, it was accepted for centuries as a sound basis for the arbitrary legal transition to adulthood. There may have been some rough accuracy in correlating the physical development of a

225. See *supra* Part I; see also Victoria Slade, Note, *The Infancy Defense in the Modern Contract Age: A Useful Vestige*, 34 SEATTLE UNIV. L. REV. 613, 616 (2011).

226. See *supra* notes 8–12 and accompanying text.

227. See Slade, *supra* note 225, at 632–34.

228. See *supra* notes 56–61 and accompanying text.

229. See *supra* notes 56–61 and accompanying text.

boy being able to bear the weight of armor, which physical development surely mirrored the cognitive and neurological development occurring at the same time. The medieval English may not have had MRIs and neuroscience, but they surely had a good degree of learned common sense. The only reason that the age was ever lowered from twenty-one to eighteen was the convulsive, unique period of political turmoil that accompanied the Vietnam War and the protest that accompanied the military draft of those eighteen years of age and older.²³⁰ In essence, it was the idea that a person that was “[o]ld enough to fight,” was “old enough to vote.”²³¹

Here’s the thing—we were wrong.²³² The factors that go into drafting able-bodied soldiers in an exigent time of war have little to nothing to do with the cognitive capacities necessary to vote or to contract, and they were illogically conflated during the debate in the aftermath of the Vietnam War and the draft. As Congressman Emmanuel Celler stated during the 1960s:

To say that he who is old enough to fight is old enough to vote is to draw an utterly fallacious parallel. No such parallel exists. The ability to choose, to separate promise from performance, to evaluate on the basis of fact, are the prerequisites to good voting. Eighteen to twenty-one are mainly formative years where the youth is racing forward to maturity. His attitudes shift from place to place. These are the years of the greatest uncertainties, a fertile ground for the demagogues. Youth attaches itself to promises, rather than to performance. These are rightfully the years of rebellion rather than reflection. We will be doing a grave injustice to democracy if we grant the vote to those under twenty-one.²³³

Fighting and voting are, as Congressman Celler said at the time, “as different as chalk is from cheese.”²³⁴ Soldiers (certainly at the typical initial enlistment age of eighteen to twenty) are supposed to be “uncritically obedient,” whereas the nature of voting is to question, analyze, weigh choices, and “to evaluate on the basis of fact.”²³⁵ Of course, many of the same cognitive functions Congressman Celler discussed with respect to voting apply equally or to a greater extent in contracting.

Congressman Celler’s rationale was lost in a universal, frenzied chorus of political support at the time for lowering the age of voting (and eventually, contract), in light of the perceived fairness of letting eighteen-year-olds have

230. See *supra* notes 62–93 and accompanying text.

231. Schwartz, *supra* note 61, at 412 (citing CULTICE, *supra* note 63, at 234).

232. Or, as Gob Bluth might have said on the TV sitcom *Arrested Development*, “I’ve made a huge mistake.” *Arrested Development* (Fox television broadcast, 2003).

233. KEYSSAR, *supra* note 71, at 226.

234. DONALD GRIER STEPHENSON, JR., THE RIGHT TO VOTE: RIGHTS AND LIBERTIES UNDER THE LAW 249 (2004).

235. *Id.*

a say in selecting the political leaders who may subsequently decide to send them to war. But, these things are conceptually distinct, and the connections between the two were not particularly well thought out at the time. As Michael Rosenthal put the point:

To the extent the Vietnam War was responsible for lowering the age of majority in general and the minimum drinking age in particular in a large number of states, *it should be realized that the changes were for reasons somewhat different than the reasons an age of majority is usually lowered or raised.* Normally, a change is based on society's view of the age that should be considered the age of responsible decision-making or competency. When states lowered the age of majority and the minimum drinking age because boys were serving and dying in the War, however, they did so because society felt it was *unfair* to have them serve and die and yet not have the rights and privileges of adults. *The states did not inquire whether the boys were mature enough to vote or to handle liquor; they just deemed the treatment to be unfair.*²³⁶

Now, with the benefit of forty-plus years of hindsight, Congressman Celler seems prophetic. Rosenthal's point that the age of majority was hastily lowered without sound rationalization is well taken. Their views on the capacity needed to make sound, adult-like voting decisions cohere very well with today's knowledge about brain development. We now know, due to advancements in modern science, that the human brain is still developing well into a person's twenties—past twenty-one, usually, and certainly well past age eighteen.²³⁷ Therefore, we have reason to believe that age eighteen does not generally indicate full, neurological adulthood. This has recently been corroborated by sociologists and others through observance of the typical age of traditional adult achievements, such as completing education, becoming residentially independent, getting married, and becoming a parent.²³⁸ As discussed above, Jeffrey Jensen Arnett has deemed the age range of eighteen to twenty-five as a distinct new life phase called "emerging adulthood"—a period distinct from actual, full adulthood.²³⁹ Surveys indicate that most people expect that the usual markers of adulthood, including attainment of financial independence, should occur between the ages of twenty-one and twenty-six or so.²⁴⁰

236. Rosenthal, *supra* note 171, at 653 (emphasis added).

237. *See supra* Part III.A.

238. *See supra* Part III.B.

239. *See supra* Part III.B.

240. *See supra* notes 152–157 and accompanying text.

We also have evidence from other legal areas that experimentation with age eighteen as the age of majority has been determined to be a policy failure.²⁴¹ The legal age of drinking alcohol was reduced from age twenty-one to age eighteen during the same Vietnam War-era “old enough to fight” protests; however, we quickly changed our minds when the statistics ominously brought to light the poorer impulse and risk control exhibited by eighteen- and nineteen-year-olds in the form of marked increases in fatal highway accidents, and the age was raised back to twenty-one.²⁴² The same transformation is now beginning with respect to legal regulation of smoking, as recent studies show that the overwhelming majority of smokers begin smoking when they are teenagers and lack maturity and risk-assessment ability. As a result of these findings, an increase of the legal minimum smoking age to twenty-one is being contemplated on a national level.²⁴³ And recently, the federal CARD Act imposed significant limits on the ability to obtain a credit card before age twenty-one, because of the perception that college-age students under twenty-one were being targeted by the credit card companies precisely for their unequal bargaining power and their poor maturity in making credit and financial decisions.²⁴⁴ These are, of course, the very same areas of decision and cognitive activity that are employed when a person makes contract decisions, and yet the contract age of majority remains eighteen at present.

Age eighteen, as it turns out, is not old enough as an adult marker for all of these legal areas. Frankly, it may not be a good age at which to let citizens vote, as Congressman Celler argued and others have more recently observed.²⁴⁵ Of course, that is a political and, now, a constitution decision,²⁴⁶ and the likelihood of changing the voting age is relatively low at this point. Additionally, some have even questioned whether the military draft age of eighteen—the starting point for this entire chronology of “proof” that age eighteen equals adulthood—should be retained, as opposed to raising the minimum age back to twenty-one.²⁴⁷ Interestingly, it should be noted that

241. *See supra* Part III.C.

242. *See supra* Part III.C.1.

243. *See supra* Part III.C.3.

244. *See supra* Part III.C.2.

245. *See, e.g.*, Glenn Harlan Reynolds, Opinion, *Glenn Reynolds: After Yale, Mizzou, Raise the Voting Age—to 25*, USA TODAY (Nov. 16, 2015, 10:18 AM), <http://www.usatoday.com/story/opinion/2015/11/11/raise-voting-age-25-yale-missouri-protests-political-debate-column/75577468/>; Ann Coulter, *Repeal the 26th Amendment!*, ANNCOULTER.COM (Nov. 10, 2010), <http://www.anncoulter.com/columns/2010-11-10.html>.

246. U.S. CONST. amend. XXVI.

247. *See, e.g.*, *These Boiled Brains of Nineteen*, ECONOMIST (Sept. 28, 2010, 5:36 PM), http://www.economist.com/blogs/democracyinamerica/2010/09/future_contribution_0; Michael Tierney, *The Draft Age Should be 21, Not 18*, PHILA. INQUIRER (June 4, 1988), http://articles.philly.com/1988-06-04/news/26267232_1_draft-registration-military-service-enlistments.

even the military seems to recognize the concept of emerging adulthood to some degree. For one, the current version of the “draft” system—the Selective Service registration system—requires all males from ages eighteen to twenty-six to register with the system.²⁴⁸ This happens to cohere with Arnett’s phase of “emerging adulthood” (coincidentally or not). Moreover, the military has a sequence of mobilization in the event an involuntary draft was ever commenced in the future due to a national emergency.²⁴⁹ According to the Selective Service System website, men aged twenty will be drafted first, followed by ages twenty-one through twenty-five. Notably, the Selective Service maintains that eighteen- and nineteen-year-olds will “probably not be drafted.”²⁵⁰ Although the reasons are not given, it would be reasonable to infer that the Selective Service plans to avoid drafting eighteen- and nineteen-year-olds because they are still immature and not truly adults.

Be that as it may, the fact remains that the happenstance of soldiers being drafted into war at age eighteen in a time of national emergency is not probative that they are sufficiently adult-like for purposes of decisionmaking and contracting. The two should never have been conflated, and little reason exists for them to have been treated as related other than the explosive time of political and emotional Vietnam War-era protest. As Michael Rosenthal has stated, little thought went into lowering the age of majority, other than exigent-wartime emotional pleas for fairness.²⁵¹ And, as Kathleen Horan has observed, the early 1970s may have been precisely the *wrong* point at which to lower the age, because it was just at this point that college education became more normative, which in turn led to a delay in the assumption of self-sufficiency and other markers of adulthood.²⁵² A law review article from 1965—several years before the reduction to age eighteen occurred—made a similar point:

[T]he modern minor spends more time in attaining a formal education than did his counterpart of even three decades ago. He is thus isolated from the commercial world to a greater degree than if he were earning a living, and is likely to be less sophisticated in the ways of contract and business. *Therefore, from the standpoint of*

248. 50 U.S.C. app. § 453 (2012).

250. *Id.*; Suzanne Gamboa, *What Many Young Men Need to Know About the Draft*, NBC NEWS (Oct. 14, 2014, 7:39 AM), <http://www.nbcnews.com/news/latino/what-many-young-men-need-know-about-draft-n224746>.

250. *Id.*; Suzanne Gamboa, *What Many Young Men Need to Know About the Draft*, NBC NEWS (Oct. 14, 2014, 7:39 AM), <http://www.nbcnews.com/news/latino/what-many-young-men-need-know-about-draft-n224746>.

251. See Rosenthal, *supra* note 171, at 653.

252. Kathleen Conrey Horan, *Postminority Support for College Education—A Legally Enforceable Obligation in Divorce Proceedings?*, 20 FAM. L.Q. 589, 604 (1987) (citing Washburn, *Post-Majority Support: Oh Dad, Poor Dad*, 44 TEMP. L.Q. 319, 328–29 (1971)).

*the maturity of today's youth, the age of twenty-one might be too low an age to grant contractual capacity.*²⁵³

More recently, Cheryl Preston and Brandon Crowther have observed that “[t]rends of the past few decades suggest that if legislatures were to move the line, the cutoff age would likely *increase, not decrease*.”²⁵⁴ Furthermore, the point on delayed financial independence overlaps with another reason that age twenty-one is more appropriate: part of the reality of the infancy doctrine is to allow immature minors to avoid poorly-made contract decisions, so that their *parents* will not ultimately have to foot the bill.²⁵⁵ If the contract age of majority is left at eighteen, then eighteen- and nineteen-year-old “adults” will be bound to their obligations, even though the reality is that this “adult” is still looking to her parents to bail her out (the technicality that the parents are not legally obligated to support their daughter at that age being outweighed by the relational reality that they often will).²⁵⁶ Shifting the age back to twenty-one would more closely align with the realities of most family support situations.²⁵⁷

Accordingly, the contract age of majority should never have been lowered and thus should be returned to age twenty-one. Simply put, if the goal of the contract law minority doctrine is to soundly and sensibly set the age at which we best estimate that sufficient maturation and development has occurred so that contract decisions, risk assessments, and understanding can be appropriately undertaken, then the evidence is clear: age twenty-one is a better benchmark than eighteen, and should likely never have been abandoned. Age twenty-one served contract law and other areas quite well, and was a venerable rule of long-lasting effectiveness for over 500 years. Although it is true that rules of law should not be blindly followed simply because of their longevity,²⁵⁸ in this case the following would not be blind. It is instead supported now by the weight of scientific knowledge, sociological research, and

253. See Note, *supra* note 59, at 144–45 (emphasis added) (footnotes omitted) (citing U.S. DEP’T OF COMMERCE, STATISTICAL ABSTRACT OF THE UNITED STATES: 1964, at 107 (1964); U.S. BUREAU OF THE CENSUS, CENSUS OF THE POPULATION: 1960 tbl.127 (1963); U.S. BUREAU OF THE CENSUS, HISTORICAL STATISTICS OF THE UNITED STATES: COLONIAL TIMES TO 1957, at 211 ser. H-322 (1960)).

254. Cheryl B. Preston & Brandon T. Crowther, *Minor Restrictions: Adolescence Across Legal Disciplines, the Infancy Doctrine, and the Restatement (Third) of Restitution and Unjust Enrichment*, 61 U. KAN. L. REV. 343, 375 (2012) (emphasis added) (first citing Coulter, *supra* note 245; and then citing Rodney Skager, *Extending Childhood into the Teen Years: “Infantilization” and its Consequences*, 18 RECLAIMING CHILDREN & YOUTH 18 (2009)).

255. See *supra* notes 13–15 and accompanying text.

256. See *supra* notes 13–15 and accompanying text.

257. See *supra* notes 152–157 and accompanying text.

258. Oliver Wendell Holmes, Jr., *The Path of the Law*, 10 HARV. L. REV. 457, 469 (1897) (“It is revolting to have no better reason for a rule of law than that so it was laid down in the time of Henry IV. It is still more revolting if the grounds upon which it was laid down have vanished long since, and the rule simply persists from blind imitation of the past.”).

legal experimentation.²⁵⁹ The age of majority is not a vested right, but rather is set by the will of the legislature.²⁶⁰ The contract age of majority could and should be changed by legislation across the states, in light of the compelling evidence of its sensibility as the more appropriate and accurate age of majority.

B. Possible Objections

Before concluding, I anticipate at least a few possible objections to the proposal to return the contract age of majority to twenty-one. The first objection is simply a form of the one that was raised in the 1960s and 1970s at the time the voting age was changed: “old enough to fight, old enough to vote.” This seems to be, at least in part, an argument that being an adult for one purpose means one is an adult for all purposes. But this has never been the case. And there are different ages for different purposes in all manner of contexts:

People can vote at 18, but in some states they don’t age out of foster care until 21. They can join the military at 18, but they can’t drink until 21. They can drive at 16, but they can’t rent a car until 25 without some hefty surcharges. If they are full-time students, the Internal Revenue Service considers them dependents until 24; those without health insurance will soon be able to stay on their parents’ plans even if they’re not in school until age 26, or up to 30 in some states. Parents have no access to their child’s college records if the child is over 18, but parents’ income is taken into account when the child applies for financial aid up to age 24.²⁶¹

It is simply not necessary that the same majority age be applied in all legal contexts.²⁶² Rather, the legislature is empowered to set a particular age for a particular circumstance in the manner most appropriate.²⁶³

For the particular context at issue here—contracting—it is worth making some observations with respect to the different considerations in place. Military matters—where the minimum age is eighteen—are obviously based on potential national emergencies that create a need for many able-bodied fighting men and women. Concepts of full maturity and adulthood are not as important as the need for a mass of soldiers who are capable of withstanding the rigors of training and combat, understanding the need for following orders, being away from home, handling weapons safely, and performing basic, militaristic tasks.²⁶⁴ Voting is, yet again, different. Voting involves allowing

259. *See supra* Part III.

260. *See, e.g.*, *Davenport v. Davenport*, 356 So.2d 205, 208 (Ala. Civ. App. 1978).

261. Henig, *supra* note 125.

262. 43 C.J.S. *Infants* § 2 (2004) (citing *Allam v. State*, 830 P.2d 435 (Alaska Ct. App. 1992)).

263. *Id.*

264. *See supra* notes 232–234 and accompanying text.

the person to take part in a collective, democratic expression of majoritarian will. The vote does not directly affect the person's individual affairs, except insofar as the affairs of the community (or state or nation) are collectively affected. However, unlike voting, contracting (like drinking) affects the individual person's affairs directly and uniquely. A poor decision to contract affects that person and that person alone—there is no other “vote” to offset the person's poor financial decision. Therefore, because of the direct impact of contracting on the person's individual affairs, it is more important that one be sufficiently adult-like and mature before being allowed to contract, as opposed to being allowed to vote.

A second foreseeable objection concerns the possible effect of an increase in the age of majority on eighteen-year-olds' access to the marketplace, since, the theory goes, companies will refuse to contract with them on the basis of the risk of subsequent disaffirmance.²⁶⁵ In the first place, it should be noted that minors are not prohibited from contracting; they merely gain the power of disaffirming any contracts they choose to enter.²⁶⁶ But, in observing that others may be dissuaded from contracting with minors, Farnsworth quotes Lord Mansfield, who once stated: “miserable must the condition of minors be, excluded from the society and commerce of the world.”²⁶⁷ Schwartz puts it more plainly: “the practical result of a judicial refusal to hold infants to their promises was that no one was willing to contract with them. The common law's paternalism toward infants excluded them from the commercial world.”²⁶⁸ Schwartz cites Bill Gates, Michael Dell, and Mark Zuckerberg as several examples of minor entrepreneurs who could not have succeeded if the age of majority had been twenty-one.²⁶⁹ But, there are also anecdotes of minors who have succeeded in entrepreneurship in spite of their minority status: Ashley Qualls founded WhateverLife.com at age fourteen; Juliath Brindak developed a social media platform at age sixteen; and Nick D'Aloisio designed an app worth \$30 million at age seventeen.²⁷⁰

But the more important point is that minor status does not seem to hinder companies from engaging in commercial activity with minors. A 1965 law review article noted, “recent surveys show that today's minors spend annu-

265. See FARNSWORTH, *supra* note 8, §4.3, at 444.

266. See *supra* Part I.

267. FARNSWORTH, *supra* note 8, § 4.3, at 444 (quoting *Zouch v. Parsons*, 97 Eng. Rep. 1103, 1106–07 (K.B. 1765)).

268. Schwartz, *supra* note 61, at 418 (footnotes omitted) (first citing FARNSWORTH, *supra* note 8, § 4.5; then citing Arthur Allen Leff, *Unconscionability and the Code—The Emperor's New Clause*, 115 U. PA. L. REV. 485, 556–57 (1967); and then citing *Zouch*, 97 Eng. Rep. at 1107–08).

269. *Id.* at 421–22.

270. See John Boitnott, *40 Young People Who Became Millionaires Before They Were 20*, INC. (Sept. 22, 2014), <http://www.inc.com/john-boitnott/40-young-people-who-became-millionaires-before-they-were-20.html>.

ally more than twelve billion dollars The business community obviously feels that the risk of disaffirmance is more than offset by the advantages to it and to the economy in allowing these sales.”²⁷¹ Fast forward to the present, and the willingness to engage the minor is even more prevalent:

Today’s children are subjected to a constant stream of advertisements. . . . Because of the increase in their disposable income, children and teen consumers have been recognized as a huge market, and accordingly, advertisers have ruthlessly targeted them. What has emerged is the most brand-loyal, consumerist generation this nation has ever seen. . . . A contract that formerly took weeks of negotiation and hours of reading fine print may now be sealed merely through a click. Obligations can even arise when a user simply browses a website, without clicking anything.²⁷²

Facebook and YouTube explicitly allow a child to create an account at age thirteen.²⁷³ Although other online merchants usually state they will contract only with purchasers who are eighteen, the age requirement is rarely enforced other than in simply asking the purchaser to enter her age without otherwise verifying it.²⁷⁴ These companies are regularly engaging in commercial transactions with minors, regardless of the legal age of contract. The same is surely true of traditional, brick-and-mortar stores as well. In fact, there are research companies that specialize in educating businesses in how to “tap the youth market through advertising campaigns and outreach specifically designed to appeal to minors.”²⁷⁵ These companies are surely well-advised on legal matters, fully cognizant of existing contract doctrine on minors, and prepared to tap into the lucrative minor market, taking any risks of

271. Note, *supra* note 59, at 146–47 (footnotes omitted) (citing TIME MAG., Jan. 29, 1965, at 56, 57a).

272. See Slade, *supra* note 225, at 613–14 (footnotes omitted) (first citing JULIET B. SCHOR, BORN TO BUY: THE COMMERCIALIZED CHILD AND THE NEW CONSUMER CULTURE 9 (2004); then citing Allen Chappell, *What a Teen Consumer Wants*, IMEDIA (Oct. 21, 2004), <http://www.imediaconnection.com/articles/ported-articles/red-dot-articles/2004/oct/what-a-teen-consumer-wants/>; then citing TRU-TEENS, TWEENS, AND TWENTY-SOMETHINGS RESEARCH, <http://www.tru-insight.com>; and then citing ONLINE CONTRACT FORMATION 328 (N. Stephen Kinsella & Andrew F. Simpson eds., 2004)).

273. See *Age Requirements on Google Accounts*, GOOGLE, <https://support.google.com/accounts/answer/1350409?hl=en> (last visited Dec. 21, 2016); *How Do I Report a Child Under the Age of 13?*, FACEBOOK, <https://www.facebook.com/help/157793540954833> (last visited Dec. 21, 2016).

274. See, e.g., Tom Rawstorne, *What’s YOUR Child Buying Online?*, DAILY MAIL, <http://www.dailymail.co.uk/femail/article-1033878/Whats-YOUR-child-buying-online.html> (last updated July 9, 2008, 4:59 PM).

275. Slade, *supra* note 225, at 632; see also *How Marketers Target Kids*, MEDIA SMARTS, <http://mediasmarts.ca/digital-media-literacy/media-issues/marketing-consumerism/how-marketers-target-kids> (last visited Jan. 12, 2017). Major retail corporations use such services in a clear attempt to market directly to minors. Slade, *supra* note 225, at 632 n.99 (listing major retailers).

disaffirmance into account in their business models.²⁷⁶ The idea that changing the age of majority to twenty-one will suddenly keep all those under twenty-one from the marketplace does not seem to constitute a major cause for concern.

One last objection of note is that some disagree that the rule providing minors' ability to disaffirm their contracts should continue at all.²⁷⁷ Suffice it to say that I believe there continue to be good reasons for the disaffirmation doctrine. Teenagers and even young adults in their early twenties lack the maturity, judgment, and decisionmaking ability of adults. This has always been the underlying premise of the rule allowing minors to void their contracts. And now, we actually have direct scientific proof of this, whereas the rule has always previously been based, presumably, on observation, supposition, and experience. But, as Cheryl Preston and Brandon Crowther have recently observed in defending the continued existence of the doctrine, "[f]ew people dispute that protecting minors from more-experienced adults is a worthy goal."²⁷⁸ Although some believe that other doctrines—such as duress and unconscionability—are sufficient to protect minors, Preston and Crowther argue otherwise. They contend that two factors militate against this argument. First, contract law's general weakening of the requirement of assent: the advent of standard form contracts, especially in the online "click" context, makes surprise over contract terms an ever-increasing likelihood.²⁷⁹ Second, these methods are being used to impose ever more onerous terms, such as arbitration clauses.²⁸⁰ These factors in the emerging contract jurisprudence have "diluted the chance that vulnerable minors could find relief outside of the infancy doctrine."²⁸¹ Therefore, sound reasons exist for keeping the venerable rules of infancy in place for the protection of minors.

V. CONCLUSION

The age of majority should be returned to age twenty-one. The rule that minors' contracts are voidable has existed for centuries.²⁸² It is a sound doctrine, which serves to protect minors from their own impulsive and foolish

276. See Larry A. DiMatteo, ss*Deconstructing the Myth of the "Infancy Law Doctrine": From Incapacity to Accountability*, 21 OHIO N.U. L. REV. 481, 502 (1994) ("The 'fact' is that the ever-growing size of the infant consumer market is an indication that the infancy law doctrine has done little to discourage adults from selling or contracting with minors.").

277. See, e.g., *id.* at 501–02.

278. Preston & Crowther, *supra* note 1, at 71.

279. See *id.* at 71–74.

280. See *id.* at 74–76.

281. *Id.* at 77.

282. See WILLISTON, *supra* note 3, § 9:3.

financial decisions and to protect them from the actions of potentially exploitative adults and commercial entities.²⁸³ Until very recently, the centuries-old doctrine was accompanied by an age of majority set at twenty-one.²⁸⁴ The age was only reduced to eighteen due to a series of explosive protests in the face of heated and emotional opposition to the Vietnam War, and the draft of eighteen-year-olds into military service—eighteen-year-olds who had not been afforded the opportunity to vote for the politicians who then sent them to war.²⁸⁵ The resultant lowering of the voting age to eighteen by enactment of the Twenty-Sixth Amendment caused a ripple effect, and many other legislative ages of majority were changed as well, including the contract age of majority.²⁸⁶ Whatever the wisdom of lowering the voting age, little thought was given to the wisdom of lowering the contract age of majority beyond the fairness perceived in the military draft situation.²⁸⁷

However, with the benefit of modern developments in neurological science, we now know that human brains do not fully mature until the early to mid-twenties and beyond. The full powers of cognition, decisionmaking, risk-assessment, and impulse control are not fully developed until at least age twenty-one or later.²⁸⁸ Sociologists have also begun to observe that the ages eighteen to twenty-five are, in reality, a distinct life phase now referred to as “emerging adulthood,” in which the full adult attributes are gradually attained.²⁸⁹ Census and demographic data tend to corroborate these findings, and survey results indicate that most people do not perceive adulthood (including financial independence) as having been reached until the age of twenty-one or later.²⁹⁰ Finally, legal experimentation in the areas of alcohol, smoking, and credit card ownership have resulted in (or are in the process of trending towards) an increase in the responsible age from eighteen back to twenty-one.²⁹¹

With the benefit of forty years of hindsight, reflection, and the scientific, sociological, demographic, and legal data now available, it seems clear that the contract age of majority was always sensibly placed at age twenty-one. Now, the decision to lower the age in the early 1970s in a wave of emotional and frenzied protest seems to have been ill-advised. Young people at ages eighteen, nineteen, and twenty are still in the formative years of attaining

283. See FARNSWORTH, *supra* note 8, § 4.2, at 442.

284. WILLISTON, *supra* note 3, § 9:3.

285. See *supra* notes 62–93 and accompanying text.

286. See *supra* notes 60–91 and accompanying text.

287. Rosenthal, *supra* note 171, at 653.

288. See *supra* Part III.A.

289. See *supra* Part III.B.

290. See *supra* notes 152–169 and accompanying text.

291. See *supra* Part III.C.

maturity, and the reasons for minors' need for protection in the area of contract are fully applicable to those of this age. Accordingly, legislatures should follow the lead provided by alcohol regulation and the federal CARD Act and revert the contract age of majority to twenty-one. Only then will an historical misstep in contract law be remedied.

EXHIBIT 34

the frontal cortex¹⁵. Striatal structures are involved in cognitive functions such as learning, which is linked to frontal system function¹⁵ and improves throughout adolescence⁸. This suggests temporal and functional relationships between simultaneous postadolescent reductions in gray-matter density in frontal and striatal regions.

Thus, we describe *in-vivo* documentation for a temporal and spatial progression of postadolescent maturation into the frontal lobes, highlighting the potential importance of frontal/striatal maturation to adult cognition.

ACKNOWLEDGEMENTS

We thank the McConnell Brain Imaging Center at the Montreal Neurological Institute and the SPM software developers at the Wellcome Department of Cognitive Neurology. Finally, we thank David Kornsand for assistance in anatomical analyses and John Bacheller for artwork. This study was supported by grants P50 NS22343, and R01 HD 23854, and NIMH NRSA grant 5T32 MH16381, NSF DBI 9601356, the NCRR (P41 RR13642), NINDS (NS38753) and the pediatric supplement of the Human Brain Project, funded jointly by NIMH and NIDA (P20 MH/DA52176).

Brain development during childhood and adolescence: a longitudinal MRI study

Jay N. Giedd¹, Jonathan Blumenthal¹, Neal O. Jeffries², F. X. Castellanos¹, Hong Liu¹, Alex Zijdenbos³, Tomáš Paus³, Alan C. Evans³ and Judith L. Rapoport¹

¹ Child Psychiatry Branch, National Institute of Mental Health, Building 10, Room 4C110, 10 Center Drive, MSC 1367, Bethesda, Maryland 20892, USA

² Biometry Branch, National Institute of Neurological Disease and Stroke, Federal Building, Room 7C06, 7550 Wisconsin Avenue, Bethesda, Maryland, 20892, USA

³ Montreal Neurological Institute, McGill University, 3801 University Street, Montreal, Quebec H3A 2B4, Canada

Correspondence should be addressed to J.N.G. (jgiedd@helix.nih.gov)

Pediatric neuroimaging studies^{1–5}, up to now exclusively cross sectional, identify linear decreases in cortical gray matter and increases in white matter across ages 4 to 20. In this large-scale longitudinal pediatric neuroimaging study, we confirmed linear increases in white matter, but demonstrated nonlinear changes in cortical gray matter, with a preadolescent increase followed by a postadolescent decrease. These changes in cortical gray matter were regionally specific, with developmental curves for the frontal and parietal lobe peaking at about age 12 and for the temporal lobe at about age 16, whereas cortical gray matter continued to increase in the occipital lobe through age 20.

The subjects for this study were healthy boys and girls participating in an ongoing longitudinal pediatric brain-MRI project at the Child Psychiatry Branch at the National Institute of Mental Health. Subjects were recruited from the community as previously described, using phone screening, questionnaires mailed to parents and teachers and face-to-face physical and psychological testing; approximately one in six volunteers were accepted⁵. At least 1 scan was obtained from each of 145 healthy subjects (89 male). Of

RECEIVED 17 MAY; ACCEPTED 12 AUGUST 1999

1. Yakovlev, P. I. & Lecours, A. R. in *Regional Development of the Brain in Early Life* (ed. Minkowski, A.) 3–70 (Blackwell Scientific, Oxford, 1967)
2. Benes, F. M., Turtle, M., Khan, Y. & Farol, P. *Arch. Gen. Psychiatry* 51, 477–484 (1994).
3. Sowell, E. R. *et al. Neuroimage* 9, 587–597 (1999).
4. Jernigan, T. L., Trauner, D. A., Hesselink, J. R. & Tallal, P. A. *Brain* 114, 2037–2049 (1991).
5. Paus, T. *et al. Science* 283, 1908–1911 (1999).
6. Hudspeth, W. J. & Pribram, K. H. *Int. J. Psychophysiol.* 21, 19–29 (1990).
7. Chugani, H. T., Phelps, M. E. & Mazziotta, J. C. *Ann. Neurol.* 22, 487–497 (1987).
8. Levin, H. S. *et al. Dev. Neuropsychol.* 7, 377–395 (1991).
9. Woods, R. P., Grafton, S. T., Holmes, C. J., Cherry, S. R. & Mazziotta, J. C. *J. Comput. Assist. Tomogr.* 22, 139–152 (1998).
10. Friston, K. J. *et al. Hum. Brain Mapp.* 2, 189–210 (1995).
11. Worsley, K. J. *et al. Hum. Brain Mapp.* 8 (in press).
12. Fuster, J. M. *The Prefrontal Cortex: Anatomy, Physiology, and Neuropsychology of the Frontal Lobe*, 2nd edn (Raven, New York, 1989).
13. Cohen, M. J., Branch, W. B., Willis, W. G., Yeyandt, L. L. & Hynd, G. W. in *Handbook of Neuropsychological Assessment: A Biopsychosocial Perspective* (eds Puente, A. E. & McCaffrey, R. J.) 49–79 (Plenum, New York, 1992).
14. Connor, J. R. & Menzies, S. L. *Glia* 17, 83–93 (1996).
15. Rolls, E. T. *Rev. Neurol. (Paris)* 150, 648–660 (1994).

these, 65 had at least 2 scans, 30 had at least 3 scans, 2 had at least 4 scans and 1 had 5 scans, acquired at approximately two-year intervals. The age range was from 4.2 to 21.6 years. There were no significant sex differences for age, Tanner stage, ethnicity, socioeconomic status, height, weight or handedness.

All subjects were scanned on the same GE 1.5 Tesla Signa scanner using the same three-dimensional, spoiled-gradient, recalled echo in the steady state (3D SPGR) imaging protocol, with an axial-slice thickness of 1.5 mm, a time-to-echo of 5 ms, a repetition time of 24 ms, flip angle of 45°, a 192 (256 acquisition matrix, 1 excitation and a field of view of 24 cm. A clinical neuroradiologist evaluated all scans; no gross abnormalities were reported.

Volumes of white and cortical gray matter were quantitatively analyzed by combining a technique using an artificial neural network to classify tissues based on voxel intensity with non-linear registration to a template brain for which these tissue regions had been manually defined⁷. This technique supplemented MRI signal-intensity information with predetermined brain anatomy and provides lobar (frontal, parietal, temporal and occipital) parcellation of cortical gray- and white-matter volumes.

We used previously described statistical analysis techniques that combine cross-sectional and longitudinal data⁸. These longitudinal methods are more sensitive to detecting individual growth patterns, even in the presence of large interindividual variation⁹. We assessed if there was significant change with age, if developmental curves differed by sex and/or region and whether the developmental curves were linear or quadratic.

The volume of white matter increased linearly with age (Fig. 1; Table 1), increasing less in females than in males. The net increase across ages 4 to 22 was 12.4%. Curves for white-matter development did not significantly differ among various lobes. In contrast, changes in volume of cortical gray matter were non-linear and regionally specific. Gray matter in the frontal lobe increased during pre-adolescence with a maximum size occurring at 12.1 years for males and 11.0 years for females, followed by a decline during post-adolescence that resulted in a net decrease in volume across this age span. Parietal-lobe gray matter followed a similar pattern, increasing during pre-adolescence to a maximum size at age 11.8 years for males and 10.2 years for females, followed by decline during postadolescence and a net decrease

scientific correspondence

Table 1. Developmental curves for different regions.

Structure	Male intercept	Female intercept	Age coefficient β_1	Age ² coefficient β_2	p value for no change ($\beta_1 = 0, \beta_2 = 0$)	p value for only linear change ($\beta_2 = 0$)	p value for curves having same shape
Total cerebrum	1382 (12.3)	1260 (19.3)	5.6 (10.0)	-0.72 (0.15)	$p < 0.0001$	$p < 0.0001$	$p = 0.83$
Total gray	758 (7.3)	686 (11.3)	-0.50 (0.80)	-0.39 (0.12)	$p = 0.001$	$p = 0.001$	$p = 0.47$
Frontal gray	235 (2.3)	214 (3.8)	-0.38 (0.28)	-0.18 (0.04)	$p < 0.0001$	$p < 0.0001$	$p = 0.84$
Temporal gray	191 (1.7)	175 (2.6)	0.81 (0.22)	-0.10 (0.03)	$p < 0.0001$	$p = 0.002$	$p = 0.99$
Parietal gray	126 (1.3)	116 (20.0)	-0.31 (0.15)	-0.10 (0.02)	$p < 0.0001$	$p < 0.0001$	$p = 0.51$
Occipital gray	70.1 (1.2)	61.5 (1.7)	0.41 (0.14)	0.009 (0.02)	$p = 0.007$	$p = 0.69$	$p = 0.07$

The developmental curves are modeled by the equation: size = intercept + β_1 (age - mean age) + β_2 (age - mean age)² + ϵ where the intercept term is a random effect that varies by individual and intra-individual correlation of ϵ is taken into account. A Wald statistic assesses whether the curve changes with age (that is, whether β_1 and β_2 are both 0). A z statistic of β_2 assesses whether the curve is best fit by a linear ($\beta_2 = 0$) or quadratic curve ($\beta_2 \neq 0$). The curves were found to have similar shapes by sex (no significant differences for any structure), but because the height of the curves did vary, separate terms were used for boys and girls. Multivariate analysis showed that shapes for the four regions of gray matter significantly differed from one another ($p < 0.0001$), with parietal and frontal regions most similar and temporal the most distinct.

in volume; however, pre- and post-adolescent slopes were steeper for parietal than for frontal lobes. Temporal-lobe gray matter also followed a nonlinear developmental course, but maximum size was not reached until 16.5 years for males and 16.7 years for

females, with a slight decline thereafter. Occipital-lobe gray matter increased linearly over the age range, without evidence of significant decline or leveling. Developmental curves for the different cortical regions significantly differed from each other; those for frontal and parietal lobes were the most similar. The absolute size of the cortical gray matter was approximately 10% larger in boys, and peaked slightly earlier in girls, but the shapes of the curves were not significantly different between boys and girls.

The regional specificity of findings in cortical gray matter sheds light on the debate regarding synchronous versus heterochronous development of the cerebral cortex. Nonhuman primate studies generally reveal synchronous cortical development (that is, with similar timing in diverse cortical regions)¹⁰. However, in humans there are limited but compelling histological data to suggest that synapse elimination is heterochronous, with changes in primary visual and auditory cortex occurring before those in frontal cortex¹¹. The present data support heterochronic development in human cerebral cortex. The pre-adolescent increase and post-adolescent decrease in cortical gray matter parallel developmental PET studies of cerebral glucose metabolism¹² and EEG studies of slow-wave sleep amplitude¹³.

This MRI study demonstrates a pre-adolescent increase in cortical gray matter; this phenomenon was previously obscured, probably by the lack of longitudinal data, as even in an analysis of the 145 cross-sectional data points in our sample, the largest to date, we could not detect nonlinearity in these developmental curves. Whether this gray-matter increase is related to changes in neuropil, neuronal size or dendritic or axonal arborization will be best addressed by methods other

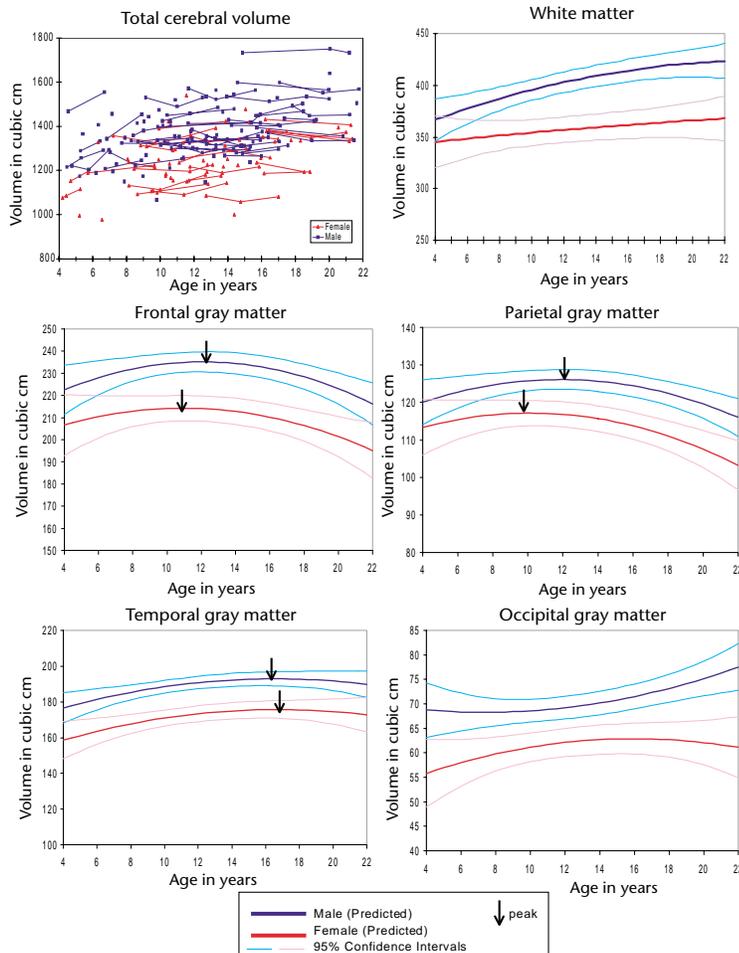


Fig. 1. Predicted size with 95% confidence intervals for cortical gray matter in frontal, parietal, temporal and occipital lobes from 89 males and 56 females, ages 4 to 22 years. The arrows indicate peaks of the curves.

than MRI. If the increase is related to a second wave of overproduction of synapses, it may herald a critical stage of development when the environment or activities of the teenager may guide selective synapse elimination during adolescence. The relative prominence of the role of the environment in shaping late synaptogenesis is supported by rat studies^{14,15}. That the frontal and parietal gray matter peaks approximately one year earlier in females, corresponding with the earlier age of onset of puberty, suggests a possible influence of gonadal hormones. Studies of healthy monozygotic and dizygotic twins, chromosomal aneuploidies (XXY, XXYY, XYY), congenital adrenal hyperplasia (producing high levels of testosterone *in utero*) and psychiatric illnesses are underway to address the effects of genes, hormones and environment on this process.

RECEIVED 21 MAY; ACCEPTED 9 AUGUST 1999

1. Jernigan, T. L., Trauner, D. A., Hesselink, J. R. & Tallal, P. A. *Brain* 114, 2037–2049 (1991).

2. Pfefferbaum, A. *et al. Arch. Neurol.* 51, 874–887 (1994).
 3. Caviness, V. S. Jr., Kennedy, D. N., Richelme, C., Rademacher, J. & Filipek, P. A. *Cereb. Cortex.* 6, 726–736 (1996).
 4. Reiss, A. L., Abrams, M. T., Singer, H. S., Ross, J. L. & Denckla, M. B. *Brain* 119, 1763–1774 (1996).
 5. Giedd, J. N. *et al. Cereb. Cortex.* 6, 551–560 (1996).
 6. Lange, N., Giedd, J. N., Castellanos, F. X., Vaituzis, A. C. & Rapoport, J. L. *Psychiatry Res.* (in press).
 7. Zijdenbos, A. P., Dawant, B. M. & Margolin, R. A. *Comput. Med. Imaging Graph.* 18, 11–23 (1994).
 8. Giedd, J. N. *et al. Prog. Neurosychopharmacol. Biol. Psychiatry* 23, 571–588 (1999).
 9. Hand, D. J. & Crowder, M. J. *Practical Longitudinal Data Analysis* (Chapman and Hall, London, 1996).
 10. Rakic, P., Bourgeois, J. P., Eckenhoff, M. F., Zecevic, N. & Goldman-Rakic, P. S. *Science* 232, 232–235 (1986).
 11. Huttenlocher, P. R. & Dabholkar, A. S. *J. Comp. Neurol.* 387, 167–178 (1997).
 12. Chugani, H. T., Phelps, M. E. & Mazziotta, J. C. *Ann. Neurol.* 22, 487–497 (1987).
 13. Feinberg, I. J. *Psychiatr. Res.* 10, 283–386 (1974).
 14. Kleim, J. A., Lussnig, E., Schwarz, E. R., Comery, T. A. & Greenough, W. T. *J. Neurosci.* 16, 4529–4535 (1996).
 15. Bourgeois, J. P., Jastreboff, P. J. & Rakic, P. *Proc. Natl. Acad. Sci. USA* 86, 4297–4301 (1989).

A contingent aftereffect in the auditory system

C.-J. Dong, N. V. Swindale and M. S. Cynader

Department of Ophthalmology, University of British Columbia, 2550 Willow Street, Vancouver, British Columbia V5Z 3N9, Canada

Correspondence should be addressed to C.-J.D. (cdong@interchg.ubc.ca)

Pairs of stimulus attributes, such as color and orientation, that are normally uncorrelated in the real world are generally perceived independently; that is, the perception of color is usually uninfluenced by orientation and *vice versa*. Yet this independence can be altered by relatively brief exposure to artificially correlated stimuli, as has been shown for vision¹. Here we report an analogous contingent aftereffect in the auditory system that can persist for four hours after the initial adaptation.

After a few minutes of alternately viewing an orange-black vertical grating and a blue-black horizontal grating, the white stripes in a vertical black-and-white grating appear blue-green, whereas the white stripes in a horizontal grating appear orange¹.

There are numerous demonstrations of other types of visual contingent aftereffect, such as color-contingent orientation² and motion^{3,4} aftereffects and spatial frequency⁵- and motion^{6,7}-contingent color aftereffects. These visual contingent aftereffects can be extremely persistent. For example, the motion-contingent color aftereffect and the color-contingent motion aftereffect can persist for at least 24 hours^{3,6}. The motion-contingent color aftereffect can last as long as six weeks in some cases⁷.

In contrast to the rich variety of reported visual contingent aftereffects, there are no reports of contingent aftereffects for

Fig. 1. Stimulus protocols. (a) Time sequence of stimuli. Each run began with 10 minutes of adaptation, followed by a series of brief test sounds (1 s), with either a rising (0.7 octaves per s) or a falling (−0.7 octaves per s) pitch presented by a loudspeaker moving at one of six different velocities (2°, 6° or 10° per s, either to the left or the right). For each test presentation, the subject was asked to press one of two buttons to indicate the direction (leftward or rightward) of spatial movement. (b) Detailed time sequence of adapting stimuli. While the central frequency of an adapting sound (1-octave band-pass noise) was moving upward (0.7 octave per s), the loudspeaker moved to the left (30° per s) for 1 second (from −15° to 15° in azimuth). Following a silent interval of 1.4 seconds, the loudspeaker moved to the right (−30° per s) for 1 second, while the central frequency of the sound moved downward (−0.7 octave per s). During adaptation, this sequence was repeated continuously. In the control condition, the loudspeaker moved over the same trajectory with the same time course, but the center frequency of the adapting sound was kept constant at 1.5 kHz. Note that the vertical axis in the top panel has a logarithmic scale.

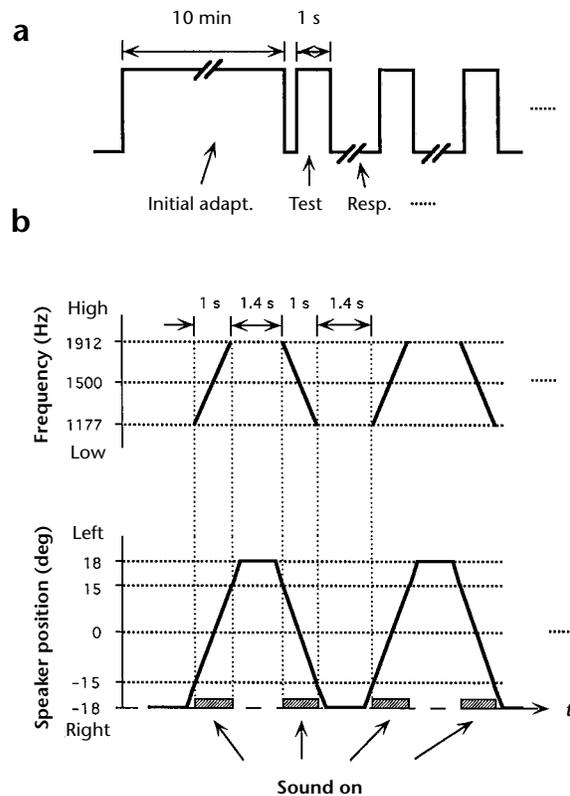


EXHIBIT 37

Dynamic mapping of human cortical development during childhood through early adulthood

Nitin Gogtay^{*†}, Jay N. Giedd^{*}, Leslie Lusk^{*}, Kiralee M. Hayashi[‡], Deanna Greenstein^{*}, A. Catherine Vaituzis^{*}, Tom F. Nugent III^{*}, David H. Herman^{*}, Liv S. Clasen^{*}, Arthur W. Toga[‡], Judith L. Rapoport^{*}, and Paul M. Thompson[‡]

^{*}Child Psychiatry Branch, National Institutes of Mental Health, National Institutes of Health, Bethesda, MD 20892; and [‡]Laboratory of Neuro Imaging, Department of Neurology, University of California School of Medicine, Los Angeles, CA 90095-1769

Communicated by Leslie G. Ungerleider, National Institutes of Health, Bethesda, MD, April 15, 2004 (received for review January 7, 2004)

We report the dynamic anatomical sequence of human cortical gray matter development between the age of 4–21 years using quantitative four-dimensional maps and time-lapse sequences. Thirteen healthy children for whom anatomic brain MRI scans were obtained every 2 years, for 8–10 years, were studied. By using models of the cortical surface and sulcal landmarks and a statistical model for gray matter density, human cortical development could be visualized across the age range in a spatiotemporally detailed time-lapse sequence. The resulting time-lapse “movies” reveal that (i) higher-order association cortices mature only after lower-order somatosensory and visual cortices, the functions of which they integrate, are developed, and (ii) phylogenetically older brain areas mature earlier than newer ones. Direct comparison with normal cortical development may help understanding of some neurodevelopmental disorders such as childhood-onset schizophrenia or autism.

Human brain development is structurally and functionally a nonlinear process (1–3), and understanding normal brain maturation is essential for understanding neurodevelopmental disorders (4, 5). The heteromodal nature of cognitive brain development is evident from studies of neurocognitive performance (6, 7), functional imaging (functional MRI or positron-emission tomography) (8–10), and electroencephalogram coherence studies (1, 2, 10). Prior imaging studies show regional nonlinear changes in gray matter (GM) density during childhood and adolescence with prepubertal increase followed by postpubertal loss (11–14). The GM density on MRI is an indirect measure of a complex architecture of glia, vasculature, and neurons with dendritic and synaptic processes. Studies of GM maturation show a loss in cortical GM density over time (15, 16), which temporally correlates with postmortem findings of increased synaptic pruning during adolescence and early adulthood (17–19). Here we present a study of cortical GM development in children and adolescents by using a brain-mapping technique and a prospectively studied sample of 13 healthy children (4–21 years old), who were scanned with MRI every 2 years for 8–10 years. Because the scans were obtained repeatedly on the same subjects over time, statistical extrapolation of points in between scans enabled construction of an animated time-lapse sequence (“movie”) of pediatric brain development. We hypothesized that GM development in childhood through early adulthood would be nonlinear as described before and would progress in a localized, region-specific manner coinciding with the functional maturation. We also predicted that the regions associated with more primary functions (e.g., primary motor cortex) would develop earlier compared with the regions that are involved with more complex and integrative tasks (e.g., temporal lobe).

The result is a dynamic map of GM maturation in the pre- and postpubertal period. Our results, while highlighting the remarkable heterogeneity, show that the cortical GM development appears to follow the functional maturation sequence, with the primary sensorimotor cortices along with frontal and occipital poles maturing first, and the remainder of the cortex developing in a parietal-to-frontal (back-to-front) direction. The superior

temporal cortex, which contains association areas that integrate information from several sensory modalities, matured last. Furthermore, the maturation of the cortex also appeared to follow the evolutionary sequence in which these regions were created.

Methods

Subjects. Sample demographics are shown in Table 1. All subjects were recruited from the community for an ongoing National Institute of Mental Health study of human brain development (20). Briefly, each subject was given a structured diagnostic interview to rule out any psychiatric diagnoses at each visit. Subjects returned every 2 years for a follow-up MRI together with psychiatric and neurocognitive reassessment. A subset of all children who had three or more usable MRI scans and were between the ages of 4 and 21 years was chosen to be included in this study. The study was approved by the National Institute of Mental Health institutional review board, and an informed consent was obtained from subjects >18 years old or from parents of minor subjects, and an additional written assent was obtained from each minor subject.

Image Processing and Analysis. MRI images were acquired at the National Institute of Mental Health on the same 1.5-T General Electric scanner. The MRI sequence was consistent throughout the study. T1-weighted images with contiguous 1.5-mm slices in the axial plane and 2.0-mm slices in the coronal plane were obtained by using 3D spoiled-gradient recalled echo in the steady state. Imaging parameters were: echo time, 5 ms; repetition time, 24 ms; flip angle, 45°; acquisition matrix, 256 × 192; number of excitations, 1; and field of view, 24 cm. With each major software/hardware upgrade, the reliability of the data before and after the upgrade was tested by scanning a set of subjects before and after the upgrade (20). Briefly, for each scan, a radio-frequency bias field-correction algorithm was applied. Baseline images were normalized, transforming them to a standard 3D stereotaxic space (21). Follow-up scans were then aligned to the baseline scan from the same subject, and mutually registered scans for each subject were linearly mapped into the International Consortium for Brain Mapping (ICBM) space (22). An extensively validated tissue classifier generated detailed maps of GM, white matter, and cerebrospinal fluid by using a Gaussian mixture distribution to generate a maximum *a posteriori* segmentation of the data (23, 24), and a surface model of the cortex was then automatically extracted for each subject and time point as described (25).

An image-analysis technique known as cortical pattern matching (25–27) was used to better localize cortical differences over time and increase the power to detect systematic changes (25). This approach matches gyral features of cortical

Abbreviations: GM, gray matter; STG, superior temporal gyrus.

[†]To whom correspondence should be addressed at: Child Psychiatry Branch, National Institute of Mental Health, Building 10, Room 3N 202, Bethesda, MD 20892. E-mail: nitin@codon.nih.gov.

© 2004 by The National Academy of Sciences of the USA

Table 1. Demographics of the study sample

No. of subjects	13
Gender (no. of male:female)	6:7
Total no. of scans	52
Average age (\pm SD) at	
Scan 1	9.8 \pm 3.8 years
Scan 2	11.7 \pm 4.1 years
Scan 3	13.8 \pm 4.4 years
Scan 4	16.7 \pm 4.3 years
Average age for all scans	13.0 \pm 4.8 years
Average IQ (\pm SD)	125.8 \pm 12.7
Handedness (no. of right:left)	12:1

surface anatomy as far as possible across subjects before making cross-subject comparisons, group averages, and statistical maps. Because this technique eliminates some confounding anatomical variance, there is increased statistical power for detecting statistical effects on cortical measures as well as increased ability to localize these effects relative to major sulcal and gyral landmarks. In the cortical matching step, secondary deformations are computed that match gyral patterns across all the time points and all subjects, which allows data to be averaged and compared across corresponding cortical regions. A set of 34 sulcal landmarks per brain constrains the mapping of one cortex onto the other by using corresponding cortical regions across subjects. An image analyst blind to subject identity, gender, and age traced each of 17 sulci in each lateral hemisphere on the surface rendering of each brain. These sulci included the Sylvian fissure, central, precentral, and postcentral sulci, superior temporal sulcus (STS) main body, STS ascending branch, STS posterior branch, primary and secondary intermediate sulci, and inferior temporal, superior, and inferior frontal, intraparietal, transverse occipital, olfactory, occipitotemporal, and collateral sulci. In addition to contouring the major sulci, a set of six midline landmark curves bordering the longitudinal fissure was outlined in each hemisphere to establish hemispheric gyral limits. Landmarks were defined according to a detailed anatomical protocol. This protocol is available on the Internet (www.loni.ucla.edu/~khayashi/Public/medial_surface) and has known inter- and intrarater reliability as reported (25).

A time-dependent average 3D cortical model for the group was created by flattening all sulcal/gyral landmarks into a 2D plane along with the cortical model assigning a color code to retain 3D shape information. Once data were in this flat space, sulcal features were aligned across subjects to an average set of sulcal curves. The warped cortical maps were mathematically reinflated to 3D, producing a crisp average cortical model with gyral features in their mean anatomic locations (28).

To quantify local GM, we used a measure termed “GM density,” used in many prior studies, which measures the proportion of GM in a small region of fixed radius (15 mm) around each cortical point (15, 25, 26, 28). The GM-density measure averages information on GM volumes over a small neighborhood (the 15-mm kernel used in this report), providing an increased signal-to-noise ratio, and it averages away some of the noise inherent in resolving the cortical GM boundaries in MRI. However, if GM density is used, some localization power is lost, and the approach can average data from opposing sulcal banks. The measure also can index GM changes stemming from differences in cortical surface curvature, in which increased curvature may cause less GM to be sampled within the kernel of a fixed radius. Our work, however, shows that GM density and thickness are very highly correlated (K. Narr, R. M. Bilder, A. W. Toga, R. P. Woods, D. E. Rex, P. Szeszko, D. Robinson, Y. Wang, H. DeLuca, D. Asuncion, and P. M. Thompson, unpub-

lished data) and therefore likely index similar maturational processes.

To determine whether there was enough power to achieve statistical significance at each surface point on the cortex, we fitted the model of GM change and estimated the multiple regression coefficient (R^2) at each point, which varies in the range of 0 to 1. From the null distribution of R^2 , adjusted for the number of degrees of freedom in the statistical model, it is possible to determine whether there is sufficient power to reject the null hypothesis ($R^2 = 0$) at each cortical point. The significance of the model fit, $p(R^2)$, then was plotted at each cortical point (data not shown). The resulting map indicated that R^2 is not zero at almost every cortical point, suggesting that the changes seen were very highly significant.

Statistical plots were generated by using a mixed-model regression analysis (11, 30) for the GM volumes at each of 65,536 points on the entire cortical surface as well as individual lobar volumes and also at several specific points of interest over the surface. Because a nonlinear mixed model was used, intersubject differences in GM density were modeled separately from the intraindividual rates of cortical change, giving additional power to resolve longitudinal changes at each cortical point. Hypothesis tests for model building were based on F statistics with $\alpha = 0.05$. Specifically, F tests were used to determine whether the order of a developmental growth model was cubic, quadratic, or linear. If a cubic model was not significant, a quadratic model was tested; if a quadratic model was not significant, a linear model was tested. Thus a growth model was polynomial/nonlinear if either the cubic or quadratic term significantly contributed to the regression equation. Given that each hypothesis was tested only once, correction of the statistics for multiple comparisons was not necessary.

The following regions were selected for analyses in each hemisphere: precentral gyrus, primary motor cortex (Fig. 1A), superior frontal gyrus, posterior limit near the central sulcus (Fig. 1B), inferior frontal gyrus, posterior limit (Fig. 1C), inferior frontal sulcus, anterior limit (Fig. 1D), inferior frontal sulcus in the dorsolateral prefrontal cortex (Fig. 1E), anterior end of superior frontal sulcus (Fig. 1F), frontal pole (Fig. 1G), primary sensory cortex in postcentral gyrus (Fig. 1H), supramarginal gyrus (area 40) (Fig. 1I), angular gyrus (area 39) (Fig. 1J), occipital pole (Fig. 1K), anterior, middle, and posterior portions of superior temporal gyrus (STG) (Fig. 1L–N), inferior temporal gyrus midpoint, as well the anterior and posterior limits (Fig. 1O–Q), and on the inferior surface, anterior and posterior ends of olfactory sulcus (Fig. 2R and S) and the anterior and posterior ends of collateral sulcus (Fig. 2T and U). Corresponding points were chosen on both hemispheres by using the same sulcal landmarks.

Results

Overall, the total GM volume was found to increase at earlier ages, followed by sustained loss starting around puberty. However, as seen in the time-lapse sequence (Figs. 2 and 3), the process of GM loss (maturation) begins first in dorsal parietal cortices, particularly the primary sensorimotor areas near the interhemispheric margin, and then spreads rostrally over the frontal cortex and caudally and laterally over the parietal, occipital, and finally the temporal cortex. (This sequence is available in Movies 1–4, which are published as supporting information on the PNAS web site.) Frontal and occipital poles lose GM early, and in the frontal lobe, the GM maturation ultimately involves the dorsolateral prefrontal cortex, which loses GM only at the end of adolescence.

To examine further the maturation patterns within individual cortical subregions, we used mixed-model regression analyses to construct plots of linear as well as nonlinear (quadratic or cubic) age effects on GM volumes at points of interest along the cortical

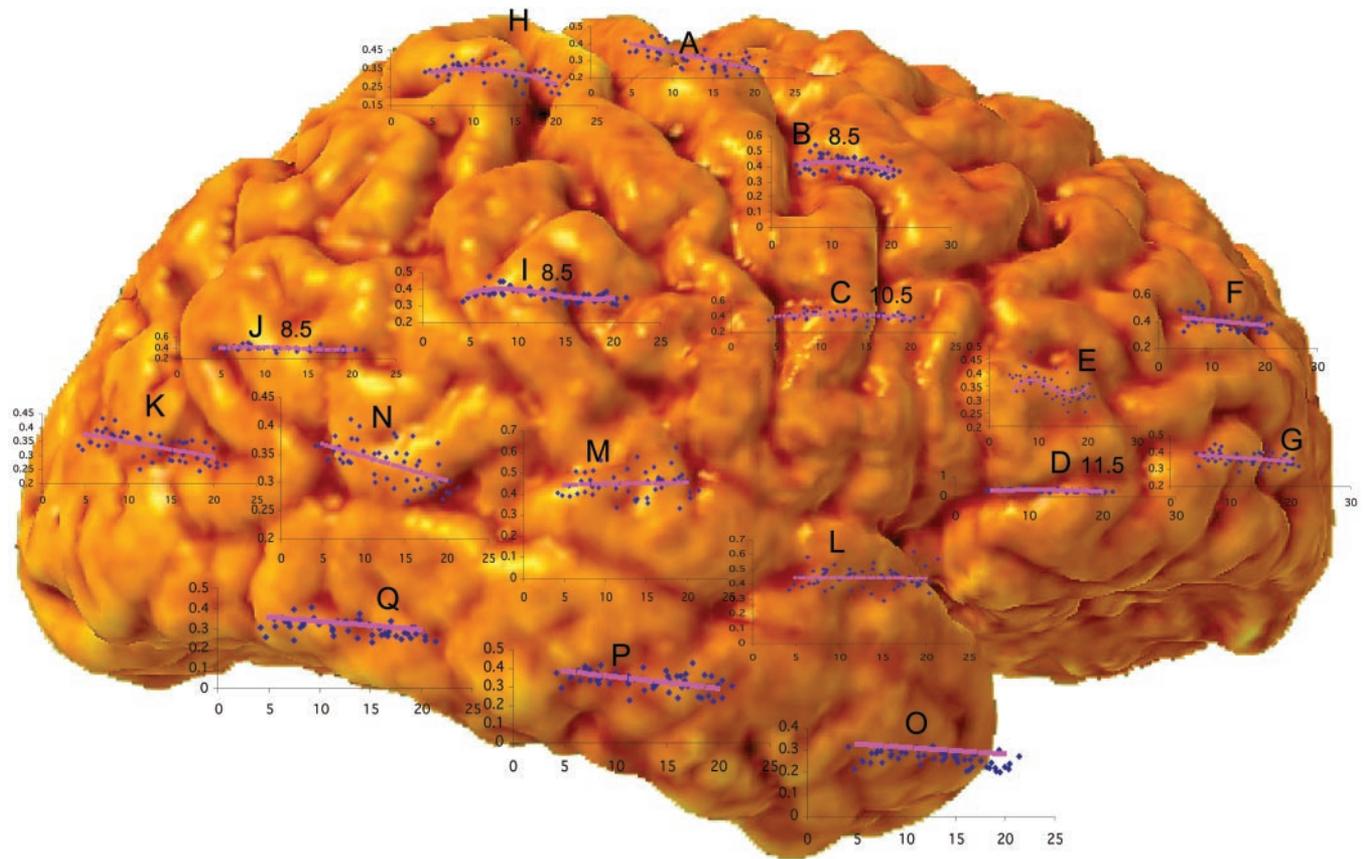


Fig. 1. Mixed-model regression plots at regions of interest over the cortical surface. The following regions were selected for analyses in each hemisphere: A, precentral gyrus and primary motor cortex; B, superior frontal gyrus, posterior end near central sulcus; C, inferior frontal gyrus, posterior end; D, inferior frontal sulcus, anterior end in the ventrolateral prefrontal cortex; E, inferior frontal sulcus in the dorsolateral prefrontal cortex; F, anterior limit of superior frontal sulcus; G, frontal pole; H, primary sensory cortex in postcentral gyrus; I, supramarginal gyrus (area 40); J, angular gyrus (area 39); K, occipital pole; L–N, anterior, middle, and posterior portions of STG; O–Q, anterior, middle, and posterior points along the inferior temporal gyrus anterior end. All quadratic, cubic, or linear terms were significant with $P < 0.05$. Age of peak GM is shown for B–D, I, and J. x-axis values are ages in years, and y-axis values show GM volumes.

surface by using major sulcal landmarks to ensure that corresponding anatomy was correlated correctly across time and subjects. When we compared the mean lobar volumes in this sample with our larger cross-sectional sample ($n = 149$), the trends for total and lobar GM volumes were in agreement in both groups (data not shown) (11). However, at individual subregions across the cortex, GM maturation shows a variable maturation pattern.

Within the frontal cortex, the precentral gyrus (Figs. 1A and 3) matures early. GM loss progresses linearly at an early age, whereas more rostral regions of the frontal lobe (along the superior and inferior frontal gyri; Figs. 1 and 3, B–G) mature successively in an anterior progression, as also indicated by the progressively later peaks of nonlinear GM loss (Fig. 1 B–D), with the prefrontal cortex maturing last (Figs. 1, D and E, and 3). In the parietal lobe, the GM loss begins in the postcentral gyrus (Figs. 1H and 3; with a nonlinear early peak), progressing laterally into the angular gyrus (area 40; Figs. 1I and 3), and supramarginal gyrus (area 39; Figs. 1J and 3). The frontal and occipital poles, similar to the pre- and postcentral gyri, mature early (Figs. 1 G and K and 3).

Later Maturation. Parts of the temporal lobe, on the other hand, show a characteristic late maturation pattern. The temporal lobe matures last except for the temporal pole, which shows GM loss around the same time as the frontal and occipital poles (Figs. 1O and 3). By contrast, the superior and inferior

temporal gyri (STG and inferior temporal gyrus) do not show the same degree of GM loss throughout this age range. This is also shown by the flat graphs for age effects (Figs. 1 L and M and 3). Within the STG, the posterior part shows a distinct linear trajectory (Fig. 1N).

On the inferior brain surface, the medial aspects of the inferior temporal lobe (presumptive entorhinal cortex, medial to the rhinal sulcus, between the anterior end of the collateral sulcus and the posterior end of the olfactory sulcus) mature early and do not change much thereafter, as seen by the flat graphs for the age effects (Fig. 2T). A similar maturational pattern occurs in the caudal and medial parts of the inferior frontal lobe (Fig. 2S, presumptive piriform cortex). Other parts of the ventral temporal lobe show a lateral-to-medial pattern of maturation, whereas the orbitofrontal regions continued to mature until the oldest age that we studied (Fig. 2).

Discussion

Here we show a visualization of dynamic progression of human cortical brain development in a prospective, longitudinal study of healthy children and adolescents. Earlier reports have either been cross-sectional (i.e., an MRI scan is acquired only once per subject) or used methods that provide mean global volumes instead of point-by-point comparison that is possible with the mapping methods (11, 15). Cross-sectional designs are influenced by interindividual variance and cohort effects, whereas methods that provide mean global volumes provide no spatio-

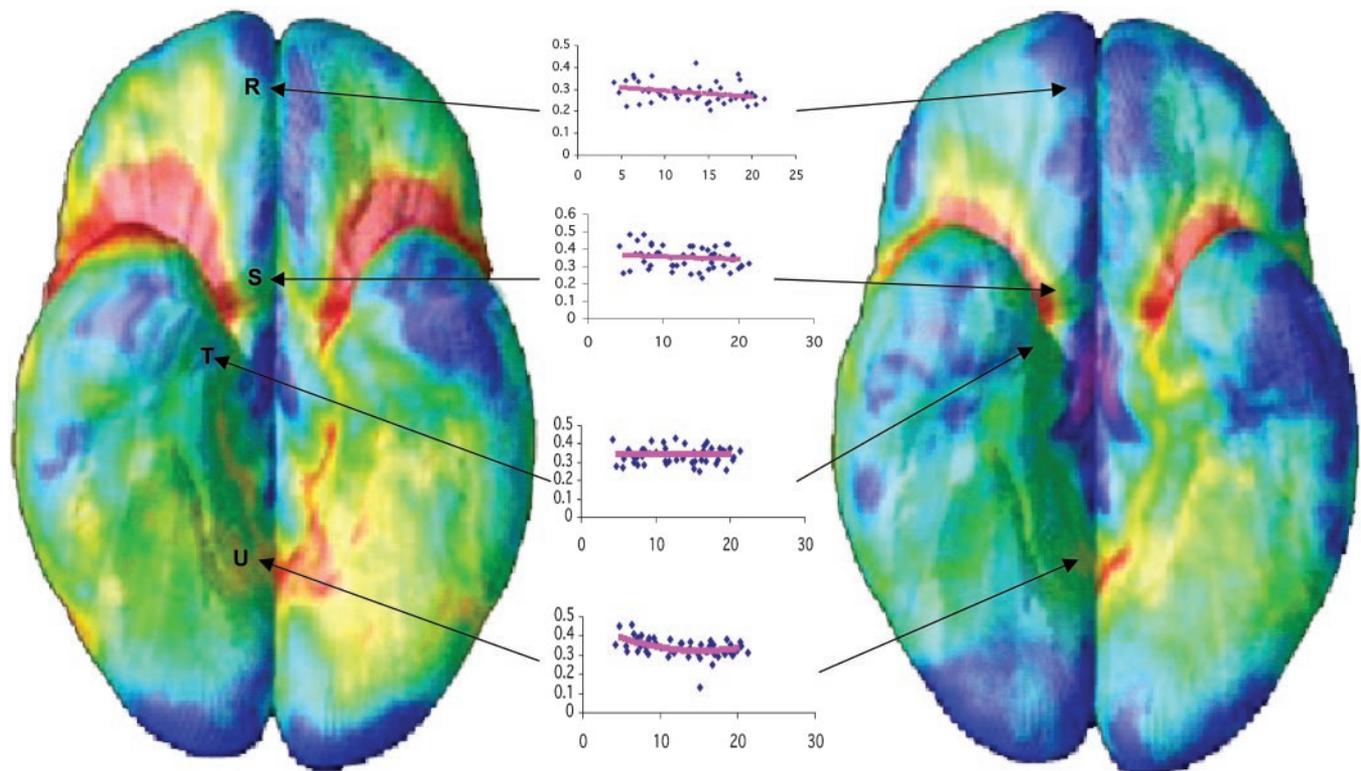


Fig. 2. Bottom view of the brain showing early and late time-lapse images. Points correspond to anterior and posterior ends of the olfactory sulcus (R and S) and collateral sulcus (T and U), and mixed-model graphs corresponding to the regions of interest on the right hemisphere are shown in the middle. *x*-axis values show ages in years, and *y*-axis values show GM volumes.

temporal detail. We have overcome these limitations by studying a longitudinally acquired pre- and postpubertal sample, in which the same children were rescanned prospectively over a 10-year period. Our results, while highlighting heterochronicity of human cortical development, suggest that individual subregions follow temporally distinct maturational trajectories in which higher-order association areas mature only after the lower-order sensorimotor regions, the functions of which they integrate, have matured. Additionally, it appears that phylogenetically older cortical areas mature earlier than the newer cortical regions.

Frontal-lobe maturation progressed in a back-to-front direction, beginning in the primary motor cortex (the precentral gyrus) and spreading anteriorly over the superior and inferior frontal gyri, with the prefrontal cortex developing last. Conversely, the frontal pole matured at approximately the same age as the primary motor cortex. In the posterior half of the brain, the maturation began in the primary sensory area, spreading laterally over the rest of the parietal lobe. Similar to the frontal pole, the occipital pole matured early. Lateral temporal lobes were the last to mature.

Thus, the sequence in which the cortex matured agrees with regionally relevant milestones in cognitive and functional development. Parts of the brain associated with more basic functions matured early: motor and sensory brain areas matured first, followed by areas involved in spatial orientation, speech and language development, and attention (upper and lower parietal lobes). Later to mature were areas involved in executive function, attention, and motor coordination (frontal lobes). The frontal pole, involved in taste and smell processing, and the occipital pole, containing the primary visual cortex, also matured early, as expected. This maturational sequence was also reflected in the peak ages for maximum GM values, which increase as development progresses anteriorly (Fig. 1 A–D and

H–J). Visually, the prefrontal cortex and the inferior parietal cortex on the left side matured earlier than the corresponding regions on the right side, which may be because of the fact that the majority of children in this sample are right-handed, with a left-dominant hemisphere that matures early.

The temporal lobe followed a distinct maturation pattern. Temporal poles matured early. Most of the remaining temporal lobe matured during the age range of this sample except for a small area in the posterior part of the STG, which appeared to mature last. In humans, temporal cortex, in particular the posterior aspect of superior temporal sulcus, superior temporal gyrus, and middle temporal gyrus, is thought to be a heteromodal association site (along with prefrontal and inferior parietal cortices) and is involved with integration of memory, audiovisual association, and object-recognition functions (31–34). Thus, the temporal cortex continues to mature after other association areas, the functions of which it integrates, are relatively developed.

Phylogenetically, some of the oldest cortical regions lie on the inferior brain surface in the medial aspect of the temporal lobe (the posterior part of the piriform cortex and the entorhinal cortex, for example) or on the inferior and medial aspect of the frontal lobe near the caudal end of the olfactory sulcus (anterior piriform cortex and the orbital periallocortex) (35–37). The maturation process in the vicinity of these areas appeared to have started early (ontogenetically) already by the age of 4 years, as seen by the linear or flat plots (Fig. 2 S and T). From these areas, maturation slowly progresses laterally. In the inferior frontal cortex, the medial and posterior aspects of the olfactory cortices matured early, whereas orbitofrontal cortices matured later. In the remainder of the inferior temporal lobe, the maturation appeared later and in a somewhat lateral-to-medial direction. In mammals, the inferior temporal cortex, along with

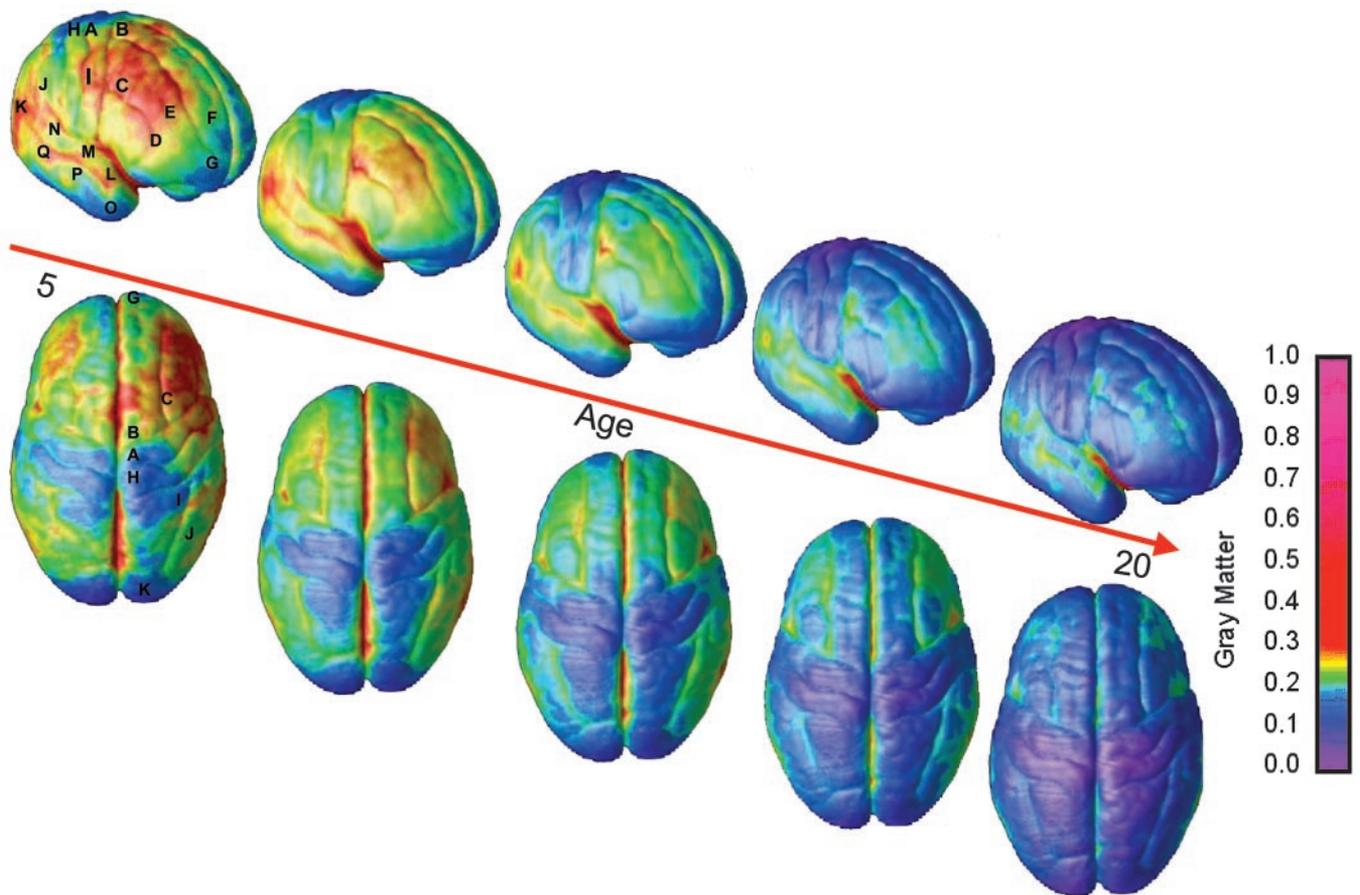


Fig. 3. Right lateral and top views of the dynamic sequence of GM maturation over the cortical surface. The side bar shows a color representation in units of GM volume. The initial frames depict regions of interest in the cortex as described for Fig. 1. This sequence is available in Movies 1–4 in the supporting information.

parts of the STG, posterior parietal cortex, and prefrontal cortex, are high-order association areas, which are also most recent evolutionarily (38, 39). Our observation of these areas appearing to mature later may suggest that the cortical development follows the evolutionary sequence to some degree.

The exact process underlying the GM loss is unknown. Cerebral white matter increases in the first four decades because of axonal myelination (40) and may partially explain the observed GM loss (41, 42). Although changes in sulcal and gyral folding patterns or other nonatrophic processes such as dehydration could influence the GM density, the primary cause for loss of GM density is unknown. We speculate that it may be driven at least partially by the process of synaptic pruning (43) together with trophic glial and vascular changes and/or cell shrinkage (44). Thus, region-specific differences in GM maturation may result from the underlying heterochronous synaptic pruning in the cortex, as has been shown in the primate and human cerebral cortical development (18, 45–48). Interestingly, in the frontal cortex, the dorsolateral prefrontal cortex matures last, coinciding with its later myelination, demonstrating that pruning myelination may often occur in parallel.

These findings may have clinical implications. For example, autism, with onset before the age of 3 years, shows global cerebral GM hyperplasia in the first 2 years of life (49) and larger frontal and temporal GM volumes by 4 years, followed by a slower rate of growth in these regions by 7 years (50, 51). Childhood-onset schizophrenia, with a mean age of onset around the age of 10 years, is associated with a striking parietal GM loss, which progresses anteriorly during adolescence in a back-to-

front fashion (52), whereas adult-onset schizophrenia (the more typical form) is more strongly associated with deficits in later-maturing temporal and frontal regions (53–55) and is associated with selective abnormalities of the heteromodal regions (29). Thus, alterations either in degree or timing of basic maturational pattern may at least partially be underlying these neurodevelopmental disorders.

The magnitude of the changes in some cortical regions is highly significant and consistent with the growth and loss rates observed in our prior longitudinal studies. In an earlier report (28), we developed an approach using tensor mapping to measure the local growth rates and tissue-loss rates at a local level in the anatomy of the caudate and corpus callosum. In very small regions of these structures, local growth rates exceeded 40% per year, and local tissue-loss rates reached 40% per year in small regions of the basal ganglia. Because of the increased spatial resolution, peak local rates of change obtained from anatomical mapping approaches are often greater than those obtained in volumetric studies of anatomically parcellated brain structures. Assessment of lobar volumes, for example, can average growth or tissue-loss rates over a large structure, and the peak rates of volumetric change are reduced correspondingly. The cellular substrate for these cortical changes may be a combination of myelination, dendritic pruning, and changes in the neuronal, glial, vascular, and neurite packing density in different cortical laminae. There also may be changes in the relaxometric properties of the MRI signal, which is based on underlying water content. The myelination component can result in very large net percent changes in cortical volumes over periods of several years, especially when the volumes assessed are relatively small.

There are several limitations to this study. These analyses are based on 52 scans, in which 1,976 anatomical models were created, giving sufficient power to track change, but are from only 13 children. In addition, this is a nonrepresentative population with an average IQ of 125, reflecting a referral bias of the National Institute of Mental Health study. We were not able to capture prepubertal gain in the time-lapse movie sequence, although it was readily visualized in the mixed-model graphs. Similarly, gender differences in brain maturation could not be explored, because there are only six males and seven females in the sample. However, our findings uncover key information on the maturational sequence of early

brain development and its relation to functional and evolutionary milestones.

We thank Drs. Steven Wise (National Institutes of Health) and Alex Martin (National Institutes of Health) for valuable input and comments. This work was supported by National Institute of Mental Health Intramural funding; research grants from the National Institute for Biomedical Imaging and Bioengineering (EB 001561) and National Center for Research Resources (P41 RR13642 and R21 RR19771); and a Human Brain Project grant to the International Consortium for Brain Mapping, funded jointly by the National Institute of Mental Health and National Institute on Drug Abuse (P20 MH/DA52176).

1. Thatcher, R. W. (1992) *Brain Cognit.* **20**, 24–50.
2. Thatcher, R. W., Walker, R. A. & Giudice, S. (1987) *Science* **236**, 1110–1113.
3. Johnson, M. H. (2001) *Nat. Rev. Neurosci.* **2**, 475–483.
4. Stiles, J. (2000) *Dev. Neuropsychol.* **18**, 237–272.
5. Schlaggar, B. L., Brown, T. T., Lugar, H. M., Visscher, K. M., Miezin, F. M. & Petersen, S. E. (2002) *Science* **296**, 1476–1479.
6. Cepeda, N. J., Kramer, A. F. & Gonzalez de Sather, J. C. (2001) *Dev. Psychol.* **37**, 715–730.
7. Tamm, L., Menon, V. & Reiss, A. L. (2002) *J. Am. Acad. Child. Adolesc. Psychiatry* **41**, 1231–1238.
8. Luna, B., Thulborn, K. R., Munoz, D. P., Merriam, E. P., Garver, K. E., Minshew, N. J., Keshavan, M. S., Genovese, C. R., Eddy, W. F. & Sweeney, J. A. (2001) *Neuroimage* **13**, 786–793.
9. Chugani, H. T., Phelps, M. E. & Mazziotta, J. C. (1987) *Ann. Neurol.* **22**, 487–497.
10. Meyer-Lindenberg, A. (1996) *Electroencephalogr. Clin. Neurophysiol.* **99**, 405–411.
11. Giedd, J. N., Blumenthal, J., Jeffries, N. O., Castellanos, F. X., Liu, H., Zijdenbos, A., Paus, T., Evans, A. C. & Rapoport, J. L. (1999) *Nat. Neurosci.* **2**, 861–863.
12. Sowell, E. R., Thompson, P. M., Tessner, K. D. & Toga, A. W. (2001) *J. Neurosci.* **21**, 8819–8829.
13. Jernigan, T. L., Trauner, D. A., Hesselink, J. R. & Tallal, P. A. (1991) *Brain* **114**, 2037–2049.
14. Jernigan, T. L. & Tallal, P. (1990) *Dev. Med. Child Neurol.* **32**, 379–385.
15. Sowell, E. R., Peterson, B. S., Thompson, P. M., Welcome, S. E., Henkenius, A. L. & Toga, A. W. (2003) *Nat. Neurosci.* **6**, 309–315.
16. Sowell, E. R., Thompson, P. M., Holmes, C. J., Jernigan, T. L. & Toga, A. W. (1999) *Nat. Neurosci.* **2**, 859–861.
17. Huttenlocher, P. R. (1994) in *Human Behavior and the Developing Brain*, eds Dawson, G. & Fischer, K. (Guilford, New York), pp. 137–152.
18. Bourgeois, J. P., Goldman-Rakic, P. S. & Rakic, P. (1994) *Cereb. Cortex* **4**, 78–96.
19. Rakic, P. (1996) in *Child and Adolescent Psychiatry*, ed. Lewis, M. (Williams and Wilkins, Baltimore), pp. 9–30.
20. Giedd, J. N., Snell, J. W., Lange, N., Rajapakse, J. C., Casey, B. J., Kozuch, P. L., Vaituzis, A. C., Vauss, Y. C., Hamburger, S. D., Kaysen, D., et al. (1996) *Cereb. Cortex* **6**, 551–560.
21. Sled, J. G., Zijdenbos, A. P. & Evans, A. C. (1998) *IEEE Trans. Med. Imaging* **17**, 87–97.
22. Collins, D. L., Neelin, P., Peters, T. M. & Evans, A. C. (1994) *J. Comput. Assist. Tomogr.* **18**, 192–205.
23. Shattuck, D. W. & Leahy, R. M. (2001) *IEEE Trans. Med. Imaging* **20**, 1167–1177.
24. Zijdenbos, A. P. & Dawant, B. M. (1994) *Crit. Rev. Biomed. Eng.* **22**, 401–465.
25. Thompson, P. M., Hayashi, K. M., de Zubicaray, G., Janke, A. L., Rose, S. E., Semple, J., Herman, D., Hong, M. S., Dittmer, S. S., Doodrell, D. M., et al. (2003) *J. Neurosci.* **23**, 994–1005.
26. Thompson, P. M., Mega, M. S., Vidal, C., Rapoport, J. L. & Toga, A. (2001) *Detecting Disease-Specific Patterns of Brain Structure Using Cortical Pattern Matching and a Population-Based Probabilistic Brain Atlas, IEEE Conference on Information Processing in Medical Imaging (IPMI), UC Davis 2001* (Springer, Berlin).
27. Ashburner, J., Csernansky, J. G., Davatzikos, C., Fox, N. C., Frisoni, G. B. & Thompson, P. M. (2003) *Lancet Neurol.* **2**, 79–88.
28. Thompson, P. M., Giedd, J. N., Woods, R. P., MacDonald, D., Evans, A. C. & Toga, A. W. (2000) *Nature* **404**, 190–193.
29. Buchanan, R. W., Francis, A., Arango, C., Miller, K., Lefkowitz, D. M., McMahon, R. P., Barta, P. E. & Pearson, G. D. (2004) *Am. J. Psychiatry* **161**, 322–331.
30. Giedd, J. N., Jeffries, N. O., Blumenthal, J., Castellanos, F. X., Vaituzis, A. C., Fernandez, T., Hamburger, S. D., Liu, H., Nelson, J., Bedwell, J., et al. (1999) *Biol. Psychiatry* **46**, 892–898.
31. Mesulam, M. M. (1998) *Brain* **121**, 1013–1052.
32. Calvert, G. A. (2001) *Cereb. Cortex* **11**, 1110–1123.
33. Martin, A. & Chao, L. L. (2001) *Curr. Opin. Neurobiol.* **11**, 194–201.
34. Mesulam, M. (2000) *Principles of Behavioral and Cognitive Neurology* (Oxford Univ. Press, New York).
35. Puelles, L. (2001) *Philos. Trans. R. Soc. London B* **356**, 1583–1598.
36. Puelles, L. & Rubenstein, J. L. (2003) *Trends Neurosci.* **26**, 469–476.
37. Rubenstein, J. L., Martinez, S., Shimamura, K. & Puelles, L. (1994) *Science* **266**, 578–580.
38. Allman, J., Hakeem, A. & Watson, K. (2002) *Neuroscientist* **8**, 335–346.
39. Fuster, J. M. (2002) *J. Neurocytol.* **31**, 373–385.
40. Bartzokis, G., Beckson, M., Lu, P. H., Nuechterlein, K. H., Edwards, N. & Mintz, J. (2001) *Arch. Gen. Psychiatry* **58**, 461–465.
41. Benes, F. M. (1989) *Schizophr. Bull.* **15**, 585–593.
42. Benes, F. M., Turtle, M., Khan, Y. & Farol, P. (1994) *Arch. Gen. Psychiatry* **51**, 477–484.
43. Huttenlocher, P. R. (1979) *Brain Res.* **163**, 195–205.
44. Morrison, J. H. & Hof, P. R. (1997) *Science* **278**, 412–419.
45. Rakic, P., Bourgeois, J. P. & Goldman-Rakic, P. S. (1994) *Prog. Brain Res.* **102**, 227–243.
46. Bourgeois, J. P. (1997) *Acta. Paediatr. Suppl.* **422**, 27–33.
47. Zecevic, N., Bourgeois, J. P. & Rakic, P. (1989) *Brain Res. Dev. Brain Res.* **50**, 11–32.
48. Huttenlocher, P. R. & Dabholkar, A. S. (1997) *J. Comp. Neurol.* **387**, 167–178.
49. Courchesne, E., Carper, R. & Akshoomoff, N. (2003) *J. Am. Med. Assoc.* **290**, 337–344.
50. Saitoh, O. & Courchesne, E. (1998) *Psychiatry Clin. Neurosci.* **52** Suppl, S219–S222.
51. Carper, R. A., Moses, P., Tigue, Z. D. & Courchesne, E. (2002) *Neuroimage* **16**, 1038–1051.
52. Thompson, P. M., Vidal, C., Giedd, J. N., Gochman, P., Blumenthal, J., Nicolson, R., Toga, A. W. & Rapoport, J. L. (2001) *Proc. Natl. Acad. Sci. USA* **98**, 11650–11655.
53. Shenton, M. E., Dickey, C. C., Frumin, M. & McCarley, R. W. (2001) *Schizophr. Res.* **49**, 1–52.
54. Gur, R. E., Cowell, P., Turetsky, B. I., Gallacher, F., Cannon, T., Bilker, W. & Gur, R. C. (1998) *Arch. Gen. Psychiatry* **55**, 145–152.
55. DeLisi, L. E., Stritzke, P., Riordan, H., Holan, V., Boccio, A., Kushner, M., McClelland, J., Van Eyl, O. & Anand, A. (1992) *Biol. Psychiatry* **31**, 241–254.

EXHIBIT 38

PUBLIC RELEASE: 17-MAY-2004

Imaging study shows brain maturing

NIH/NATIONAL INSTITUTE OF MENTAL HEALTH

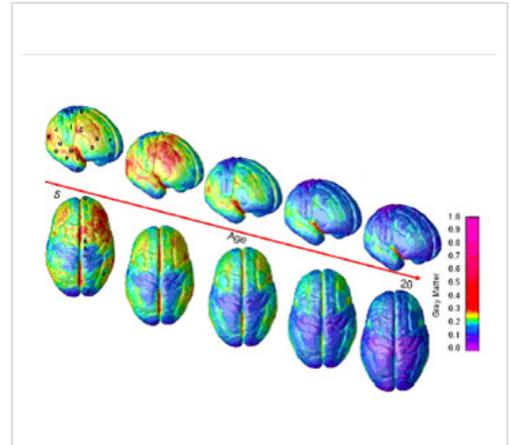
The brain's center of reasoning and problem solving is among the last to mature, a new study graphically reveals. The decade-long magnetic resonance imaging (MRI) study of normal brain development, from ages 4 to 21, by researchers at NIH's National Institute of Mental Health (NIMH) and University of California Los Angeles (UCLA) shows that such "higher-order" brain centers, such as the prefrontal cortex, don't fully develop until young adulthood.

A time-lapse 3-D movie that compresses 15 years of human brain maturation, ages 5 to 20, into seconds shows gray matter - the working tissue of the brain's cortex - diminishing in a back-to-front wave, likely reflecting the pruning of unused neuronal connections during the teen years. Cortex areas can be seen maturing at ages in which relevant cognitive and functional developmental milestones occur. The sequence of maturation also roughly parallels the evolution of the mammalian brain, suggest Drs. Nitin Gogtay, Judith Rapoport, NIMH, and Paul Thompson, Arthur Toga, UCLA, and colleagues, whose study is published online during the week of May 17, 2004 in The Proceedings of the National Academy of Sciences.

"To interpret brain changes we were seeing in neurodevelopmental disorders like schizophrenia, we needed a better picture of how the brain normally develops," explained Rapoport.

The researchers scanned the same 13 healthy children and teens every two years as they grew up, for 10 years. After co-registering the scans with each other, using an intricate set brain anatomical landmarks, they visualized the ebb and flow of gray matter - neurons and their branch-like extensions - in maps that, together, form the movie showing brain maturation from ages 5 to 20.

It was long believed that a spurt of overproduction of gray matter during the first 18 months of life was followed by a steady decline as unused circuitry is discarded. Then, in the late 1990s, NIMH's Dr. Jay Giedd, a co-author of the current study, and colleagues, discovered a second wave of overproduction of gray matter just prior to puberty, followed by a second bout of "use-it-or-lose-it" pruning during the teen years.



Time-Lapse Imaging Tracks Brain Maturation from ages 5 to 20

Constructed from MRI scans of healthy children and teens, the time-lapse "movie" (<http://www.nimh.nih.gov/press/prbrainmaturing.mpeg>), from which the above images were extracted, compresses 15 years of brain development (ages 5 - 20) into just a few seconds. Red indicates more gray matter, blue less gray matter. Gray matter wanes in a back-to-front wave as the brain matures and neural connections are pruned. Areas performing more basic functions mature earlier; areas for higher order functions mature later. The prefrontal cortex, which handles reasoning and other "executive" functions, emerged late in evolution and is among the last to mature. Studies in twins are showing that development of such

The new study found that the first areas to mature (e.g., extreme front and back of the brain) are those with the most basic functions, such as processing the senses and movement. Areas involved in spatial orientation and language (parietal lobes) follow. Areas with more advanced functions -- integrating information from the senses, reasoning and other "executive" functions (prefrontal cortex) - mature last.

late-maturing areas is less influenced by heredity than areas that mature earlier.

Source: Paul Thompson, Ph.D.
UCLA Laboratory of Neuroimaging

In a related study published a few years ago, Rapoport and colleagues discovered an exaggerated wave of gray matter loss in teens with early onset schizophrenia. These teens, who became psychotic prior to puberty, lost four times the normal amount of gray matter in their frontal lobes, suggesting that childhood onset schizophrenia "may be an exaggeration of a normal maturation process, perhaps related to excessive synaptic pruning," note the researchers. By contrast, children with autism show an abnormal back-to-front wave of gray matter increases, rather than decreases, suggesting "a specific faulty step in early development."

Also participating in the new study were: Leslie Lusk, Cathy Vaituzis, Tom Nugent, David Herman, Drs. Deanna Greenstein, Liv Clasen, NIMH; Kiralee Hayashi, UCLA.

###

NIMH is part of the National Institutes of Health (NIH), the Federal Government's primary agency for biomedical and behavioral research. NIH is a component of the U.S. Department of Health and Human Services.

Disclaimer: AAAS and EurekAlert! are not responsible for the accuracy of news releases posted to EurekAlert! by contributing institutions or for the use of any information through the EurekAlert system.

Media Contact

Jules Asher
NIMHpress@nih.gov
301-443-4536

🐦 @nimhgov

<http://www.nimh.nih.gov> ↗

EXHIBIT 37



[f . SHARE](#) [t . TWEET](#) [✉ . EMAIL](#)

PUBLICATIONS AND TESTIMONY

What Makes Teens Tick

Posted on May 10, 2004

[ARTICLES](#) [JUVENILES](#)

Time Magazine

May 10, 2004

What Makes Teens Tick; A flood of hormones, sure. But also a host of structural changes in the brain. Can those explain the behaviors that make adolescence so exciting—and so exasperating?

By Claudia Wallis; Kristina Dell, with reporting by Alice Park/New York

Five young men in sneakers and jeans troop into a waiting room at the National Institutes of Health Clinical Center in Bethesda, Md., and drape themselves all over the chairs in classic collapsed-teenager mode, trailing backpacks, a CD player and a laptop loaded with computer games. It's midafternoon, and they are, of course, tired, but even so their presence adds a jangly, hormonal buzz to the bland, institutional setting. Fair-haired twins Corey and Skyler Mann, 16, and their burlier big brothers Anthony and Brandon, 18, who are also twins, plus eldest brother Christopher, 22, are here to have their heads examined. Literally. The five brothers from Orem, Utah, are the latest recruits to a giant study that's been going on in this building since 1991. Its goal: to determine how the brain develops from childhood into adolescence and on into early adulthood.

It is the project of Dr. Jay Giedd (pronounced Geed), chief of brain imaging in the child psychiatry branch at the National Institute of Mental Health. Giedd, 43, has devoted the past 13 years to peering inside the heads of 1,800 kids and teenagers using high-powered magnetic resonance imaging (MRI). For each volunteer, he creates a unique photo album, taking MRI snapshots every two years and building a record as the brain morphs and grows. Giedd started out investigating the developmental origins of attention-deficit/hyperactivity disorder (ADHD) and autism ("I was going alphabetically," he jokes) but soon discovered that so little was known about how the brain is supposed to develop that it was impossible to figure out where things might be going wrong. In a way, the vast project that has become his life's work is nothing more than an attempt to establish a gigantic control group. "It turned out that normal brains were so interesting in themselves," he marvels. "And the adolescent studies have been the most surprising of all."

Before the imaging studies by Giedd and his collaborators at UCLA, Harvard, the Montreal Neurological

Institute and a dozen other institutions, most scientists believed the brain was largely a finished product by the time a child reached the age of 12. Not only is it full-grown in size, Giedd explains, but “in a lot of psychological literature, traced back to [Swiss psychologist Jean] Piaget, the highest rung in the ladder of cognitive development was about age 12—formal operations.” In the past, children entered initiation rites and started learning trades at about the onset of puberty. Some theorists concluded from this that the idea of adolescence was an artificial construct, a phenomenon invented in the post—Industrial Revolution years. Giedd’s scanning studies proved what every parent of a teenager knows: not only is the brain of the

adolescent far from mature, but both gray and white matter undergo extensive structural changes well past puberty. “When we started,” says Giedd, “we thought we’d follow kids until about 18 or 20. If we had to pick a number now, we’d probably go to age 25.”

Now that MRI studies have cracked open a window on the developing brain, researchers are looking at how the newly detected physiological changes might account for the adolescent behaviors so familiar to parents: emotional outbursts, reckless risk taking and rule breaking, and the impassioned pursuit of sex, drugs and rock ‘n’ roll. Some experts believe the structural changes seen at adolescence may explain the timing of such major mental illnesses as schizophrenia and bipolar disorder. These diseases typically begin in adolescence and contribute to the high rate of teen suicide. Increasingly, the wild conduct once blamed on “raging hormones” is being seen as the by-product of two factors: a surfeit of hormones, yes, but also a paucity of the cognitive controls needed for mature behavior.

In recent years, Giedd has shifted his focus to twins, which is why the Manns are such exciting recruits. Although most brain development seems to follow a set plan, with changes following cues that are preprogrammed into genes, other, subtler changes in gray matter reflect experience and environment. By following twins, who start out with identical—or, in fraternal twins, similar—programming but then diverge as life takes them on different paths, he hopes to tease apart the influences of nature and nurture. Ultimately, he hopes to find, for instance, that Anthony Mann’s plan to become a pilot and Brandon’s to study law will lead to brain differences that are detectable on future MRIs. The brain, more than any other organ, is where experience becomes flesh.

Throughout the afternoon, the Mann brothers take turns completing tests of intelligence and cognitive function. Between sessions they occasionally needle one another in the waiting room. “If the other person is in a bad mood, you’ve got to provoke it,” Anthony asserts slyly. Their mother Nancy Mann, a sunny paragon of patience who has three daughters in addition to the five boys, smiles and rolls her eyes.

Shortly before 5 p.m., the Manns head downstairs to the imaging floor to meet the magnet. Giedd, a trim, energetic man with a reddish beard, twinkly blue eyes and an impish sense of humor, greets Anthony and tells him what to expect. He asks Anthony to remove his watch, his necklace and a high school ring, labeled KEEPER. Does Anthony have any metal in his body? Any piercings? Not this clean-cut, soccer-playing Mormon. Giedd tapes a vitamin E capsule onto Anthony’s left cheek and one in each ear. He explains that the oil-filled capsules are opaque to the scanner and will define a plane on the images, as well as help researchers tell left from right. The scanning will take about 15 minutes, during which Anthony must lie completely still. Dressed in a red sweat shirt, jeans and white K-Swiss sneakers, he stretches out on the

MRI, Giedd points out, “made studying healthy kids possible” because there’s no radiation involved. (Before MRI, brain development was studied mostly by using cadavers.) Each of the Mann boys will be scanned three times. The first scan is a quick survey that lasts one minute. The second lasts two minutes and looks for any damage or abnormality. The third is 10 minutes long and taken at maximum resolution. It’s the money shot. Giedd watches as Anthony’s brain appears in cross section on a computer screen. The machine

scans 124 slices, each as thin as a dime. It will take 20 hours of computer time to process the images, but the analysis is done by humans, says Giedd. “The human brain is still the best at pattern recognition,” he marvels.

Some people get nervous as the MRI machine clangs noisily. Claustrophobes panic. Anthony, lying still in the soul of the machine, simply falls asleep.

CONSTRUCTION AHEAD

One reason scientists have been surprised by the ferment in the teenage brain is that the brain grows very little over the course of childhood. By the time a child is 6, it is 90% to 95% of its adult size. As a matter of fact, we are born equipped with most of the neurons our brain will ever have—and that’s fewer than we have in utero. Humans achieve their maximum brain-cell density between the third and sixth month of gestation—the culmination of an explosive period of prenatal neural growth. During the final months before birth, our brains undergo a dramatic pruning in which unnecessary brain cells are eliminated. Many neuroscientists now believe that autism is the result of insufficient or abnormal prenatal pruning.

What Giedd’s long-term studies have documented is that there is a second wave of proliferation and pruning that occurs later in childhood and that the final, critical part of this second wave, affecting some of our highest mental functions, occurs in the late teens. Unlike the prenatal changes, this neural waxing and waning alters not the number of nerve cells but the number of connections, or synapses, between them. When a child is between the ages of 6 and 12, the neurons grow bushier, each making dozens of connections to other neurons and creating new pathways for nerve signals. The thickening of all this gray matter—the neurons and their branchlike dendrites—peaks when girls are about 11 and boys 12 1/2, at which point a serious round of pruning is under way. Gray matter is thinned out at a rate of about 0.7% a year, tapering off in the early 20s. At the same time, the brain’s white matter thickens. The white matter is composed of fatty myelin sheaths that encase axons and, like insulation on a wire, make nerve-signal transmissions faster and more efficient. With each passing year (maybe even up to age 40) myelin sheaths thicken, much like tree rings. During adolescence, says Giedd, summing up the process, “you get fewer but faster connections in the brain.” The brain becomes a more efficient machine, but there is a trade-off: it is probably losing some of its raw potential for learning and its ability to recover from trauma.

Most scientists believe that the pruning is guided both by genetics and by a use-it-or-lose-it principle. Nobel prizewinning neuroscientist Gerald Edelman has described that process as “neural Darwinism”—survival of the fittest (or most used) synapses. How you spend your time may be critical. Research shows,

Case 3:19-cv-01226-L-AMG Document 34-8 Filed 01/03/20 PageID.7382 Page 5 of 192

for instance, that practicing piano quickly thickens neurons in the brain regions that control the fingers. Studies of London cab drivers, who must memorize all the city's streets, show that they have an unusually large hippocampus, a structure involved in memory. Giedd's research suggests that the cerebellum, an area that coordinates both physical and mental activities, is particularly responsive to experience, but he warns that it's too soon to know just what drives the buildup and pruning phases. He's hoping his studies of twins will help answer such questions: "We're looking at what they eat, how they spend their time—is it video games or sports? Now the fun begins," he says.

No matter how a particular brain turns out, its development proceeds in stages, generally from back to front. Some of the brain regions that reach maturity earliest—through proliferation and pruning—are those in the back of the brain that mediate direct contact with the environment by controlling such sensory functions as vision, hearing, touch and spatial processing. Next are areas that coordinate those functions: the part of the brain that helps you know where the light switch is in your bathroom even if you can't see it in the middle of the night. The very last part of the brain to be pruned and shaped to its adult dimensions is the prefrontal cortex, home of the so-called executive functions—planning, setting priorities, organizing thoughts, suppressing impulses, weighing the consequences of one's actions. In other words, the final part of the brain to grow up is the part capable of deciding, I'll finish my homework and take out the garbage, and then I'll IM my friends about seeing a movie.

"Scientists and the general public had attributed the bad decisions teens make to hormonal changes," says Elizabeth Sowell, a UCLA neuroscientist who has done seminal MRI work on the developing brain. "But once we started mapping where and when the brain changes were happening, we could say, Aha, the part of the brain that makes teenagers more responsible is not finished maturing yet."

RAGING HORMONES

Hormones, however, remain an important part of the teen-brain story. Right about the time the brain switches from proliferating to pruning, the body comes under the hormonal assault of puberty. (Research suggests that the two events are not closely linked because brain development proceeds on schedule even when a child experiences early or late puberty.) For years, psychologists attributed the intense, combustible emotions and unpredictable behavior of teens to this biochemical onslaught. And new research adds fresh support. At puberty, the ovaries and testes begin to pour estrogen and testosterone into the bloodstream, spurring the development of the reproductive system, causing hair to sprout in the armpits and groin, wreaking havoc with the skin, and shaping the body to its adult contours. At the same time, testosterone-like hormones released by the adrenal glands, located near the kidneys, begin to circulate. Recent discoveries show that these adrenal sex hormones are extremely active in the brain, attaching to receptors everywhere and exerting a direct influence on serotonin and other neurochemicals that regulate mood and excitability.

The sex hormones are especially active in the brain's emotional center—the limbic system. This creates a "tinderbox of emotions," says Dr. Ronald Dahl, a psychiatrist at the University of Pittsburgh. Not only do feelings reach a flash point more easily, but adolescents tend to seek out situations where they can allow their emotions and passions to run wild. "Adolescents are actively looking for experiences to create intense

Case 3:13-cv-01226-LAM Document 34-8 Filed 01/09/20 PageID.1388 Page 6 of 12
feelings” says Dahl. “It’s a very important hint that there is some particular hormonal brain relationship contributing to the appetite for thrills, strong sensations and excitement.” This thrill seeking may have evolved to promote exploration, an eagerness to leave the nest and seek one’s own path and partner. But in a world where fast cars, illicit drugs, gangs and dangerous liaisons beckon, it also puts the teenager at risk.

That is especially so because the brain regions that put the brakes on risky, impulsive behavior are still under construction. “The parts of the brain responsible for things like sensation seeking are getting turned on in big ways around the time of puberty,” says Temple University psychologist Laurence Steinberg. “But

the parts for exercising judgment are still maturing throughout the course of adolescence. So you’ve got this time gap between when things impel kids toward taking risks early in adolescence, and when things that allow people to think before they act come online. It’s like turning on the engine of a car without a skilled driver at the wheel.”

DUMB DECISIONS

Increasingly, psychologists like Steinberg are trying to connect the familiar patterns of adolescents’ wacky behavior to the new findings about their evolving brain structure. It’s not always easy to do. “In all likelihood, the behavior is changing because the brain is changing,” he says. “But that is still a bit of a leap.” A critical tool in making that leap is functional magnetic resonance imaging (fMRI). While ordinary MRI reveals brain structure, fMRI actually shows brain activity while subjects are doing assigned tasks.

At McLean Hospital in Belmont, Mass., Harvard neuropsychologist Deborah Yurgelun-Todd did an elegant series of FMRI experiments in which both kids and adults were asked to identify the emotions displayed in photographs of faces. “In doing these tasks,” she says, “kids and young adolescents rely heavily on the amygdala, a structure in the temporal lobes associated with emotional and gut reactions. Adults rely less on the amygdala and more on the frontal lobe, a region associated with planning and judgment.” While adults make few errors in assessing the photos, kids under 14 tend to make mistakes. In particular, they identify fearful expressions as angry, confused or sad. By following the same kids year after year, Yurgelun-Todd has been able to watch their brain-activity pattern—and their judgment—mature. Fledgling physiology, she believes, may explain why adolescents so frequently misread emotional signals, seeing anger and hostility where none exists. Teenage ranting (“That teacher hates me!”) can be better understood in this light.

At Temple University, Steinberg has been studying another kind of judgment: risk assessment. In an experiment using a driving-simulation game, he studies teens and adults as they decide whether to run a yellow light. Both sets of subjects, he found, make safe choices when playing alone. But in group play, teenagers start to take more risks in the presence of their friends, while those over age 20 don’t show much change in their behavior. “With this manipulation,” says Steinberg, “we’ve shown that age differences in decision making and judgment may appear under conditions that are emotionally arousing or have high social impact.” Most teen crimes, he says, are committed by kids in packs.

Other researchers are exploring how the adolescent propensity for uninhibited risk taking propels teens to experiment with drugs and alcohol. Traditionally, psychologists have attributed this experimentation to

Case 3:19-cv-01226-L-AMG Document 34-8 Filed 01/03/20 PageID.7384 Page 7 of 192

peer pressure, teenagers' attraction to novelty and their roaring interest in loosening sexual inhibitions. But researchers have raised the possibility that rapid changes in dopamine-rich areas of the brain may be an additional factor in making teens vulnerable to the stimulating and addictive effects of drugs and alcohol. Dopamine, the brain chemical involved in motivation and in reinforcing behavior, is particularly abundant and active in the teen years.

Why is it so hard to get a teenager off the couch and working on that all important college essay? You might blame it on their immature nucleus accumbens, a region in the frontal cortex that directs motivation to seek rewards. James Bjork at the National Institute on Alcohol Abuse and Alcoholism has been using fMRI to study motivation in a challenging gambling game. He found that teenagers have less activity in this region than adults do. "If adolescents have a motivational deficit, it may mean that they are prone to engaging in behaviors that have either a really high excitement factor or a really low effort factor, or a combination of both." Sound familiar? Bjork believes his work may hold valuable lessons for parents and society. "When presenting suggestions, anything parents can do to emphasize more immediate payoffs will be more effective," he says. To persuade a teen to quit drinking, for example, he suggests stressing something immediate and tangible—the danger of getting kicked off the football team, say—rather than a future on skid row.

Persuading a teenager to go to bed and get up on a reasonable schedule is another matter entirely. This kind of decision making has less to do with the frontal lobe than with the pineal gland at the base of the brain. As nighttime approaches and daylight recedes, the pineal gland produces melatonin, a chemical that signals the body to begin shutting down for sleep. Studies by Mary Carskadon at Brown University have shown that it takes longer for melatonin levels to rise in teenagers than in younger kids or in adults, regardless of exposure to light or stimulating activities. "The brain's program for starting nighttime is later," she explains.

PRUNING PROBLEMS

The new discoveries about teenage brain development have prompted all sorts of questions and theories about the timing of childhood mental illness and cognitive disorders. Some scientists now believe that ADHD and Tourette's syndrome, which typically appear by the time a child reaches age 7, may be related to the brain proliferation period. Though both disorders have genetic roots, the rapid growth of brain tissue in early childhood, especially in regions rich in dopamine, "may set the stage for the increase in motor activities and tics," says Dr. Martin Teicher, director of developmental biopsychiatry research at McLean Hospital. "When it starts to prune in adolescence, you often see symptoms recede."

Schizophrenia, on the other hand, makes its appearance at about the time the prefrontal cortex is getting pruned. "Many people have speculated that schizophrenia may be due to an abnormality in the pruning process," says Teicher. "Another hypothesis is that schizophrenia has a much earlier, prenatal origin, but as the brain prunes, it gets unmasked." MRI studies have shown that while the average teenager loses about 15% of his cortical gray matter, those who develop schizophrenia lose as much as 25%.

WHAT'S A PARENT TO DO?

Brain scientists tend to be reluctant to make the leap from the laboratory to real-life, hard-core teenagers.

Case Title: Journal of the American Academy of Child and Adolescent Psychiatry | Volume 59 | Page 1013-1020 | Page ID: 7355 | Page 8 of 192
Some case titles borrowed by the way. Document: Biological Discoveries | Page ID: 7355 | Page 8 of 192
and other marketing schemes that misapplied their science. It is clear, however, that there are implications in the new research for parents, educators and lawmakers.

In light of what has been learned, it seems almost arbitrary that our society has decided that a young American is ready to drive a car at 16, to vote and serve in the Army at 18 and to drink alcohol at 21. Giedd says the best estimate for when the brain is truly mature is 25, the age at which you can rent a car. "Avis must have some pretty sophisticated neuroscientists," he jokes. Now that we have scientific evidence that

the adolescent brain is not quite up to scratch, some legal scholars and child advocates argue that minors should never be tried as adults and should be spared the death penalty. Last year, in an official statement that summarized current research on the adolescent brain, the American Bar Association urged all state legislatures to ban the death penalty for juveniles. "For social and biological reasons," it read, "teens have increased difficulty making mature decisions and understanding the consequences of their actions."

Most parents, of course, know this instinctively. Still, it's useful to learn that teenage behavior is not just a matter of willful pigheadedness or determination to drive you crazy—though these, too, can be factors. "There's a debate over how much conscious control kids have," says Giedd, who has four "teenagers in training" of his own. "You can tell them to shape up or ship out, but making mistakes is part of how the brain optimally grows." It might be more useful to help them make up for what their brain still lacks by providing structure, organizing their time, guiding them through tough decisions (even when they resist) and applying those time-tested parental virtues: patience and love.

—With reporting by Alice Park/New York

INSIDE THE ADOLESCENT BRAIN

The brain undergoes two major developmental spurts, one in the womb and the second from childhood through the teen years, when the organ matures by fits and starts in a sequence that moves from the back of the brain to the front

BRAIN AREA	
CORPUS CALLOSUM	
DESCRIPTION / DUTIES	Thought to be involved in problem solving and creativity, this bundle of nerve fibers connects the left and right hemispheres of the brain. During adolescence, the nerve fibers thicken and process information more and more efficiently
PREFRONTAL CORTEX	
DESCRIPTION / DUTIES	The CEO of the brain, also called the area of sober second thought, is the last part of the brain to mature—which may be why teens get into so much trouble. Located just behind the forehead, the prefrontal cortex grows during the preteen years and then shrinks as neural connections are pruned during

BASAL GANGLIA**DESCRIPTION / DUTIES**

Larger in females than in males, this part of the brain acts like a secretary to the prefrontal cortex by helping it prioritize information. The basal ganglia and prefrontal cortex are tightly connected: at nearly the same time, they grow neuron connections and then prune them. This area of the brain is also active in small and large motor movements, so it may be important to expose preteens to music and sports while it is growing

AMYGDALA**DESCRIPTION / DUTIES**

This is the emotional center of the brain, home to such primal feelings as fear and rage. In processing emotional information, teens tend to rely more heavily on the amygdala. Adults depend more on the rational prefrontal cortex, a part of the brain that is underdeveloped in teens. That may explain why adolescents often react more impulsively than adults

CEREBELLUM**DESCRIPTION / DUTIES**

Long thought to play a role in physical coordination, this area may also regulate certain thought processes. More sensitive to environment than to heredity, the cerebellum supports activities of higher learning like mathematics, music and advanced social skills. New research shows that it changes dramatically during adolescence, increasing the number of neurons and the complexity of their connections. The cerebellum is the only part of the brain that continues growing well into the early 20s

NERVE PROLIFERATION...**DESCRIPTION / DUTIES**

By age 11 for girls and 12 1/2 for boys, the neurons in the front of the brain have formed thousands of new connections. Over the next few years, most of these links will be pruned

... AND PRUNING**DESCRIPTION / DUTIES**

Those that are used and reinforced-the pathways involved in language, for example-will be strengthened, while the ones that aren't used will die out

Text by Kristina Dell

VIEW BY CATEGORY

[All Publications And Testimony](#)

[Books](#)

[Testimony and Statements](#)

[Articles](#)

[Law Reviews](#)

[Studies](#)

Join our mailing list

Enter your email address

SUBSCRIBE



POLICY ISSUES



FACTS & RESEARCH



EXECUTIONS



DEATH ROW



STATE & FEDERAL INFO



ABOUT



FOR THE MEDIA

RESOURCES



FOR EDUCATORS

FACT SHEET

DONATE

Death Penalty Information Center

1701 K Street NW Suite 205

Washington, DC 20006

Phone: [202-289-2275](tel:202-289-2275)

Email: dpic@deathpenaltyinfo.org

[Privacy Policy](#) | ©2019 Death Penalty Information Center

EXHIBIT 38



Search Encyclopedia

Search

Understanding the Teen Brain

It doesn't matter how smart teens are or how well they scored on the SAT or ACT. Good judgment isn't something they can excel in, at least not yet.

The rational part of a teen's brain isn't fully developed and won't be until age 25 or so.

In fact, recent research has found that adult and teen brains work differently. Adults think with the prefrontal cortex, the brain's rational part. This is the part of the brain that responds to situations with good judgment and an awareness of long-term consequences. Teens process information with the amygdala. This is the emotional part.

In teen's brains, the connections between the emotional part of the brain and the decision-making center are still developing—and not always at the same rate. That's why when teens have overwhelming emotional input, they can't explain later what they were thinking. They weren't thinking as much as they were feeling.

What's a parent to do?

You're the most important role model your kids have. Sure, their friends are important to them, but the way you behave and fulfill your responsibilities will have a profound and long-lasting effect on your children.

- Discussing the consequences of their actions can help teens link impulsive thinking with facts. This helps the brain make these connections and wires the brain to make this link more often.
- Remind your teens that they're resilient and competent. Because they're so focused in the moment, adolescents have trouble seeing they can play a part in changing bad situations. It can help to remind them of times in the past they thought would be devastating, but turned out for the best.

- Become familiar with things that are important to your teens. It doesn't mean you have to like hip-hop music, but showing an interest in the things they're involved in shows them they're important to you.
- Ask teens if they want you to respond when they come to you with problems, or if they just want you to listen.

Parents tend to jump in with advice to try to fix their children's problems or place blame. But this can make teens less likely to be open with their parents in the future. You want to make it emotionally safe and easy for them to come to you, so you can be part of their lives.

Signs of trouble

It's normal for teens to be down or out of sorts for a couple of days. But if you see a significant mood or behavioral change that lasts more than 2 weeks, it could mean something else is going on, such as depression.

If you think your teen could be depressed, promptly seek professional treatment for your child. Depression is serious and, if left untreated, can be life-threatening.

Your teen needs your guidance, even though they may think they don't. Understanding their development can help you support them in becoming independent, responsible adults.

Medical Reviewers:

- Anne Fetterman RN BSN
- Joseph Campellone MD
- Raymond Kent Turley BSN MSN RN

Ask a Medical Librarian

Make an Appointment

EXHIBIT 39

Development/Plasticity/Repair

Neurodevelopmental Trajectories of the Human Cerebral Cortex

Philip Shaw,¹ Noor J. Kabani,³ Jason P. Lerch,⁴ Kristen Eckstrand,¹ Rhoshel Lenroot,¹ Nitin Gogtay,¹ Deanna Greenstein,¹ Liv Clasen,¹ Alan Evans,⁴ Judith L. Rapoport,¹ Jay N. Giedd,¹ and Steve P. Wise²

¹Child Psychiatry Branch and ²Laboratory of Systems Neuroscience, National Institute of Mental Health, Bethesda, Maryland 20892, ³Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada M4N 3N1, and ⁴Montreal Neurological Institute, McGill University, Montreal, Quebec, Canada H3A 2B4

Understanding the organization of the cerebral cortex remains a central focus of neuroscience. Cortical maps have relied almost exclusively on the examination of postmortem tissue to construct structural, architectonic maps. These maps have invariably distinguished between areas with fewer discernable layers, which have a less complex overall pattern of lamination and lack an internal granular layer, and those with more complex laminar architecture. The former includes several agranular limbic areas, and the latter includes the homotypical and granular areas of association and sensory cortex. Here, we relate these traditional maps to developmental data from noninvasive neuroimaging. Changes in cortical thickness were determined *in vivo* from 764 neuroanatomic magnetic resonance images acquired longitudinally from 375 typically developing children and young adults. We find differing levels of complexity of cortical growth across the cerebrum, which align closely with established architectonic maps. Cortical regions with simple laminar architecture, including most limbic areas, predominantly show simpler growth trajectories. These areas have clearly identified homologues in all mammalian brains and thus likely evolved in early mammals. In contrast, polysensory and high-order association areas of cortex, the most complex areas in terms of their laminar architecture, also have the most complex developmental trajectories. Some of these areas are unique to, or dramatically expanded in primates, lending an evolutionary significance to the findings. Furthermore, by mapping a key characteristic of these development trajectories (the age of attaining peak cortical thickness) we document the dynamic, heterochronous maturation of the cerebral cortex through time lapse sequences (“movies”).

Key words: brain development; cytoarchitecture; cognition; cerebral cortex; prefrontal cortex; primate

Introduction

Most maps of human cerebral cortex have partitioned it according to histological features, such as the distribution of cell bodies or myelin, and, more recently, molecular markers (von Economo and Koskinas, 1925; Ongur et al., 2003; Zilles et al., 2004). Comparisons of similar classifications among several species provide an evolutionary perspective, and such analyses have identified two broad cortical types. One type, allocortex, has a primitive three-layered form that strongly resembles its homologues in reptiles. Another type, isocortex, lacks such homologues and has a more derived structure characterized by more than three layers (typically six) and a more complex pattern of afferent and efferent projections (Kaas, 1987; Puelles, 2001; Allman et al., 2002; Striedter, 2005). Between allocortex and isocortex, areas sometimes called “transition cortex” have intermediate properties. Using structural neuroimaging of the *in vivo* developing brain, we explored the possibility that these different kinds of cortex show

differing levels of complexity in the trajectories of their growth in childhood and adolescence.

Using computational neuroanatomy, we defined cortical thickness at over 40,000 points throughout the cerebrum in a cohort of 375 healthy children and adolescents. Cortical thickness was chosen as a metric which both captures the columnar architecture of the cortex and is sensitive to developmental change in typically developing and clinical populations (Lerch et al., 2005; O’Donnell et al., 2005; Makris et al., 2006; Shaw et al., 2006a,b; Lu et al., 2007; Sowell et al., 2007).

Most of the children in our cohort had repeated neuroanatomic imaging, and such longitudinal data can be combined with cross-sectional data to model developmental change, with the longitudinal data being particularly informative. For cortical thickness, the simplest trajectory that can be fitted to describe its change over time is a straight line. More complex growth models include distinct phases of increase and decrease in cortical thickness: a quadratic model has two such phases (typically an initial increase which reaches a peak before declining) and a cubic model has three. The complexity of growth may vary across the cerebral cortex, and we sought to explore whether this variation aligned with cytoarchitectural properties.

Derived properties of developmental curves, such as the age of reaching various points of inflection, are frequently used as developmental indices (Tanner et al., 1976; Jolicoeur et al., 1988).

Received Nov. 30, 2007; revised Feb. 7, 2008; accepted Feb. 26, 2008.

This work was supported by the Intramural Research Program of the National Institutes of Health. We thank all the participants in this study and their families.

The authors declare no competing financial interests.

Correspondence should be addressed to Philip Shaw, Child Psychiatry Branch, Room 3N202, Building 10, Center Drive, National Institute of Mental Health, Bethesda, MD 20892. E-mail: shawp@mail.nih.gov.

DOI:10.1523/JNEUROSCI.5309-07.2008

Copyright © 2008 Society for Neuroscience 0270-6474/08/283586-09\$15.00/0

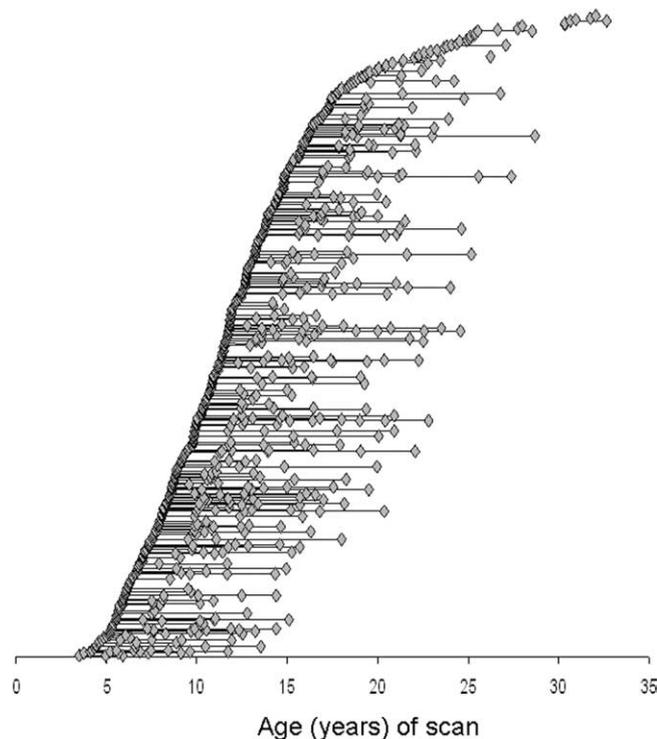


Figure 1. The age distribution of the data. The age at each scan is indicated by a blue diamond. For each subject, the first scan is always the leftmost; subjects with repeated scans have a horizontal line drawn connecting the age at first scan with the age at later scans.

For cortical thickness, the age at which peak cortical thickness is reached (the point where increase gives way to decrease in cortical thickness) can be determined for cortical points with either a cubic or quadratic (but not linear) trajectory and, thus, emerges as a potentially useful index of cortical development. We therefore additionally examined the pattern of attaining peak cortical thickness across the cerebrum, to confirm and expand previous observations of a heterochronous sequence, with primary sensory areas attaining peak cortical thickness before polymodal, high-order association areas (Gogtay et al., 2004).

Materials and Methods

Participants. Three hundred and seventy-five children and adolescents, healthy children with no personal or family history of psychiatric or neurological disorders, had a total of 764 magnetic resonance images. Each subject completed the Childhood Behavior Checklist as a screening tool and then underwent a structured diagnostic interview by a child psychiatrist to rule out any psychiatric or neurological diagnoses (Giedd et al., 1996). Handedness was determined using the PANESS (Physical and Neurological Examination for Soft Signs), and 336 (90%) were predominately right-handed, 20 (5%) predominately left-handed, and 19 (5%) ambidextrous. The mean intelligence quotient (IQ) was 115 (SD, 13) as determined from age appropriate versions of the Wechsler Intelligence Scales (Shaw et al., 2006b). Socioeconomic status (SES) was determined from the Hollingshead Scales and the mean score was 40 (SD, 19) (Hollingshead, 1975). The age range spanned from 3.5 to 33 years, and the age distribution of scans is illustrated in Figure 1. The subjects came from 292 different families; 196 (52%) were male. The age range spanned from 3.5 to 33 years. All subjects had at least one scan (mean age at initial scan, 12.3 years; SD, 5.3); 203 (54.1%) had at least two scans (mean age, 13.8; SD, 4.6); 106 (28.3%) had at least three scans (mean, 15.3; SD, 4.2); and 57 (15.2%) had four or more scans (mean 18, SD 4.5).

Neuroimaging. T1-weighted images with contiguous 1.5 mm axial slices and 2.0 mm coronal slices were obtained using three-dimensional spoiled gradient recalled echo in the steady state on a 1.5-T General

Electric (Milwaukee, WI) Signa scanner. Imaging parameters were as follows: echo time, 5 ms; repetition time, 24 ms; flip angle, 45°; acquisition matrix, 256 × 192; number of excitations, 1; and field of view, 24 cm. Head placement was standardized as described previously (Giedd et al., 1999). The same scanner was used throughout the study. The native MRI scans were registered into standardized stereotaxic space using a linear transformation and corrected for nonuniformity artifacts (Sled et al., 1998). The registered and corrected volumes were segmented into white matter, gray matter, CSF, and background using an advanced neural net classifier (Zijdenbos et al., 2002). A surface deformation algorithm was applied which first fits the white matter surface, then expands outward to find the gray matter-CSF intersection defining a known relationship between each vertex of the white matter surface and its gray matter surface counterpart; cortical thickness is defined as the distance between these linked vertices (and measured at 40,962 such vertices) (MacDonald et al., 2000). A 30-mm-bandwidth blurring kernel was applied; this size was chosen on the basis of population simulations which that this bandwidth maximized statistical power while minimizing false positives (Lerch and Evans, 2005). This kernel allows anatomical localization, as 30 mm blurring along the surface using a diffusion smoothing operator preserves cortical topologic features and represents considerably less cortex than the equivalent volumetric Gaussian blurring kernel.

The validity of this automated measure against expert manual neuroanatomical estimation of cortical thickness has been demonstrated previously for selected cortical regions in an adult population (Kabani et al., 2001). We repeated this validation study in our pediatric population in the cortical regions included in the original study (the pre and post central gyri, the superior frontal gyrus, the superior temporal gyrus, the cuneus, the superior parietal lobule and supramarginal gyrus) (Kabani et al., 2001). We also examined regions of particular interest for this study. These were the insula, the orbitofrontal cortex (measured bilaterally in its anterior, posterior, medial, and lateral divisions), and medial cortical regions (the anterior and posterior cingulate, the medial dorsal prefrontal cortex, and the parahippocampal gyrus). Twenty scans were chosen at random from the cohort (from ages 6 through 15). For each brain region the neuroanatomist (N.K.) used image analyses software (MacDonald, 1996) to mark one point or tag on the CSF and gray matter border which represents the outer surface of the cortex, and another point of the gray and white matter border which represents the inner surface of the cortex. The distance between the two tags was calculated, mimicking the algorithm used by the automated tool. For a given tag placed by the neuroanatomist on the outer cortical surface, the closest vertex on the automatically extracted cortical surface was identified and its associated cortical thickness was noted. The output of the manual and automatic methods were compared using a repeated measures ANOVA followed by paired *t* tests to identify regional differences. There was a significant difference for type of measurement with the automated estimates being larger (mean, 4.62; SE, 0.06) than the manual (mean, 4.41; SE, 0.04; $F_{(1,684)} = 8.8, p = 0.02$). There was a significant interaction of the type of measurement and region ($F_{(35,684)} = 2.59, p < 0.001$) which was further explored. Overall there was no significant difference between the manual and automated measures in 30 of the 36 regions, with poorer performance noted bilaterally in the precentral gyrus, and in the left postcentral gyrus, and in the middle frontal gyrus, gyrus rectus and the cuneus in the left hemisphere. Notably, only one of these regions lay in an area of particular interest for this study (the left gyrus rectus). There was no correlation between age and the difference between the automated and manual estimates ($r = 0.02, p = 0.53$). Thus, there was no evidence that the differences between the two metrics had any significant age related bias.

To determine developmental trajectories at each cortical point, mixed model regression analysis was chosen as it permits the inclusion of multiple measurements per person, missing data, and irregular intervals between measurements, thereby increasing statistical power (Pinheiro and Bates, 2000). Our classification of developmental trajectories was based on a step-down model selection procedure: at each cortical point we modeled cortical thickness using a mixed-effects polynomial regression model, testing for cubic, quadratic and linear age effects. If the cubic age effect was not significant at $p < 0.05$, it was removed and we stepped

down to the quadratic model and so on. In this way, we were able to classify the development of each cortical point as being best explained by a cubic, quadratic, or linear function of age. We consider cubic models to be more complex than quadratic, which in turn are held to be more complex than linear models. A random effect for each individual was nested within a random effect for each family, thus accounting for both within-person and within-family dependence. Thus, for cortical points with a cubic model, the k th cortical thickness of the i th individual in the j th family was modeled as $\text{thickness}_{ijk} = \text{intercept} + d_{ij} + \beta_1(\text{age}) + \beta_2(\text{age})^2 + \beta_3(\text{age})^3 + e_{ijk}$, where d_{ij} are nested random effects modeling within-person and within-family dependence, the intercept and β terms are fixed effects, and e_{ijk} represents the residual error. Quadratic models lacked the cubic age term, and linear models the cubic and quadratic age terms. The analyses were repeated entering SES and IQ as covariates.

The age at which peak cortical thickness was attained was calculated for cubic and quadratic models from the first order derivatives of the fitted curves.

Results

Throughout most of the lateral frontal, lateral temporal, parietal and occipital isocortex, developmental trajectories are cubic, with a period of initial childhood increase, followed by adolescent decline and then stabilization of cortical thickness in adulthood (Fig. 2). Growth characterized by increase and decrease, but lacking the phase of stabilization within the first three decades of life (a quadratic model) is present in much of the insula and anterior cingulate cortex. A linear trajectory is seen in the posterior orbitofrontal and frontal operculum, portions of the piriform cortex, the medial temporal cortex, subgenual cingulate areas, and medial occipitotemporal cortex. Graphs illustrating individual data points from representative regions with a cubic, quadratic or linear trajectory are shown in Figure 3.

We examined the complexity of developmental trajectories with respect to cortical regions of differing cytoarchitectural types, using histological atlases to assign cytoarchitectonic fields (Ongur et al., 2003). This analysis revealed a clear parallel between basic types of cortex and the pattern of cortical development. The orbitofrontal cortex exemplifies the correspondence between cortical types and developmental trajectories (Fig. 4). In the most anterior part of this region, a cubic trajectory characterizes the homotypical (six-layered) isocortex of the frontal pole and lateral orbitofrontal regions. In contrast, most of the cortex on the posterior orbital surface follows relatively simple quadratic and linear growth trajectories. This region has a lamination pattern typical of transitional cortex: compared with homotypical isocortex it has fewer, less well developed layers and lacks the clear concentration of nonpyramidal cells of layer 4, the internal granular layer (Brockhaus, 1940; Mesulam and Mufson, 1982; Ongur et al., 2003). In the most posterior part of this region,

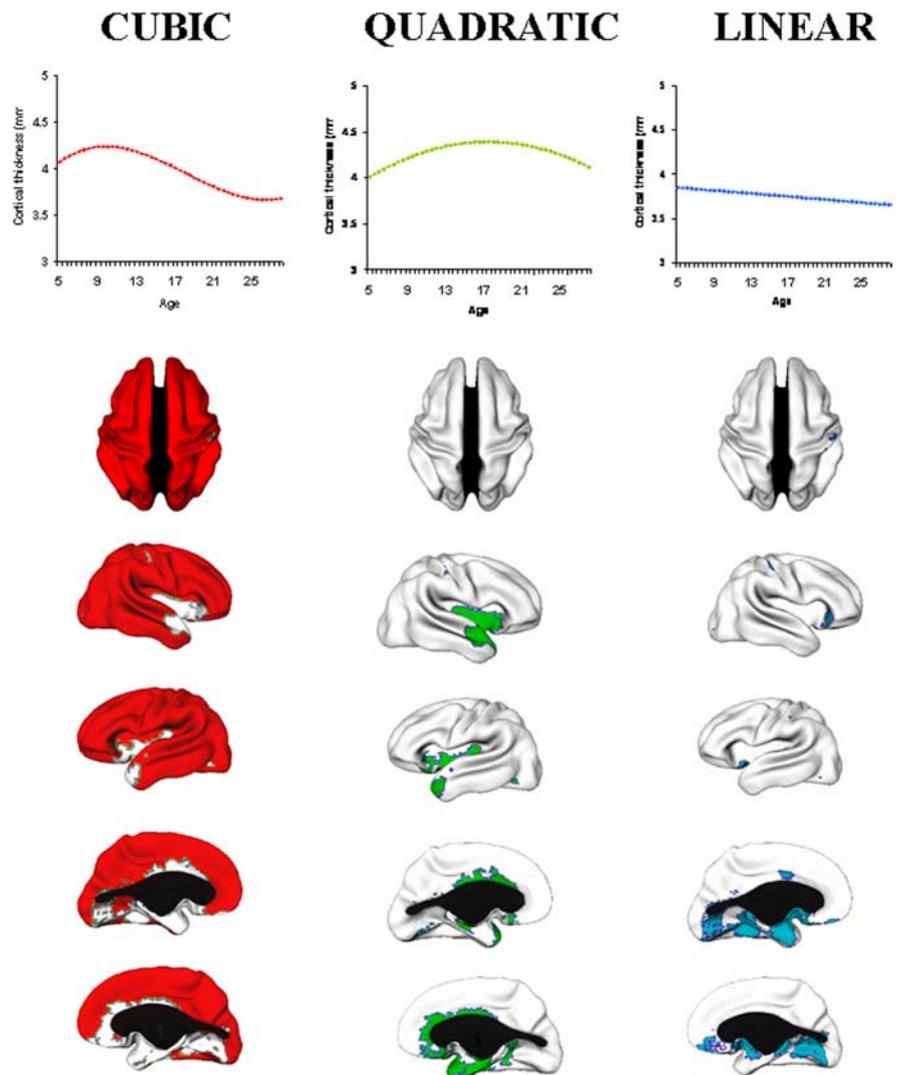


Figure 2. Complexity of developmental trajectories throughout the cerebral cortex. The brain maps show the vertices having a cubic (red), quadratic (green) or linear (blue) developmental trajectory. The graphs show the growth pattern for each of these divisions. In order there are dorsal, right lateral, left medial, left lateral, and right medial views. The corpus callosum is blacked out.

linear and quadratic growth characterizes the piriform cortex, a primitive allocortical area that subserves olfaction.

Although Figure 4 focuses on the orbitofrontal cortex, the same principles are observed generally, where a transition from isocortex to simpler forms occurs. The results for the medial frontal cortex are similar to those in the orbitofrontal cortex, with cubic growth anteriorly, especially in the homotypical cortex of the medial frontal pole- and linear or quadratic trajectories more posteriorly in regions of dysgranular or agranular architecture (Fig. 5, top). For the insula (Fig. 5, bottom), the pattern is much the same. The anterior insula, with its agranular and poorly laminated cortex, has a linear developmental trajectory. Moving posteriorly to the dysgranular and homotypical insula, there is at first a more complex quadratic fit; still more posteriorly, as the cortex becomes increasingly homotypical, the trajectory becomes cubic. Likewise in the temporal lobe, an allocortical component such as the piriform cortex shows a predominately a linear trajectory. In contrast, the lateral temporal isocortex has a cubic trajectory and transition areas such as the entorhinal and perirhinal regions have quadratic and linear trajectories (Fig. 2). These results are

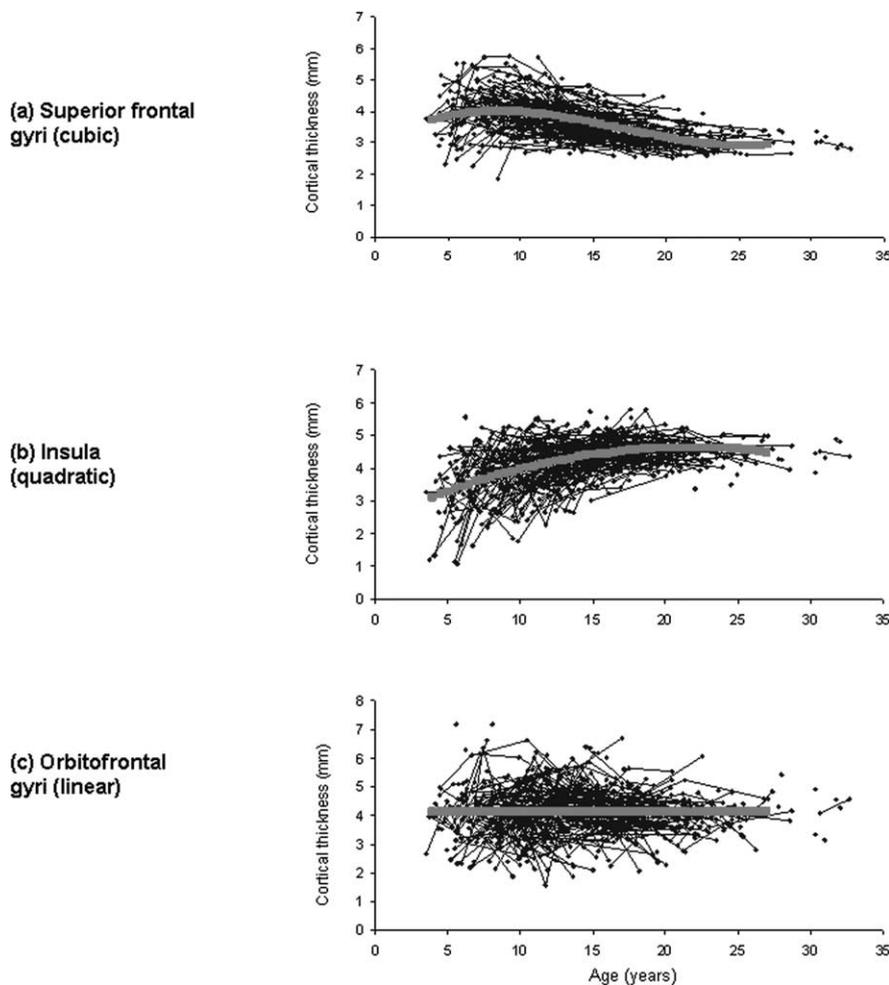


Figure 3. Graphs showing raw cortical thickness data in blue, with the fitted trajectory superimposed in pink. *a–c*, The first three images show in order the mean cortical thickness and trajectory for representative regions: the superior frontal gyri, which have a cubic trajectory (*a*); the portion of the insula which has a quadratic trajectory, seen in green in Figure 5 (*b*); the portion of the orbitofrontal cortex which has a linear trajectory, seen in blue in Figure 4 (*c*).

summarized in Table 1. There are some cortical regions where this link between cortical types and developmental trajectories does not hold, most notably in the medial occipitotemporal and the anterior superior temporal areas, both of which are isocortical regions that nonetheless have a linear and quadratic trajectory, respectively. The pattern of results held when SES and IQ were entered as covariates, either separately or together.

We next determined the age at which peak cortical thickness was attained for all points with either a cubic or quadratic trajectory, using the first order derivative of the fitted curve for each point. A peak age cannot be determined for the points with a linear trajectory. The results are presented as a time-lapse dynamic sequence (supplemental Movies 1, 2, available at www.jneurosci.org as supplemental material), “stills” taken from the movies (Fig. 6), and the estimated age of peak cortical thickness for 56 brain regions (as defined by the ANIMAL segmentation tool).

To summarize the results, within isocortex, the primary sensory and motor areas generally attain their peak cortical thickness before adjacent secondary areas, and also before other polymodal association areas. In the posterior brain, the first area to reach its peak thickness is the somatic sensory cortex (~7 years), followed

by the occipital poles, containing much of the striate primary visual area (~7 years on the left, and ~8 years on the right) and then the remaining parieto-occipital cortex, with polymodal regions (such as the posterior parietal cortex) reaching peak thickness later (~9–10 years). In the frontal cortex, the primary motor cortex attains peak cortical thickness relatively early (~9 years), followed by the supplementary motor areas (~10 years) and most of the frontal pole (~10 years). High-order cortical areas, such as the dorsolateral prefrontal cortex and cingulate cortex, reach peak thickness last (~10.5 years). In the medial views, the occipital and frontal poles attain peak thickness early, and then a centripetal wave sweeps from these areas, with the medial prefrontal and cingulate cortex attaining peak thickness last. There is also a marked dorsal to ventral progression of development. Detailed results for each brain regions are given in Table 2.

Discussion

Alignment of cortical types with developmental trajectories

This study demonstrates a tight alignment between developmental trajectories and the cortical types depicted in traditional cytoarchitectonic maps, affording these classic maps a developmental significance. The study both supports and extends previous work (Gogtay et al., 2004; Sowell et al., 2004; O’Donnell et al., 2005) through the inclusion of a much larger sample size which allowed the detection of higher order effects of age.

Other longitudinal studies of typical development support some of the present findings. For example, the simple linear growth we report in one part of allocortex, the piriform area, has also been found previously for the hippocampus (Gogtay et al., 2006). We were unable to measure the hippocampus directly in the present study, but Gogtay and colleagues found that the trajectory of volume change of the allocortical hippocampus was linear. The prominence of isocortical thinning in adolescence is confirmed in studies using other cortical morphometric measures such as gray matter density, demonstrating the complementary nature of these different measures of cortical characteristics (Gogtay et al., 2004; Sowell et al., 2004).

The model used here applies only to the age range covered and cannot be extrapolated. For example, if the cubic trajectory were extended beyond the age range, it would imply there is an increase in cortical thickness in adulthood (starting around the age of ~25), which is neither biologically plausible nor supported by existing data in this age range (Sowell et al., 2007). Rather, the age at which the phase of cortical thinning stops (the second point of inflection in a cubic curve) is better conceptualized as the points of transition into the essentially stable cortical dimensions of adulthood. Areas with cubic trajectories reach this inflection point faster than those with quadratic curves, and in this sense could be conceptualized as having faster growth.

Methodological issues

It is important to consider the possibility of methodological artifact contributing to the results. This could arise, for example, as the cortical surface reconstruction, which is the basis of the automated technique, may be particularly difficult in regions of the allocortex and transitional cortex, and the resulting increase in measurement error might obscure complex (cubic) growth patterns. Several factors make this unlikely. The validity of the cortical thickness measure judged against manual estimates did not vary systematically with type of cortex. The automated cortical thickness estimates in allocortical regions of the orbitofrontal and medial cortex were as valid as the measurements of isocortical regions. Additionally, the algorithm we used and its derivatives can also accurately extract the cortical surfaces of a “phantom” brain, detect simulated thinning of the cortex and capture the neuropathologically established patterns of disease progression (MacDonald et al., 2000; Lerch and Evans, 2005; Lerch et al., 2005; Lee et al., 2006). Finally, our study benefits from its large sample size and high proportion of prospective data, factors which afforded the detection of linear and curvilinear effects of age on cortical growth which were both statistically and, we argue biologically, significant.

Environmental and genetic effects on growth trajectories

The nature of the cellular events underpinning cortical change in humans has not been established. Some of the earliest aspects of cortical development, such as the emergence and resolution of the subplate as neuroblasts migrate from the neuroepithelium to their mature laminar locations (Kostovic and Rakic, 1990; Kostovic et al., 2002) determine cerebral lamination *in utero* and perinatally, but fall outside the age window we studied. Studies in nonhuman animal suggest that cortical dimensions during critical periods for the development of cognitive functions may reflect experience-dependent molding of the architecture of cortical columns along with dendritic spine and axonal remodeling (Chklovskii et al., 2004; Mataga et al., 2004; Hensch, 2005; Sur and Rubenstein, 2005). Such morphological events may contribute to the childhood phase of increase in cortical thickness, which occurs in regions with either a cubic or quadratic trajectory. The phase of cortical thinning which dominates adolescence might reflect the use-dependent selective elimination of synapses (Huttenlocher and Dabholkar, 1997) that could refine neural circuits, including those supporting cognitive abilities (Hensch, 2004; Knudsen, 2004). Events occurring at the interface between white

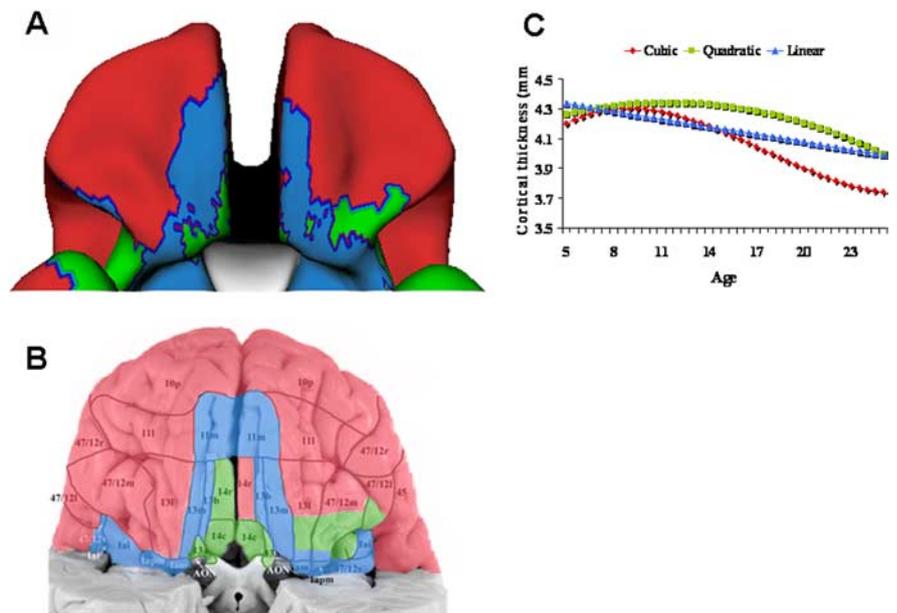


Figure 4. *A*, Complexity of developmental trajectories throughout the orbitofrontal cortex, projected onto a standard brain template. The anterior and lateral orbitofrontal cortex has a cubic fit (red); medial and posterior orbitofrontal cortex has simpler quadratic (green) and linear (blue) trajectories. *B*, The trajectories are superimposed on a cytoarchitectonic map of the region by Öngür et al. (2003) to illustrate the overlap between the cytoarchitectonic fields and regional differences in trajectories. *C*, The trajectory of each of the divisions.

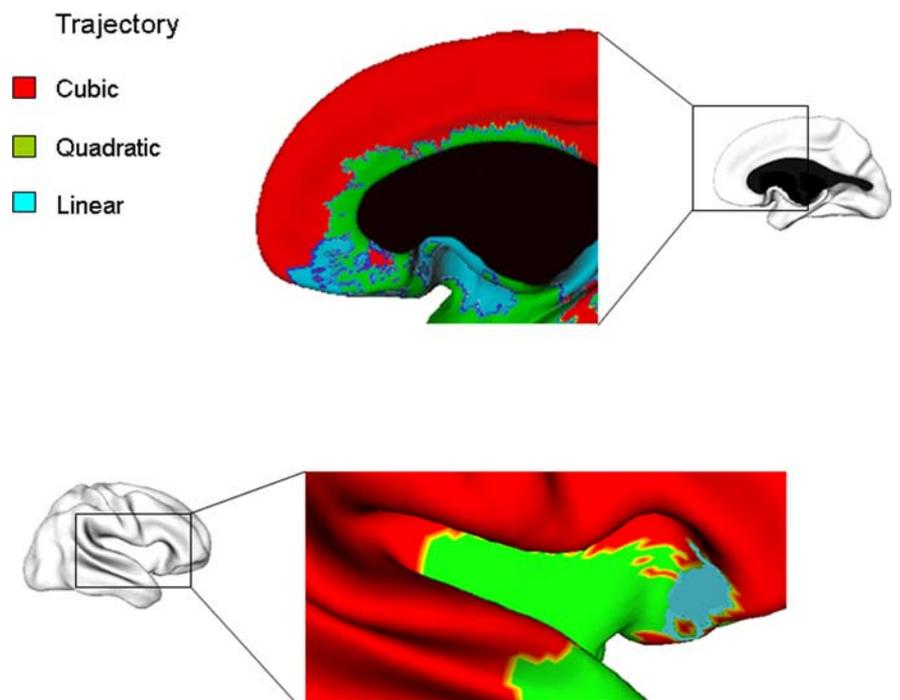


Figure 5. Top, Detailed views of trajectories in the right medial prefrontal cortex, where isocortical regions have a cubic trajectory, and transitional areas have either a quadratic trajectory (e.g., the agranular and poorly laminated cortex of area 24a in the cingulate gyrus) or a linear decline in thickness (e.g., the thin and largely agranular cortex of the gyrus rectus). Bottom, The right insula shows progressively more complex trajectories moving: the posterior portion has a cubic trajectory (red), the body of the insula has a quadratic fit (green) and the anterior insula has a linear fit (blue). A similar pattern holds for the left insula.

and gray matter, such as the proliferation of myelin into the peripheral cortical neuropil in childhood and adolescence, may also influence cortical thickness (Yakovlev and Lecours, 1967; Sowell et al., 2004).

This account of possible cellular events emphasizes the role of

Table 1. The different orders of trajectories are given with the corresponding cortical regions and the underlying cortical type

Trajectory	Region	Cortical type
Linear	Piriform	Allocortex
	L entorhinal/perirhinal	Transition cortex
	Subgenual cingulate	Transition cortex
	Posterior orbitofrontal	Transition cortex
	Frontal operculum	Transition cortex
	Anterior insula	Transition cortex
	Medial occipitotemporal	Homotypical isocortex
Quadratic	Anterior cingulate (ventral supracallosal part)	Transition cortex
	Posterior orbitofrontal	Transition cortex
	R entorhinal/perirhinal	Transition cortex
	R parahippocampal	Homotypical isocortex
	R anterior superior temporal	Homotypical isocortex
	L temporal polar	Homotypical isocortex
	Body of insula	Homotypical and dysgranular isocortex
Cubic	Lateral orbitofrontal	Homotypical isocortex
	Medial and lateral frontal pole	Homotypical isocortex
	Lateral prefrontal (superior, middle, and inferior gyri)	Homotypical isocortex
	Anterior cingulate (dorsal supracallosal part)	Agranular isocortex
	Precentral motor	Agranular isocortex
	Somatosensory	Granular isocortex
	Posterior parietal	Homotypical isocortex
	Posterior insular	Homotypical isocortex
	Auditory	Granular isocortex
	Lateral temporal cortex	Homotypical isocortex
	Polar occipital	Granular isocortex
	Lateral occipital (superior, middle, and inferior gyri)	Homotypical isocortex

Homotypical isocortex corresponds to the six layer prototype described by Brodmann; the granular cortex is similar to the homotypical isocortex, but has a thick and sometimes complex internal granular layer (layer 4); the agranular isocortex develops in the six-layer pattern of homotypical isocortex, but the cells composing layer 4 disperse during development; dysgranular isocortex has a thin, but discernable layer 4 and in that sense is intermediate between agranular isocortex and homotypical isocortex (but it is not, however, intermediate between isocortex and allocortex); allocortex, the three-layer cortex typified in mammalian brains by the hippocampus and piriform area; transition cortex, cortical areas, typically limbic, with a laminar organization intermediate between allocortex and isocortex. L, Left; R, right.

experience as one determinant of cortical architecture. Our assessment of the environmental factors was limited to a child's socioeconomic status and entering this measure as a covariate did not change the pattern of results. It would however be interesting to examine the impact of other key factors, particularly family and school environments on cortical development. Individual differences in intelligence influence cortical thickness and its development (Narr et al., 2006; Shaw et al., 2006b). However, our principal findings held when IQ was entered as a covariate, implying that although intelligence may influence some properties of cortical growth trajectories, such as velocity and the age of attaining peak cortical thickness, it does not impact on the basic link between complexity of cytoarchitecture and complexity of developmental trajectory.

Genetic factors are also important in determining cortical architecture (Thompson et al., 2001; Lenroot et al., 2007). Common polymorphisms such as the *catechol-O-methyltransferase Val158Met* polymorphism, a single nucleotide polymorphism in the regulator of G-protein signaling 4 gene, and a promoter region polymorphism of the serotonin transporter gene (*5-HTTLPR*) have all been found to have some influence on cortical volume, thickness or complexity (Brown and Hariri, 2006; Meyer-Lindenberg et al., 2006; Zinkstok et al., 2006; Buckholtz et al., 2007; Taylor et al., 2007). Of particular interest are genes that both contribute to both cortical growth and complexity and appear to be under positive selection in primate evolution, particularly in lineages leading to modern humans (Gilbert et al., 2005). These include the *ASPM* (abnormal spindle-like, microcephaly associated) and *MCPH1* (microcephaly, primary autosomal recessive) genes (Evans et al., 2004a,b). It would be interesting to determine

whether variation in the regional cortical expression of such genes aligns with both cortical types and developmental trajectory maps.

Functional considerations

Detailed consideration of these developmental patterns and their possible relationship to cognitive development remains for future work, but a few points can be made. For example, the posterior medial orbitofrontal areas have been linked with the limbic system and control of the autonomic nervous system, and they show a linear trajectory. These areas are thought to monitor the outcomes associated with behavior, particularly punishment or reward (Rolls, 2004; Kennerley et al., 2006), cognitive functions so fundamental that they are unlikely to undergo prolonged development. In contrast, isocortical regions often support more complex psychological functions, which show clear developmental gradients, characterized by rapid development during critical periods. We can only speculate about a possible relationship between critical periods for human skill development and the developmental trajectories described here. The delineation of critical periods for human skill development is complex, but late childhood is a period of particularly rapid development of executive skills of plan-

ning, working memory and cognitive flexibility, an age period which coincides with an increase in cortical thickness in the lateral prefrontal cortex (Chelune and Baer, 1986; Diamond, 2002; Huizinga et al., 2006; Jacobs et al., 2007). In contrast, the critical period for certain visual functions (such as letter acuity and global motion detection) has been estimated as ending in middle childhood (~age 6 or 7) (Lewis and Maurer, 2005) and, likewise, the period of increase in cortical thickness in the visual cortex also ends around this time (approximately ages 7–8). This correlation between the duration of some critical periods with the phase of increase in cortical thickness is certainly not universal. It is necessarily limited by the existence of systems (supported by similar cortical regions) with multiple critical periods, each having a different temporal window, as occurs in certain sensory systems. (Harrison et al., 2005; Levi, 2005; Lewis and Maurer, 2005). This discussion focuses on critical periods and should not be taken as dismissing the importance of continued refinement of many cognitive skills during the adolescent phase of cortical thinning (Luna et al., 2004; Luciana et al., 2005).

Conclusion

The findings reported here support the idea that the organization of the cerebral cortex can be understood in terms of a series of concentric rings, with the isocortex (having a cubic trajectory) at its core, the allocortex (showing predominately linear growth) at the periphery, and the transitional areas (having a mix of quadratic and linear trajectories) in between. The isocortex in this model not only lies at the core of the cerebral cortex in this sense, but also arises later in evolution than the piriform area (lateral allocortex) and hippocampus (medial allocortex), and additional

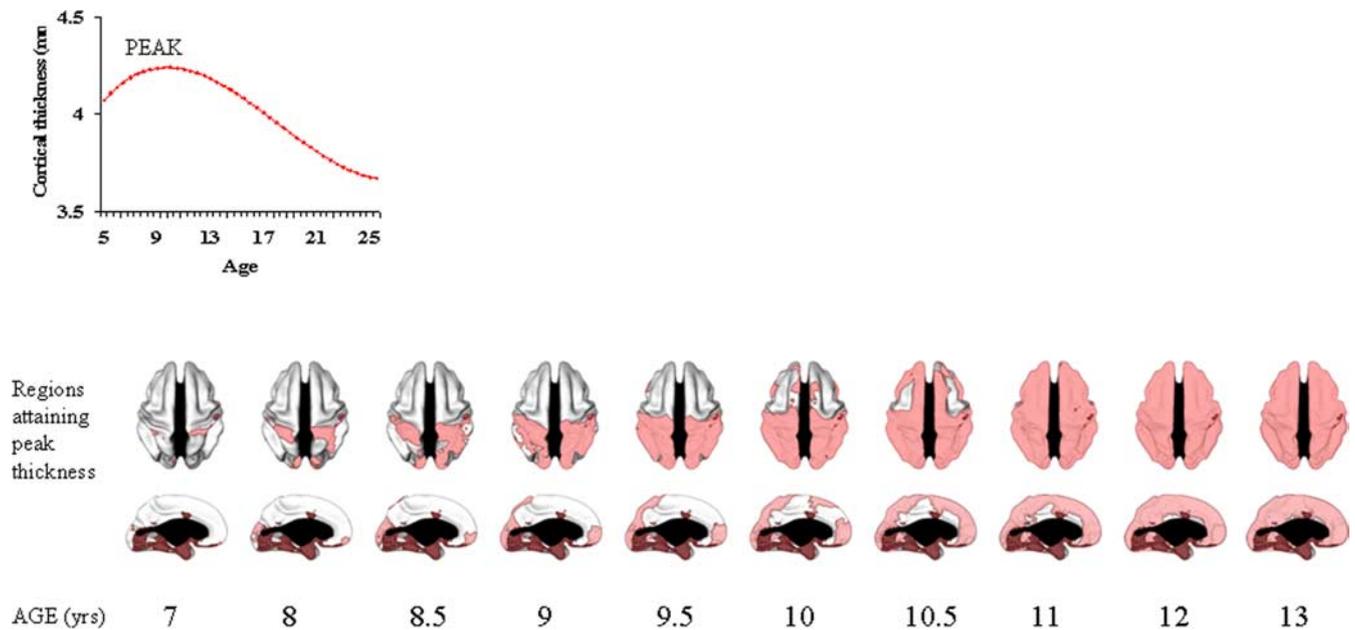


Figure 6. Age of attaining peak cortical thickness across the cerebral cortex. Peak thickness can only be estimated for regions with a cubic or quadratic trajectory and not for regions with linear change (which are indicated with a darker red shade). The changes are illustrated dynamically in supplemental Movies 1 and 2, available at www.jneurosci.org as supplemental material.

small allocortical areas. Thus, through *in vivo* neuroanatomic imaging we demonstrate that cortical development mirrors both the cytoarchitecture and history of the cerebral cortex.

References

- Allman J, Hakeem A, Watson K (2002) Two phylogenetic specializations in the human brain. *Neuroscientist* 8:335–346.
- Brockhaus H (1940) Die cyto- und myeloarchitektonik des cortex clastralis und des clastrum beim menschen. *J Psychol Neurol* 49:249–348.
- Brown SM, Hariri AR (2006) Neuroimaging studies of serotonin gene polymorphisms: exploring the interplay of genes, brain, and behavior. *Cogn Affect Behav Neurosci* 6:44–52.
- Buckholtz JW, Meyer-Lindenberg A, Honea RA, Straub RE, Pezawas L, Egan MF, Vakkalanka R, Kolachana B, Verchinski BA, Sust S, Mattay VS, Weinberger DR, Callicott JH (2007) Allelic variation in RGS4 impacts functional and structural connectivity in the human brain. *J Neurosci* 27:1584–1593.
- Chelune GJ, Baer RA (1986) Developmental norms for the Wisconsin Card Sorting test. *J Clin Exp Neuropsychol* 8:219–228.
- Chklovskii DB, Mel BW, Svoboda K (2004) Cortical rewiring and information storage. *Nature* 431:782–788.
- Diamond A (2002) Normal development of prefrontal cortex from birth to young adulthood: cognitive functions, anatomy and biochemistry. In: *Principles of frontal lobe function* (Stuss DT, Knight RT, eds), pp 466–503. New York: Oxford UP.
- Evans PD, Anderson JR, Vallender EJ, Choi SS, Lahn BT (2004a) Reconstructing the evolutionary history of microcephalin, a gene controlling human brain size. *Hum Mol Genet* 13:1139–1145.
- Evans PD, Anderson JR, Vallender EJ, Gilbert SL, Malcom CM, Dorus S, Lahn BT (2004b) Adaptive evolution of ASPM, a major determinant of cerebral cortical size in humans. *Hum Mol Genet* 13:489–494.
- Giedd JN, Snell JW, Lange N, Rajapakse JC, Casey BJ, Kozuch PL, Vaituzis AC, Vauss YC, Hamburger SD, Kaysen D, Rapoport JL (1996) Quantitative magnetic resonance imaging of human brain development: ages 4–18. *Cereb Cortex* 6:551–560.
- Giedd JN, Blumenthal J, Jeffries NO, Castellanos FX, Liu H, Zijdenbos A, Paus T, Evans AC, Rapoport JL (1999) Brain development during childhood and adolescence: a longitudinal MRI study. *Nat Neurosci* 2:861–863.
- Gilbert SL, Dobyns WB, Lahn BT (2005) Genetic links between brain development and brain evolution. *Nat Rev Genet* 6:581–590.
- Gogtay N, Giedd JN, Lusk L, Hayashi KM, Greenstein D, Vaituzis AC, Nugent III TF, Herman DH, Clasen LS, Toga AW, Rapoport JL, Thompson PM (2004) Dynamic mapping of human cortical development during childhood through early adulthood. *Proc Natl Acad Sci USA* 101:8174–8179.
- Gogtay N, Nugent III TF, Herman DH, Ordonez A, Greenstein D, Hayashi KM, Clasen L, Toga AW, Giedd JN, Rapoport JL, Thompson PM (2006) Dynamic mapping of normal human hippocampal development. *Hippocampus* 16:664–672.
- Harrison RV, Gordon KA, Mount RJ (2005) Is there a critical period for cochlear implantation in congenitally deaf children? Analyses of hearing and speech perception performance after implantation. *Dev Psychobiol* 46:252–261.
- Hensch TK (2004) Critical period regulation. *Annu Rev Neurosci* 27:549–579.
- Hensch TK (2005) Critical period plasticity in local cortical circuits. *Nat Rev Neurosci* 6:877–888.
- Hollingshead AB (1975) Four-factor index for social status. New Haven, CT: Yale UP.
- Huizinga M, Dolan CV, van der Molen MW (2006) Age-related change in executive function: developmental trends and a latent variable analysis. *Neuropsychologia* 44:2017–2036.
- Huttenlocher PR, Dabholkar AS (1997) Regional differences in synaptogenesis in human cerebral cortex. *J Comp Neurol* 387:167–178.
- Jacobs R, Harvey AS, Anderson V (2007) Executive function following focal frontal lobe lesions: impact of timing of lesion on outcome. *Cortex* 43:792–805.
- Jolicoeur P, Pontier J, Pernin MO, Sempe M (1988) A lifetime asymptotic growth curve for human height. *Biometrics* 44:995–1003.
- Kaas JH (1987) The organization of neocortex in mammals: implications for theories of brain function. *Annu Rev Psychol* 38:129–151.
- Kabani N, Le Goualher G, MacDonald D, Evans AC (2001) Measurement of cortical thickness using an automated 3-D algorithm: a validation study. *NeuroImage* 13:375–380.
- Kennerley SW, Walton ME, Behrens TE, Buckley MJ, Rushworth MF (2006) Optimal decision making and the anterior cingulate cortex. *Nat Neurosci* 9:940–947.
- Knudsen EI (2004) Sensitive periods in the development of the brain and behavior. *J Cogn Neurosci* 16:1412–1425.
- Kostovic I, Rakic P (1990) Developmental history of the transient subplate zone in the visual and somatosensory cortex of the macaque monkey and human brain. *J Comp Neurol* 297:441–470.
- Kostovic I, Judas M, Rados M, Hrabac P (2002) Laminar organization of the human fetal cerebrum revealed by histochemical markers and magnetic resonance imaging. *Cereb Cortex* 12:536–544.

Table 2. The estimated age of peak cortical thickness is given for 56 brain regions

	Hemisphere	Trajectory	Age of peak cortical thickness (years)
Frontal			
Superior	R	Cubic	10.2
	L	Cubic	10.1
Middle	R	Cubic	10.4
	L	Cubic	10.3
Inferior	R	Cubic	9.7
	L	Cubic	9.7
Medial	R	Cubic	10.6
	L	Cubic	10.0
Precentral	R	Cubic	9.6
	L	Cubic	10.5
Cingulate	R	Cubic	13.8
	L	Cubic	11.2
Medial orbitofrontal	R	Linear	
	L	Cubic	8.6
Lateral orbitofrontal	R	Cubic	9.4
	L	Cubic	9.4
Temporal			
Superior	R	Cubic	14.9
	L	Cubic	14.9
Middle	R	Cubic	11.7
	L	Cubic	11.6
Inferior	R	Cubic	11.2
	L	Cubic	11.1
Insula	R	Quadratic	18.1
	L	Quadratic	18.0
Periamygdaloid	R	Linear	
	L	Linear	
Parahippocampal	R	Linear	
	L	Linear	
Uncal	R	Linear	
	L	Linear	
Parietal			
Postcentral gyrus	R	Cubic	8.4
	L	Cubic	8.5
Superior lobule	R	Cubic	8.3
	L	Cubic	9.0
Supramarginal gyrus	R	Cubic	9.2
	L	Cubic	9.2
Angular gyrus	R	Cubic	8.5
	L	Cubic	9.0
Precuneus	R	Cubic	9.8
	L	Cubic	10.1
Lateral occipitotemporal	R	Cubic	11.2
	L	Cubic	11.1
Medial occipitotemporal	R	Linear	
	L	Linear	
Occipital			
Pole	R	Cubic	7.9
	L	Cubic	6.8
Superior	R	Cubic	8.3
	L	Cubic	8.3
Middle	R	Cubic	9.5
	L	Cubic	9.2
Inferior	R	Cubic	7.3
	L	Cubic	7.9
Lingual	R	Cubic	8.6
	L	Cubic	9.2
Cuneus	R	Cubic	9.2
	L	Cubic	8.8

This can be estimated only for regions with either a cubic or quadratic trajectory (thus, regions with a linear trajectory are marked with a dash). For regions with a mix of trajectories (e.g., the insula), the dominant trajectory, which applies to the majority of points within the region, is given. L, Left; R, right.

- Lee JK, Lee JM, Kim JS, Kim IY, Evans AC, Kim SI (2006) A novel quantitative cross-validation of different cortical surface reconstruction algorithms using MRI phantom. *NeuroImage* 31:572–584.
- Lenroot RK, Schmitt JE, Ordaz SJ, Wallace GL, Neale MC, Lerch JP, Kendler KS, Evans AC, Giedd JN (2007) Differences in genetic and environmental influences on the human cerebral cortex associated with development during childhood and adolescence. *Hum Brain Mapp*, in press.
- Lerch JP, Evans AC (2005) Cortical thickness analysis examined through power analysis and a population simulation. *NeuroImage* 24:163–173.
- Lerch JP, Pruessner JC, Zijdenbos A, Hampel H, Teipel SJ, Evans AC (2005) Focal decline of cortical thickness in Alzheimer's disease identified by computational neuroanatomy. *Cereb Cortex* 15:995–1001.
- Levi DM (2005) Perceptual learning in adults with amblyopia: a reevaluation of critical periods in human vision. *Dev Psychobiol* 46:222–232.
- Lewis TL, Maurer D (2005) Multiple sensitive periods in human visual development: evidence from visually deprived children. *Dev Psychobiol* 46:163–183.
- Lu LH, Leonard CM, Thompson PM, Kan E, Jolley J, Welcome SE, Toga AW, Sowell ER (2007) Normal developmental changes in inferior frontal gray matter are associated with improvement in phonological processing: a longitudinal MRI analysis. *Cereb Cortex* 17:1092–1099.
- Luciana M, Conklin HM, Hooper CJ, Yarger RS (2005) The development of nonverbal working memory and executive control processes in adolescents. *Child Dev* 76:697–712.
- Luna B, Garver KE, Urban TA, Lazar NA, Sweeney JA (2004) Maturation of cognitive processes from late childhood to adulthood. *Child Development* 75:1357–1372.
- MacDonald D (1996) MNI-display. Montreal: McConnell Brain Imaging Center, Montreal Neurological Institute.
- MacDonald D, Kabani N, Avis D, Evans AC (2000) Automated 3-D extraction of inner and outer surfaces of cerebral cortex from MRI. *NeuroImage* 12:340–356.
- Makris N, Biederman J, Valera EM, Bush G, Kaiser J, Kennedy DN, Caviness VS, Faraone SV, Seidman LJ (2006) Cortical thinning of the attention and executive function networks in adults with attention-deficit/hyperactivity disorder. *Cereb Cortex* 17:1364–1375.
- Mataga N, Mizuguchi Y, Hensch TK (2004) Experience-dependent pruning of dendritic spines in visual cortex by tissue plasminogen activator. *Neuron* 44:1031–1041.
- Mesulam MM, Mufson EJ (1982) Insula of the old world monkey. I. Architectonics in the insulo-orbito-temporal component of the paralimbic brain. *J Comp Neurol* 212:1–22.
- Meyer-Lindenberg A, Nichols T, Callicott JH, Ding J, Kolachana B, Buckholtz J, Mattay VS, Egan M, Weinberger DR (2006) Impact of complex genetic variation in COMT on human brain function. *Mol Psychiatry* 11:867–877.
- Narr KL, Woods RP, Thompson PM, Szeszko P, Robinson D, Dimtcheva T, Gurbani M, Toga AW, Bilder RM (2006) Relationships between IQ and regional cortical gray matter thickness in healthy adults. *Cereb Cortex* 17:2163–2171.
- O'Donnell S, Noseworthy MD, Levine B, Dennis M (2005) Cortical thickness of the frontopolar area in typically developing children and adolescents. *NeuroImage* 24:948–954.
- Ongur D, Ferry AT, Price JL (2003) Architectonic subdivision of the human orbital and medial prefrontal cortex. *J Comp Neurol* 460:425–449.
- Pinheiro JC, Bates DM (2000) *Mixed-effects models in S and S-PLUS*. New York: Springer.
- Puelles L (2001) Thoughts on the development, structure and evolution of the mammalian and avian telencephalic pallium. *Philos Trans R Soc Lond B Biol Sci* 356:1583–1598.
- Rolls ET (2004) The functions of the orbitofrontal cortex. *Brain Cogn* 55:11–29.
- Shaw P, Lerch J, Greenstein D, Sharp W, Clasen L, Evans A, Giedd J, Castellanos FX, Rapoport J (2006a) Longitudinal mapping of cortical thickness and clinical outcome in children and adolescents with attention-deficit/hyperactivity disorder. *Arch Gen Psychiatry* 63:540–549.
- Shaw P, Greenstein D, Lerch J, Clasen L, Lenroot R, Gogtay N, Evans A, Rapoport J, Giedd J (2006b) Intellectual ability and cortical development in children and adolescents. *Nature* 440:676–679.
- Sled JG, Zijdenbos AP, Evans AC (1998) A nonparametric method for automatic correction of intensity nonuniformity in MRI data. *IEEE Trans Med Imaging* 17:87–97.

- Sowell ER, Thompson PM, Leonard CM, Welcome SE, Kan E, Toga AW (2004) Longitudinal mapping of cortical thickness and brain growth in normal children. *J Neurosci* 24:8223–8231.
- Sowell ER, Peterson BS, Kan E, Woods RP, Yoshii J, Bansal R, Xu D, Zhu H, Thompson PM, Toga AW (2007) Sex differences in cortical thickness mapped in 176 healthy individuals between 7 and 87 years of age. *Cereb Cortex* 17:1550–1560.
- Striedter GF (2005) Principles of brain evolution. Sunderland, MA: Sinauer.
- Sur M, Rubenstein JL (2005) Patterning and plasticity of the cerebral cortex. *Science* 310:805–810.
- Tanner JM, Whitehouse RH, Marubini E, Resele LF (1976) The adolescent growth spurt of boys and girls of the Harpenden growth study. *Ann Hum Biol* 3:109–126.
- Taylor WD, Zuchner S, Payne ME, Messer DF, Doty TJ, MacFall JR, Beyer JL, Krishnan KRR (2007) The COMT Val158Met polymorphism and temporal lobe morphometry in healthy adults. *Psychiatry Res* 155:173–177.
- Thompson PM, Cannon TD, Narr KL, van Erp T, Poutanen VP, Huttunen M, Lonnqvist J, Standertskjold-Nordenstam CG, Kaprio J, Khaledy M, Dail R, Zoumalan CI, Toga AW (2001) Genetic influences on brain structure. *Nature Neuroscience* 4:1253–1258.
- von Economo C, Koskinas GN (1925) Die dytoarchitektonik der hirnrinde des erwachsenen menschen. Berlin: Springer.
- Yakovlev PI, Lecours AR (1967) The myelinogenetic cycles of regional maturation of the brain. In: Regional development of the brain in early life (Minokowski A, ed). Oxford: Blackwell Scientific.
- Zijdenbos AP, Forghani R, Evans AC (2002) Automatic “pipeline” analysis of 3-D MRI data for clinical trials: application to multiple sclerosis. *IEEE Trans Med Imaging* 21:1280–1291.
- Zilles K, Palomero-Gallagher N, Schleicher A (2004) Transmitter receptors and functional anatomy of the cerebral cortex. *J Anat* 205:417–432.
- Zinkstok J, Schmitz N, van Amelsvoort T, de Win M, van den Brink W, Baas F, Linszen D (2006) The COMT val158met polymorphism and brain morphometry in healthy young adults. *Neurosci Lett* 405:34–39.

EXHIBIT 40



ELSEVIER

ScienceDirect

 Current Opinion in
**Behavioral
 Sciences**


The neuroscience of adolescent decision-making

Catherine A Hartley¹ and Leah H Somerville²

Adolescence is a phase of the lifespan associated with greater independence, and thus greater demands to make self-guided decisions in the face of risks, uncertainty, and varying proximal and distal outcomes. A new wave of developmental research takes a neuroeconomic approach to specify what decision processes are changing during adolescence, along what trajectory they are changing, and what neurodevelopmental processes support these changes. Evidence is mounting to suggest that multiple decision processes are tuned differently in adolescents and adults including reward reactivity, uncertainty-tolerance, delay discounting, and experiential assessments of value and risk. Unique interactions between prefrontal cortical, striatal, and salience processing systems during adolescence both constrain and amplify various component processes of mature decision-making.

Addresses

¹Sackler Institute for Developmental Psychobiology, Weill Cornell Medical College, 1300 York Avenue, Box 140, New York, NY 10065, USA

²Department of Psychology and Center for Brain Science, Harvard University, 52 Oxford Street, Room 290, Cambridge, MA 02138, USA

Corresponding authors: Hartley, Catherine A
 (cah2031@med.cornell.edu) and Somerville, Leah H
 (somerville@fas.harvard.edu)

Current Opinion in Behavioral Sciences 2015, 5:108–115

This review comes from a themed issue on **Neuroeconomics**

Edited by **John P O'Doherty** and **Colin C Camerer**

For a complete overview see the [Issue](#) and the [Editorial](#)

Available online 3rd October 2015

<http://dx.doi.org/10.1016/j.cobeha.2015.09.004>

2352-1546/© 2015 Elsevier Ltd. All rights reserved.

Current opinion in behavioral sciences

The phase of the lifespan known as adolescence begins around the time of physical puberty and ends with the assumption of adult-like levels of autonomy. Relative to childhood, adolescents are faced with more frequent and complex demands on independent decision-making. Though adolescence is typically a phase of robust physical health, adolescents in many western societies face prominent health risks that stem, at least in part, from their own choices. Adolescents spend more time unmonitored by guardians and have growing access to risky and ambiguous situations that involve potential negative outcomes such as access to illegal substances, opportunities to take physical and sexual risks, and complex

peer-related decisions that could impact their social status. Understanding what is unique about adolescent decision-making has come under the spotlight of applied research aimed at promoting adolescent health.

Adolescent decision-making is also coming under the spotlight from another direction: neuroscience. Here, we evaluate the complex ways in which trajectories of brain development shape adolescent decision processes. A recent wave of developmental research has drawn on neuroeconomic experimental approaches that allow complex decisions to be decomposed into component processes.

Neuroeconomic approaches employ formal mathematical models to estimate parameters that modulate individual choice behavior and make quantitative predictions about the neural signals underlying idiosyncratic decision computations. Thus, neuroeconomic approaches permit precise characterization of the underlying aspects of complex decisions that are (or are not) changing with age. This review highlights recent work that links understanding of (a) what decision processes are changing during adolescence and along what trajectory they are changing, and (b) neurodevelopmental features of well-characterized neural circuits that have been implicated in different facets of adult decision-making.

To isolate developmental shifts in decision processes, empirical studies typically compare adolescent-aged participants with a reference group or groups of older and/or younger participants. However, the field lacks consensus on which age ranges should be compared and the boundaries between age groups (see [Box 1](#) for further discussion on this point). Thus, by necessity this review reflects diverse operationalizations of ‘developmental change’.

Further, development is often assumed to represent progressive, linear patterns of change over time. However, many features of adolescent development are nonlinear, and this review demonstrates that some decision processes are ‘tuned’ uniquely during adolescence when compared to both earlier and later stages of development. Whereas studies with narrow age ranges lack the age span to target nonlinear changes, studies that incorporate both pre-adolescent and post-adolescent comparison groups allow for detection of both linear and complex patterns of change.

Trajectories of adolescent neurodevelopment of neurocircuitry important for decision computations

Although the overall size and gross organization of the brain is similar in adolescents and adults, dynamic

Box 1 Where to go from here? Conceptual challenges in the study of adolescent decision-making.

Applying quantitative, neuroeconomics-based analyses has proven to be highly useful in delineating precise mechanisms underlying developmental shifts in complex choice behavior. Here we specify challenges and future directions in hopes of stimulating progress in these domains:

- *Who is an adolescent?* There is presently wide variability across studies with regard to operationalizing 'adolescence'. As adolescence is a culturally defined concept without straightforwardly observable starting and ending points, it is perhaps not surprising that consensus is lacking. Even pubertal onset, a relatively agreed upon trigger for the onset of adolescence, varies widely across sexes and across individuals, and begins centrally well before secondary sex characteristics are observed. However, such variability frequently muddies clear-cut comparison of research findings across studies. *We encourage researchers to incorporate as wide of an age range as is feasible to capture linear and nonlinear changes, to allow for continuous analyses of age that circumvent issues related to arbitrary delineations between age 'groups', and with consideration of the samples in existing studies to which one wishes to compare their findings.*
- *Applying 'adult' quantitative models of decision-making to developmental populations.* Formal models of decision-making rely on mathematical assumptions that define the latent structure of decision processes. It is important to acknowledge that these latent models have largely been developed with an adult decision-maker in mind. Applying such models to the study of developmental populations enables discovery of quantitative changes in decision processes, but this approach is relatively insensitive to qualitative differences in decision-making that might be best described by alternative models. *As 'adult' models are utilized, careful examination of unexplained variance in decision-making could open doors to characterization of qualitative shifts in decision making that occur across development.*
- Ecological validity of assessments of adolescent decision-making.
- Many tasks employed in neuroeconomic studies fail to capture key qualitative features of naturalistic choice contexts, which may diminish their validity for understanding real-world decision-making. While preserving the precision of neuroeconomics-based tasks, new tasks should be developed that also evoke the anticipatory and feedback-driven affective responses that typically accompany motivated decision-making. In addition, adolescent decision-making typically occurs within rich environments that often involve complex motivations. Prominent motivations at this age, which can compete and conflict with one another, include maintaining status with peers, achieving goals in academic, athletic, or other arenas, finding independence, and maintaining harmony within the family. Future work should attempt to strike balance between experimental precision and ecological validity. *Studies employing techniques that index choices in the real world and their specific motivational contexts (e.g., ecological momentary assessment) may offer unique insights into adolescents' naturalistic decision-making.*

changes in brain structure, function, and features of neuromodulatory systems are occurring throughout adolescence. Structural magnetic resonance imaging (MRI) studies have revealed developmentally normative reductions in the volume of gray matter across adolescence [1,2] that are thought to reflect experience-dependent pruning processes. Lagged structural development of the prefrontal cortex, particularly dorsolateral regions, has been linked to a number of functional outcomes during

adolescence, including continued improvement in impulse control [3], working memory [4], and complex reasoning [5]. As such, late development of the prefrontal cortex could constrain components of decision-making that rely heavily on deliberation or integrating complex sources of information.

By contrast, certain properties of dopaminergic signaling exhibit adolescent-specific peaks. Structurally, there is a proliferation of D1 and D2 receptors in various targets within the mesolimbic dopamine system, which prune 50% or more from the transition of adolescence to adulthood [6] paired with a peaking tissue concentration of dopamine [7]. Corresponding studies in humans using functional MRI have demonstrated an adolescent-specific exaggeration of response to various forms of reward [8,9**] and stronger parametric tracking of expected value [10] in the ventral striatum, a key target of dopaminergic signaling.

The observed developmental asymmetries in prefrontal and striatal signaling and connectivity have informed theoretical frameworks describing adolescent behavior as reflecting staggered trajectories of neurodevelopment [11–13]. Whereas the adolescent striatum exhibits exaggerated response properties in many studies, the function of prefrontal systems, which can modulate dopaminergic signals [14], is thought to be developmentally constrained. Additional findings suggest that neural signals that reflect attributions of salience or elicited arousal similarly exhibit adolescent-specific shifts in activity. Such a developmentally normative functional neurocircuitry could manifest behaviorally in robust incentive motivation [15*], reward reactivity [16], and sensation seeking [17] paired with still-developing executive control. In the remaining sections, we highlight themes emerging from our nascent understanding of how these staggered neurodevelopmental trajectories influence multiple component processes of decision-making.

Value-based learning

By taking actions in the world and observing their positive and negative consequences, one can learn through experience how to make beneficial choices. Dopaminergic reward prediction errors, which reflect the discrepancy between an expected outcome and what actually occurs, carry crucial information that enables this learning process. Prediction error signals typically correlate with activity of the ventral striatum in adults [18]. Such signals have also been observed in children and adolescents [19*,20,21], consistent with evidence of successful feedback-based learning across development [19*,22,23]. Increased magnitude of both positive [24*] and negative [25] prediction error signals has been observed during adolescence, consistent with reports of heightened adolescent responses to both reward [8,26] and punishment

[27]. However, such age differences in prediction error signals have not been consistently observed [19[•],20,21].

The extent to which a reward prediction error alters subsequent expected values depends on one's learning rate. High learning rates give a heavy weighting to a recent outcome, whereas lower learning rates integrate over a longer feedback history, with recent outcomes yielding only a small value adjustment. Several studies have observed valence-dependent developmental differences in the integration of feedback [19[•],25,28,29]. These studies suggest that children weigh recent negative feedback heavily in their updated values, and that this tendency decreases with age, a change that is associated with increased connectivity between the ventromedial prefrontal cortex (vmPFC) and the ventral striatum [19[•]]. A developmental decline in the influence of negative outcomes might foster adaptive responding in decision contexts in which reward is probabilistic, and one should persist with a response despite occasional negative feedback.

By contrast, the weighting of recent rewarding outcomes has been found to increase from childhood into adulthood [19[•],28]. Adolescents, lying at the intersection of these opposing linear trajectories, exhibit variable weighting of positive and negative prediction errors across different tasks [19[•],25,28,29]. This sensitivity to task demands is to be expected, as distinct asymmetric weightings of positive and negative feedback can optimize performance given different reinforcement structures. However, as higher learning rates for positive versus negative outcomes, independent of performance demands, can promote risk-seeking behavior [30], future studies might examine whether such a reward bias in value-based learning might contribute to adolescent risk-taking. Learning elicited through reward and punishment is mediated by D1 and D2 receptor activity, respectively [31]. The marked changes in the expression and pruning of striatal D1:D2 receptors during the transition into and out of adolescence are likely to play an important mediating role in these valence-dependent alterations in value-based learning [6].

Studies in adults have highlighted a distinction between two forms of value-based learning [32]. A 'model-free' process, relying upon the striatal error-driven updating mechanism described above, evaluates an action based solely upon previous experienced feedback. By contrast, 'model-based' evaluations, recruiting additional contributions from prefrontal and hippocampal regions, also take into account the structure of the decision environment and specific potential outcomes. Burgeoning evidence suggests that whereas model-free learning is employed from childhood onwards, reliance on model-based learning only emerges during adolescence, and continues to increase into adulthood [33]. This finding suggests that

the normal developmental changes occurring in the brain across adolescence confer an expansion in the repertoire of evaluative processes that are available to inform one's decisions.

Risk

In economics, a 'risky' choice is typically defined as a decision with multiple potential outcomes, which have probabilities that are known or can be estimated. Early accounts asserted that adolescents make risky choices because they either did not understand the potential negative consequences associated with particular actions, or perceived themselves as invulnerable to those consequences. However, several studies have refuted these assertions by demonstrating that adolescents know the potential negative consequences of risks, overestimate the probability of rare negative outcomes, as adults do, and perceive themselves as *more* vulnerable to those outcomes [34]. Consequently, Reyna and Farley [35[•]] have argued that adolescents have achieved a cognitive threshold for comprehending probabilistic outcomes [36] and for reasoning about complex decisions.

Studies have therefore turned to identifying biases in risk computations and information processing that might account for developmental differences in risky decision-making. Adolescents have been reported to exhibit similar, if not more, risk aversion relative to adults when risk attitudes are assessed via choices between statistically described gambles [37,38[•]]. However, a recent meta-analysis by Defoe and colleagues [39[•]] compiled dozens of studies using a variety of experimental tasks including the Iowa Gambling Task [40], the Balloon Analog Risk Task [41], and the Columbia Card Task (CCT; [42]) and observed reliably heightened rates of risky choices in adolescents compared to adults, with a medium effect size. Analyses of moderating effects showed that tasks in which risk is assessed experientially through immediate gain and loss feedback show the greatest uptick in risky choice in adolescents compared to adults [9^{••},29,42,43]. Additional work has demonstrated that adolescents exhibit increased risk-taking (relative to adults) in situations where risk must be learned through trial and error [29] and in dynamic choice contexts that involve incremental risk-taking (relative to both children and adults) [9^{••},42]. This difference in adolescent risk attitudes across decision contexts echoes the noted discrepancy in adulthood between risky choices made on the basis of personal experience versus formal description [43].

Direct comparison of children and adolescents revealed equivalent overall levels of risky choice. However, whether adolescents or children exhibited greater risk-taking varied substantially across tasks, and the distinctions between tasks underlying such differences were not readily apparent. As these preliminary findings are based on the small number of studies that included children

within their sample, a more precise characterization of differences in risk-taking in children and adolescents awaits converging findings from additional studies.

In adults, evaluation of risk in decisions has been associated with activity of the lateral prefrontal cortex [44] and insular cortex [45,46]. Few developmental studies to date have decoupled risk from other decision parameters such as subjective value. Van Duijvenvoode and colleagues [47^{*}] conducted an fMRI study using the CCT, a card-based choice task optimized for isolating the influence of trial-by-trial varying risk (i.e., outcome variability) and return (i.e., expected value) on decisions. Both aversion to risk and sensitivity to return increased from childhood to adulthood. Activation in the insular cortex and prefrontal cortex tracking trial-by-trial variation in risk was exaggerated in adolescents relative to children and adults, with adolescents who exhibited greater activation in these regions showing more avoidance of risk. Further work isolating risk from other decision components is needed to clarify how neurodevelopmental shifts in risk tracking relate to adolescents' orientation toward risk, as well as how the manner in which risk is evaluated alters choice.

Uncertainty

A related decision-making construct is uncertainty, or a dearth of information regarding potential outcomes or their probabilities when making decisions. Decisions in daily life are fraught with uncertainty, and the level of uncertainty for complex decisions might be particularly high for adolescents, whose information stems from a more impoverished repertoire of past experiences than adults. A study by Tymula and colleagues [38^{*}] contrasted decision-making under risk and under ambiguity (i.e., uncertainty regarding outcome probabilities) by parametrically obscuring a proportion of the information depicting odds of winning in a monetary choice task. They found that adolescents showed a greater tolerance for these ambiguous decisions than adults, whereas risk tolerance for gambles with explicit probabilities did not differ. Many real-world decisions (as well as experimental choice tasks) that are characterized as 'risky' do not involve known outcome probabilities. Thus, the use of experimental approaches that deconfound ambiguity from related decision parameters holds promise in uncovering the role ambiguity tolerance plays in unique adolescent decisions. Convergent work has extended the concept of adolescent uncertainty tolerance to the temporal domain. Using a simple task probing the degree to which simple behavioral responses are slowed by temporally unpredictable stimulus presentations, recent work has demonstrated that adolescents are less slowed by uncertainty than both children and adults [48].

Both human adolescents and other mammalian models of adolescence demonstrate a precipitous rise in novelty

seeking and exploratory behavior [49^{**},50]. A willingness to explore novel environments inherently requires tolerance of uncertain outcomes. Prominent theoretical views have considered adolescent exploratory tendencies to be highly adaptive [15^{*},51], given that a primary challenge of adolescence is to seek resources, mates, information about the world, and self-directed learning opportunities. This adaptive function of exploration is consistent with a recent proposal that developmental shifts from high to low exploration (akin to changes in search 'temperature' in computational 'simulated annealing' algorithms) may reflect a developmentally optimized search process that promotes broad investigation of potential behaviors before focusing more narrowly on those that have proven most beneficial [52]. Tolerance for ambiguity might represent a mechanism facilitating adolescent-specific exploratory tendencies.

Time

Many of the everyday choices adolescents face carry consequences that unfold over time. While going to a party on Friday night might be fun, studying for Monday's exam may bring more valuable long-term benefits. Economic models propose that when making choices between proximal rewards and more substantial but deferred reinforcement, one decreases or 'discounts' the subjective value of a delayed outcome as a function of the amount of time one must wait to receive it. Intertemporal choice in the lab has been found to have striking ecological validity, predicting an array of real world decisions that reflect prioritization of future rewards [53]. Convergent findings across numerous developmental studies of intertemporal choice suggest that discount rates decline throughout adolescence and asymptote in early adulthood [54–58]. Collectively, these studies suggest that throughout adolescent maturation, delayed rewards become more highly valued.

This developmental increase in preference for delayed rewards has been associated with both structural and functional changes in the brain [55,57–59]. Consistent with abundant evidence for the roles of both the vmPFC and the ventral striatum in the computation of subjective value [60], functional connectivity between these regions during intertemporal choice has been shown to increase linearly from childhood into adulthood, predicting a corresponding decrease in discount rates [57]. Both structural and functional connectivity between the ventral striatum and more lateral prefrontal regions has also been associated with age-related increases in patient intertemporal choice [58]. Gradual maturation of corticostriatal connectivity throughout adolescence has been proposed to underlie the development of self-regulatory ability [61] and reductions in impulsivity [62], cognitive processes that are commonly associated with decreases in discounting. This interpretation is supported by evidence in developmental samples that steeper discount rates predict

alternative forms of impulsivity, such as poor response inhibition [59,63] but see [58].

Greater recruitment of prospective future-oriented cognition might also contribute to decreases in discount rates with age. Burgeoning evidence suggests that the episodic simulation of the future during intertemporal choice promotes more patient choices [53,64]. While the capacity for episodic mental simulation is evident from childhood [65], the recruitment of future-oriented cognitive processes such as planning, or anticipating the consequences of actions continues to increase throughout adolescence [56]. In adults, the influence of mental simulation on intertemporal choice has been shown to depend upon functional connectivity between the PFC and the hippocampus [53]. Although few studies neuroimaging studies have examined the development of PFC-hippocampal connectivity, the white matter tracts connecting these regions undergo continued myelination during adolescence [66], suggesting protracted maturation of related cognitive processes. Age-related increases in foresight during choice might be facilitated by the accumulation of experience with decisions that have temporally extended consequences.

Context dependency of adolescent decisions

People who interact with adolescents often are frustrated by the mercurial qualities of their decisions. Having the flexibility to make different decisions in different contexts has been described as an adaptive consequence of continuing neurodevelopment [51,67]. Research has begun to explore the context-dependency of adolescent decisions in two domains in which adolescents might display particularly robust sensitivity: contexts of heightened arousal or excitement, and contexts involving peers.

Inspired by dual process theories, the modulation of adolescent decision-making in arousing or 'hot', compared to deliberative or 'cold' situations has been examined using the CCT [42]. In the CCT, participants select a number of cards from a deck of mixed gain and loss cards on each trial, which terminates when a loss is encountered. In the 'cold' condition, participants are encouraged to use deliberation and to weigh the available odds information to determine how many cards to select. In this condition, adolescents and adults selected an equivalent number of cards. However, despite explicit knowledge of risk information, adolescents drew more cards than adults in a 'hot' condition where each choice to draw a card was made one at a time, inducing physiological arousal and encouraging the feeling of a 'hot hand' via incremental win feedback. This contextual increase in adolescents' risk-taking reflects a diminished influence of information about odds and outcomes in the 'hot' condition. This work suggests that in arousing or exciting situations where outcomes are directly experienced, adolescents are less influenced by their explicit knowledge of

the probabilities of potential negative outcomes, and are more willing to take risks to obtain potential rewards.

The presence of peers is another uniquely powerful context that shapes adolescents' decisions [68]. Inspired by statistics showing that peer-aged passengers predict a precipitous rise in traffic fatalities among adolescent drivers [69], controlled laboratory studies using driving simulation games have found that adolescents choose to speed through a yellow light, rather than stop, more often when a peer observes their driving, whereas adults are unaffected by peer monitoring [70,71]. Similarly, adolescents show exaggerated delay discounting in the presence of peers [72], and peripubertal but not adult rodents demonstrate an age-unique increase in time spent consuming alcohol in the presence of peer-aged conspecifics [73], suggesting that peers may influence impulsive or risky decision-making across multiple domains.

Social modulation of risky behavior is perhaps unsurprising given the intensive social reorientation that characterizes adolescence [51,74]. Dramatic changes in peer relationships yield a greater importance assigned to peers, which could manifest as a greater reliance on peers' attitudes as a factor in decision value computations (e.g., [75]). Indeed, reward-related signals in the ventral striatum are intensified when adolescents choose to run a yellow light while a friend is monitoring risky decisions, compared to those of adults as well as to when they are alone [70]. However, adolescent attunement to the social environment is perhaps even more subtle than originally thought — merely being looked at by a peer is sufficient to induce uniquely high levels of physiological arousal in adolescents and modulation of corticostriatal valuation systems [76,77]. While peers are clearly influential during adolescence behavior, peers do not uniformly influence adolescents' reward valuation processes [78]. As the majority of tasks in which peer modulation of risky decision-making has been observed do not permit identification of the underlying decision computations that are affected, further research is warranted to clarify precisely how adolescent decision-making is shaped by social context.

Conclusions

Independent decision-making is a burgeoning challenge for adolescents, who are often stereotyped as making poor choices in everyday life. Scientific evidence is emerging to suggest that adolescents' decision-making is indeed unique, and that their patterns of uniqueness can be partially attributed to normative maturational changes in brain function.

Although adolescents appear to have full access to many of the cognitive foundations of decision-making, several aspects of decision-making such as intertemporal choice, prospective evaluation, and integration of positive and negative feedback are not yet tuned to typical adult

levels. Still other processes that inform decision-making are uniquely amplified during adolescence: learning from direct experience, reward reactivity, tolerance of ambiguity, and context-dependent orientation toward risk in exciting or peer-laden situations.

Greater insight into adolescent decision processes can be gained by considering the putative neurodevelopmental changes that contribute to biased decision computations. On the basis of the adult literature, the amplified components of decisions are largely signaled by neural systems that assign reward or salience value to information in the environment such as the striatum. This observation is broadly consistent with the nonlinear functional developmental trajectories for these regions. Conversely, those aspects of decisions that require reliance on abstract goals, distal outcomes, and complex cost–benefit calculation are thought to be mediated by interactions between subcortical and cortical systems, including a prominent role for the lateral prefrontal cortex. Therefore, the late development of the prefrontal cortex, and continued development of corticostriatal connectivity, could constrain the utilization of such strategic aspects of decision-making in adolescence.

Although adolescents' decision-making is not adult-like, it is developmentally normative. Thus, adolescents' unique decision computations may be optimized for the fulfillment of the specific goals of this developmental phase. Adolescents are tasked with attaining independence despite limited amounts of direct experience. Therefore, it might be advantageous for the adolescent brain to be attuned to more proximal outcomes, to be tolerant of uncertainty, and to benefit from robust learning signals that can entrain a richer experience base to scaffold the transition to independence.

Conflict of interest statement

Nothing declared.

Acknowledgements

This work was supported by the National Institute of Mental Health (R00MH087813; LHS), the National Science Foundation (CAREER 1452530; LHS), the National Institute on Drug Abuse (R03DA038701; CAH) and a generous gift from the Mortimer D. Sackler MD family (CAH). We thank Catherine Insel for helpful comments on a draft of this manuscript.

References and recommended reading

Papers of particular interest, published within the period of review, have been highlighted as:

- of special interest
 - of outstanding interest
1. Giedd JN, Vaituzis AC, Hamburger SD, Lange N, Rajapakse JC, Kaysen D, Vauss YC, Rapoport JL: **Quantitative MRI of the temporal lobe, amygdala, and hippocampus in normal human development: ages 4–18 years.** *J Comp Neurol* 1996, **366**: 223–230.
 2. Giedd JN, Blumenthal J, Jeffries NO, Castellanos FX, Liu H, Zijdenbos A, Paus T, Evans AL, Rapoport J: **Brain development during childhood and adolescence: a longitudinal MRI study.** *Nat Neurosci* 1999, **2**:861–863.
 3. Casey BJ, Giedd JN, Thomas KM: **Structural and functional brain development and its relation to cognitive development.** *Biol Psychol* 2000, **54**:241–247.
 4. Østby Y, Tamnes CK, Fjell AM, Walhovd KB: **Morphometry and connectivity of the fronto-parietal verbal working memory network in development.** *Neuropsychologia* 2011, **49**:3854–3862.
 5. Tamnes CK, Østby Y, Walhovd KB, Westlye LT, Due-Tønnessen P, Fjell AM: **Neuroanatomical correlates of executive functions in children and adolescents: a magnetic resonance imaging (MRI) study of cortical thickness.** *Neuropsychologia* 2010, **48**:2496–2508.
 6. Andersen SL, Thompson AT, Rutstein M, Hostetter JC, Teicher MH: **Dopamine receptor pruning in prefrontal cortex during the periadolescent period in rats.** *Synapse* 2000, **37**:167–169.
 7. Andersen SL, Dumont NL, Teicher MH: **Developmental differences in dopamine synthesis inhibition by (±)-7-OH-DPAT.** *Naunyn-Schmiedeberg's Arch Pharmacol* 1997, **356**:173–181.
 8. Galvan A, Hare TA, Parra CE, Penn J, Voss H, Glover G, Casey BJ: **Earlier development of the accumbens relative to orbitofrontal cortex might underlie risk-taking behavior in adolescents.** *J Neurosci* 2006, **26**:6885–6892.
 9. Braams BR, van Duijvenvoorde AC, Peper JS, Crone EA: **Longitudinal changes in adolescent risk-taking: a comprehensive study of neural responses to rewards, pubertal development, and risk-taking behavior.** *J Neurosci* 2015, **35**:7226–7238.
 - A large, definitive, longitudinal assessment of the reliability of hyperresponsive ventral striatal responses to rewards and relationships with puberty and real life risky behavior.
 10. Barkley-Levenson EE, Galvan A: **Neural representation of expected value in the adolescent brain.** *Proc Natl Acad Sci U S A* 2014, **111**:1646–1651.
 11. Ernst M, Pine DS, Hardin M: **Triadic model of the neurobiology of motivated behavior in adolescence.** *Psychol Med* 2006, **36**:299–312.
 12. Somerville LH, Casey BJ: **Developmental neurobiology of cognitive control and motivational systems.** *Curr Opin Neurobiol* 2010, **20**:236–241.
 13. Steinberg L: **A dual systems model of adolescent risk-taking.** *Dev Psychobiol* 2010, **52**:216–224.
 14. Haber SN, Kim K-S, Maily P, Calzavara R: **Reward-related cortical inputs define a large striatal region in primates that interface with associative cortical connections, providing a substrate for incentive-based learning.** *J Neurosci* 2006, **26**:8368–8376.
 15. Luciana M, Collins PF: **Incentive motivation, cognitive control, and the adolescent brain: is it time for a paradigm shift?** *Child Dev Perspect* 2012, **6**:392–399.
 - This provocative review emphasizes unique linkages between incentive motivation, dopamine, and learning during adolescence.
 16. Galvan A: **Adolescent development of the reward system.** *Front Hum Neurosci* 2010, **4**:6.
 17. Harden KP, Tucker-Drob EM: **Individual differences in the development of sensation seeking and impulsivity during adolescence: further evidence for a dual systems model.** *Dev Psychol* 2011, **47**:739.
 18. Daw ND, Doya K: **The computational neurobiology of learning and reward.** *Curr Opin Neurobiol* 2006, **16**:199–204.
 19. van den Bos W, Cohen MX, Kahnt T, Crone EA: **Striatum-medial prefrontal cortex connectivity predicts developmental changes in reinforcement learning.** *Cereb Cortex* 2012, **22**:1247–1255.
 - This study characterized changes in neural connectivity underlying age-related variation in the integration of positive and negative feedback across development.

114 Neuroeconomics

20. Javadi AH, Schmidt DH, Smolka MN: **Differential representation of feedback and decision in adolescents and adults.** *Neuropsychologia* 2014, **56**:280-288.
21. Jones RM, Somerville LH, Li J, Ruberry EJ, Powers A, Mehta N, Dyke JP, Casey BJ: **Adolescent-specific patterns of behavior and neural activity during social reinforcement learning.** *Cogn Affect Behav Neurosci* 2014, **14**:683-697.
22. van Duijvenvoorde AC, Zanolie K, Rombouts SA, Raijmakers ME, Crone EA: **Evaluating the negative or valuing the positive? Neural mechanisms supporting feedback-based learning across development.** *J Neurosci* 2008, **28**:9495-9503.
23. Decker JH, Lourenco FS, Doll BB, Hartley CA: **Experiential reward learning outweighs instruction prior to adulthood.** *Cogn Affect Behav Neurosci* 2015:1-11.
24. Cohen JR, Asarnow RF, Sabb FW, Bilder RM, Bookheimer SY, Knowlton BJ, Poldrack RA: **A unique adolescent response to reward prediction errors.** *Nat Neurosci* 2010, **13**:669-671.
- This study observed that neural prediction errors in the striatum exhibited peak magnitude during adolescence.
25. Hauser TU, Iannaccone R, Walitza S, Brandeis D, Brem S: **Cognitive flexibility in adolescence: neural and behavioral mechanisms of reward prediction error processing in adaptive decision making during development.** *Neuroimage* 2015, **104**:347-354.
26. Ernst M, Nelson EE, Jazbec S, McClure EB, Monk CS, Leibenluft E, Blair J, Pine DS: **Amygdala and nucleus accumbens in responses to receipt and omission of gains in adults and adolescents.** *Neuroimage* 2005, **25**:1279-1291.
27. Galvan A, McGlennen KM: **Enhanced striatal sensitivity to aversive reinforcement in adolescents versus adults.** *J Cogn Neurosci* 2013, **25**:284-296.
28. van der Schaaf ME, Warmerdam E, Crone EA, Cools R: **Distinct linear and non-linear trajectories of reward and punishment reversal learning during development: relevance for dopamine's role in adolescent decision making.** *Dev Cogn Neurosci* 2011, **1**:578-590.
29. Christakou A, Gershman SJ, Niv Y, Simmons A, Brammer M, Rubia K: **Neural and psychological maturation of decision-making in adolescence and young adulthood.** *J Cogn Neurosci* 2013, **25**:1807-1823.
30. Niv Y, Edlund JA, Dayan P, O'Doherty JP: **Neural prediction errors reveal a risk-sensitive reinforcement-learning process in the human brain.** *J Neurosci* 2012, **32**:551-562.
31. Frank MJ, Fossella JA: **Neurogenetics and pharmacology of learning, motivation, and cognition.** *Neuropsychopharmacology* 2011, **36**:133-152.
32. Dolan RJ, Dayan P: **Goals and habits in the brain.** *Neuron* 2013, **80**:312-325.
33. Decker JH, Otto AR, Daw ND, Casey BJ, Hartley CA: **The developmental emergence of model-based learning.** *Society for Neuroscience; Washington, DC: 2014.*
34. Millstein SG, Halpern-Felsher BL: **Judgments about risk and perceived invulnerability in adolescents and young adults.** *J Res Adolesc* 2002, **12**:399-422.
35. Reyna VF, Farley F: **Risk and rationality in adolescent decision making: implications for theory, practice, and public policy.** *Psychol Sci Public Interest* 2006, **7**:1-44.
- This comprehensive review emphasizes the highly rational features of adolescent risk estimation and decision making.
36. Schlottmann A, Wilkening F: **Judgment and decision making in young children.** In *Judgment and Decision Making as a Skill.* Edited by Dhami M, Schlotmann A, Waldmann M. Cambridge University Press; 2011:55-83.
37. Barkley-Levenson EE, Van Leijenhorst L, Galván A: **Behavioral and neural correlates of loss aversion and risk avoidance in adolescents and adults.** *Dev Cogn Neurosci* 2013, **3**:72-83.
38. Tymula A, Belmaker LAR, Roy AK, Ruderman L, Manson K, Glimcher PW, Levy I: **Adolescents' risk-taking behavior is driven by tolerance to ambiguity.** *Proc Natl Acad Sci U S A* 2012, **109**:17135-17140.
- This study dissociating attitudes towards risk and ambiguity in adolescents and adults observed greater tolerance of ambiguity, but not risk, in adolescents.
39. Defoe IN, Dubas JS, Figner B, van Aken MA: **A meta-analysis on age differences in risky decision making: adolescents versus children and adults.** *Psychol Bull* 2015, **1**:48-84.
- This meta-analysis of risky decision-making across development observed greater risk taking in adolescents versus adults.
40. Bechara A, Damasio H, Tranel D, Damasio AR: **Deciding advantageously before knowing the advantageous strategy.** *Science* 1997, **275**:1293-1295.
41. Lejuez CW, Read JP, Kahler CW, Richards JB, Ramsey SE, Stuart GL, Strong DR, Brown RA: **Evaluation of a behavioral measure of risk taking: the Balloon Analogue Risk Task (BART).** *J Exp Psychol Appl* 2002, **8**:75.
42. Figner B, Mackinlay RJ, Wilkening F, Weber EU: **Affective and deliberative processes in risky choice: age differences in risk taking in the Columbia Card Task.** *J Exp Psychol Learn Mem Cogn* 2009, **35**:709-730.
43. Hertwig R, Erev I: **The description-experience gap in risky choice.** *Trends Cogn Sci* 2009, **13**:517-523.
44. Tobler PN, Christopoulos GI, O'Doherty JP, Dolan RJ, Schultz W: **Risk-dependent reward value signal in human prefrontal cortex.** *Proc Natl Acad Sci U S A* 2009, **106**:7185-7190.
45. Mohr PN, Biele G, Heekeren HR: **Neural processing of risk.** *J Neurosci* 2010, **30**:6613-6619.
46. Preuschoff K, Quartz SR, Bossaerts P: **Human insula activation reflects risk prediction errors as well as risk.** *J Neurosci* 2008, **28**:2745-2752.
47. van Duijvenvoorde AC, Huizenga HM, Somerville LH, Delgado MR, Powers A, Weeda WD, Casey B, Weber EU, Figner B: **Neural correlates of expected risks and returns in risky choice across development.** *J Neurosci* 2015, **35**:1549-1560.
- This study characterized the neural substrates of trial-by-trial variation in risk and return measures in a risky choice task across development.
48. Rodman AM, Insel C, Skwara AC, Kastman EK, Sasse SF, Somerville LH: **Reduced cognitive interference by temporal uncertainty in adolescence.** *Association for Psychological Science; New York, NY: 2015.*
49. Spear LP: **The adolescent brain and age-related behavioral manifestations.** *Neurosci Biobehav Rev* 2000, **24**:417-463.
- This seminal article identifies striking parallels in non-human and human developmental literatures.
50. Adriani W, Chiarotti F, Laviola G: **Elevated novelty seeking and peculiar d-amphetamine sensitization in periadolescent mice compared with adult mice.** *Behav Neurosci* 1998, **112**:1152-1166.
51. Crone EA, Dahl RE: **Understanding adolescence as a period of social-affective engagement and goal flexibility.** *Nat Rev Neurosci* 2012, **13**:636-650.
52. Gopnik A, Griffiths TL, Lucas CG: **When younger learners can be better (or at least more open-minded) than older ones.** *Curr Dir Psychol Sci* 2015, **24**:87-92.
53. Peters J, Büchel C: **The neural mechanisms of inter-temporal decision-making: understanding variability.** *Trends Cogn Sci* 2011, **15**:227-239.
54. Scheres A, Dijkstra M, Ainslie E, Balkan J, Reynolds B, Sonuga-Barke E, Castellanos FX: **Temporal and probabilistic discounting of rewards in children and adolescents: effects of age and ADHD symptoms.** *Neuropsychologia* 2006, **44**:2092-2103.
55. Olson EA, Collins PF, Hooper CJ, Muetzel R, Lim KO, Luciana M: **White matter integrity predicts delay discounting behavior in 9- to 23-year-olds: a diffusion tensor imaging study.** *J Cogn Neurosci* 2009, **21**:1406-1421.

56. Steinberg L, Graham SJ, O'Brien L, Woolard J, Cauffman E, Banich M: **Age differences in future orientation and delay discounting.** *Child Dev* 2009, **80**:28-44.
57. Christakou A, Brammer M, Rubia K: **Maturation of limbic corticostriatal activation and connectivity associated with developmental changes in temporal discounting.** *Neuroimage* 2011, **54**:1344-1354.
58. van den Bos W, Rodriguez CA, Schweitzer JB, McClure SM: **Adolescent impatience decreases with increased frontostriatal connectivity.** *Proc Natl Acad Sci U S A* 2015, **112**:E3765-E3774.
59. Steinbeis N, Haushofer J, Fehr E, Singer T: **Development of behavioral control and associated vmPFC-DLPFC connectivity explains children's increased resistance to temptation in intertemporal choice.** *Cereb Cortex* 2014.
60. Bartra O, McGuire JT, Kable JW: **The valuation system: a coordinate-based meta-analysis of BOLD fMRI experiments examining neural correlates of subjective value.** *Neuroimage* 2013, **76**:412-427.
61. Casey B: **Beyond simple models of self-control to circuit-based accounts of adolescent behavior.** *Annu Rev Psychol* 2015, **66**:295-319.
62. Vink M, Zandbelt BB, Gladwin T, Hillegers M, Hoogendam JM, van den Wildenberg WPM, Du Plessis S, Kahn RS: **Frontostriatal activity and connectivity increase during proactive inhibition across adolescence and early adulthood.** *Hum Brain Mapp* 2014, **35**:4415-4427.
63. Olson EA, Hooper CJ, Collins P, Luciana M: **Adolescents' performance on delay and probability discounting tasks: contributions of age, intelligence, executive functioning, and self-reported externalizing behavior.** *Pers Individ Dif* 2007, **43**:1886-1897.
64. Benoit RG, Gilbert SJ, Burgess PW: **A neural mechanism mediating the impact of episodic prospection on farsighted decisions.** *J Neurosci* 2011, **31**:6771-6779.
65. Østby Y, Walhovd KB, Tamnes CK, Grydeland H, Westlye LT, Fjell AM: **Mental time travel and default-mode network functional connectivity in the developing brain.** *Proc Natl Acad Sci U S A* 2012, **109**:16800-16804.
66. Benes FM: **Myelination of cortical-hippocampal relays during late adolescence.** *Schizophr Bull* 1989, **15**:585.
67. Christakou A: **Present simple and continuous: emergence of self-regulation and contextual sophistication in adolescent decision-making.** *Neuropsychologia* 2014, **65**:302-312.
68. Albert D, Chein J, Steinberg L: **The teenage brain peer influences on adolescent decision making.** *Curr Dir Psychol Sci* 2013, **22**:114-120.
69. Chen L-H, Baker SP, Braver ER, Li G: **Carrying passengers as a risk factor for crashes fatal to 16- and 17-year-old drivers.** *JAMA* 2000, **283**:1578-1582.
70. Chein J, Albert D, O'Brien L, Uckert K, Steinberg L: **Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry.** *Dev Sci* 2011, **14**:F1-F10.
71. Gardner M, Steinberg L: **Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: an experimental study.** *Dev Psychol* 2005, **41**:625-635.
72. Weigard A, Chein J, Albert D, Smith A, Steinberg L: **Effects of anonymous peer observation on adolescents' preference for immediate rewards.** *Dev Sci* 2014, **17**:71-78.
73. Logue S, Chein J, Gould T, Holliday E, Steinberg L: **Adolescent mice, unlike adults, consume more alcohol in the presence of peers than alone.** *Dev Sci* 2014, **17**:79-85.
74. Nelson EE, Leibenluft E, McClure EB, Pine DS: **The social re-orientation of adolescence: a neuroscience perspective on the process and its relation to psychopathology.** *Psychol Med* 2005, **35**:163-174.
75. Knoll LJ, Magis-Weinberg L, Speekenbrink M, Blakemore S-J: **Social influence on risk perception during adolescence.** *Psychol Sci* 2015.
76. Somerville LH: **The teenage brain: sensitivity to social evaluation.** *Curr Dir Psychol Sci* 2013, **22**:129-135.
77. Somerville LH, Jones RM, Ruberry EJ, Dyke JP, Glover G, Casey B: **The medial prefrontal cortex and the emergence of self-conscious emotion in adolescence.** *Psychol Sci* 2013, **24**:1554-1562.
78. Lourenco FS, Decker JH, Pedersen GA, Dellarco DV, Casey B, Hartley CA: **Consider the source: adolescents and adults similarly follow older adult advice more than peer advice.** *PLoS One* 2015, **10**:e0128047.

EXHIBIT 41

Are Adolescents Less Mature Than Adults?

Minors' Access to Abortion, the Juvenile Death Penalty, and the Alleged

APA "Flip-Flop"

Laurence Steinberg
Elizabeth Cauffman
Jennifer Woolard
Sandra Graham
Marie Banich

Temple University
University of California, Irvine
Georgetown University
University of California, Los Angeles
University of Colorado

The American Psychological Association's (APA's) stance on the psychological maturity of adolescents has been criticized as inconsistent. In its Supreme Court amicus brief in Roper v. Simmons (2005), which abolished the juvenile death penalty, APA described adolescents as developmentally immature. In its amicus brief in Hodgson v. Minnesota (1990), however, which upheld adolescents' right to seek an abortion without parental involvement, APA argued that adolescents are as mature as adults. The authors present evidence that adolescents demonstrate adult levels of cognitive capability earlier than they evince emotional and social maturity. On the basis of this research, the authors argue that it is entirely reasonable to assert that adolescents possess the necessary skills to make an informed choice about terminating a pregnancy but are nevertheless less mature than adults in ways that mitigate criminal responsibility. The notion that a single line can be drawn between adolescence and adulthood for different purposes under the law is at odds with developmental science. Drawing age boundaries on the basis of developmental research cannot be done sensibly without a careful and nuanced consideration of the particular demands placed on the individual for "adult-like" maturity in different domains of functioning.

Keywords: adolescents, abortion, juvenile death penalty, Supreme Court, APA

In its landmark 2005 decision abolishing the juvenile death penalty (*Roper v. Simmons*, 2005), the U.S. Supreme Court held that the inherent immaturity of adolescents relative to adults mitigated teenagers' criminal responsibility to the extent that it barred the imposition of capital punishment for crimes committed under the age of 18, regardless of their heinousness. Prior to this decision, in the United States, individuals could be executed for capital crimes committed at the age of 16 or older. By a 5-to-4 vote, the Court ruled that this age boundary should be set at 18, rather than 16.

Developmental science was front and center in the Court's ruling, which drew extensively on an amicus curiae brief submitted by the American Psychological Association

(APA, 2004) and was informed by a recent summary of relevant research on psychological development during adolescence that was published in this journal (Steinberg & Scott, 2003). Writing for the majority, Justice Anthony Kennedy drew attention to three specific aspects of adolescents' immaturity that diminished their criminal culpability: their underdeveloped sense of responsibility (and difficulty controlling their impulses), their heightened vulnerability to peer pressure, and the unformed nature of their characters. As Justice Kennedy wrote,

First, as any parent knows and as the scientific and sociological studies respondent and his amici cite tend to confirm, "[a] lack of maturity and an underdeveloped sense of responsibility are found in youth more often than in adults and are more understandable among the young. These qualities often result in impetuous and ill-considered actions and decisions." . . . The second area of difference is that juveniles are more vulnerable or susceptible to negative influences and outside pressures, including peer pressure. . . . The third broad difference is that the character of a juvenile is not as well formed as that of an adult. The personality traits of juveniles are more transitory, less fixed. . . . These differences render suspect any conclusion that a juvenile falls among the worst offenders. (*Roper v. Simmons*, 2005, pp. 15–16)

The position taken by APA in its brief—that adolescents are inherently less blameworthy than adults as a consequence of their developmental immaturity—was noteworthy not only because it proved so influential to the Court's decision but because it appeared, on its face, to contradict a stance taken by APA in a previous U.S. Su-

Editor's note. June P. Tangney served as the action editor for this article.

Author's note. Laurence Steinberg, Department of Psychology, Temple University; Elizabeth Cauffman, Department of Psychology and Social Behavior, University of California, Irvine; Jennifer Woolard, Department of Psychology, Georgetown University; Sandra Graham, Psychological Studies in Education, University of California, Los Angeles; Marie Banich, Departments of Psychology and Psychiatry, University of Colorado.

Correspondence concerning this article should be addressed to Laurence Steinberg, Department of Psychology, Temple University, Philadelphia, PA 19122. E-mail: lds@temple.edu



**Laurence
Steinberg**

preme Court case, *Hodgson v. Minnesota* (1990). In that case, which concerned a minor's right to obtain an abortion without parental notification, APA had argued that because adolescents had decision-making skills comparable to those of adults, there was no reason to require teenagers to notify their parents before terminating a pregnancy (APA, 1987, 1989). Thus, in *Roper*, APA argued that science showed that adolescents were not as mature as adults, whereas in *Hodgson*, it argued that the science showed that they were.

The apparent contradiction in these views did not go unnoticed. Justice Kennedy explicitly asked at oral argument in *Roper* if the APA had "flip-flopped" between 1989 (when its final amicus brief was filed in the abortion case) and 2004 (when its brief was filed in the juvenile death penalty case). The flip-flop issue also was raised by those who disagreed with the Court's decision to abolish the juvenile death penalty. Indeed, in his dissenting opinion in *Roper v. Simmons* (2005), Justice Antonin Scalia drew unambiguous attention to this issue:

[T]he American Psychological Association (APA), which claims in this case that scientific evidence shows persons under 18 lack the ability to take moral responsibility for their decisions, has previously taken precisely the opposite position before this very Court. In its brief in *Hodgson v. Minnesota*, 497 U. S. 417 (1990), the APA found a "rich body of research" showing that juveniles are mature enough to decide whether to obtain an abortion without parental involvement. . . . The APA brief, citing psychology treatises and studies too numerous to list here, asserted: "[B]y middle adolescence (age 14–15) young people develop abilities similar to adults in reasoning about moral dilemmas, understanding social rules and laws, [and] reasoning about interpersonal relationships and interpersonal problems." (Justice Scalia, dissenting, pp. 11–12)

The petitioner in *Roper*, the State of Missouri, made a similar point in its brief:

Ultimately, Simmons wants the Court to declare that [drawing the age boundary for purposes of death penalty eligibility at 16] is now "without penological justification" not based on research that uniformly reaches that conclusion, but based on inconsistent research, viewed through the lense [sic] of a stereotype that the American Psychological Association decried in *Hodgson*: "[T]he assumption that adolescents as a group are less able than adults to understand, reason and make decisions about intellectual and social dilemmas is not supported by contemporary psychological theory and research." (*Roper*, 2004, p. 11)

Concerns about reconciling the scientific arguments offered in the two cases were also raised by abortion rights advocates, but in a different context. Indeed, after Laurence Steinberg met with the Executive Committee of the Society for Research on Adolescence, asking for the organization's endorsement of the APA stance in *Roper*, the committee decided not to sign on to the APA brief, fearing that the argument that adolescents were not as mature as adults (and thus ineligible for capital punishment) would come back to haunt those who had worked so hard to secure the abortion rights of young women. As it turns out, these worries were not unfounded. Within two years of the *Roper* decision, the U.S. Supreme Court heard *Ayotte v. Planned Parenthood of Northern New England* (2006), which, like *Hodgson*, concerned minors' access to abortion without parental involvement. Opponents of adolescents' autonomous abortion rights had taken the Court's characterization of adolescent immaturity in the juvenile death penalty case and used it to argue in favor of parental involvement requirements. Citing the *Roper* decision, they argued,

Parental involvement is critical to ensure not only that the adolescent's choice is informed, but that it is freely made and not the result of coercion or duress. . . . These concerns are heightened for adolescents who, as this Court has recently observed, are more susceptible than adults to "outside pressure" and other "negative influences," and more likely than adults to make decisions that are "impetuous and ill-considered." *Roper v. Simmons*, 125 S.Ct. 1183, 1195 (2005). (*Ayotte v. Planned Parenthood of Northern New England*, 2006, p. 15)

It is easy to see why many criticized the APA for its apparently contradictory positions. On the face of it, the APA position in the juvenile death penalty case was in direct opposition to the stance it took in *Hodgson*. In its amicus brief arguing for adolescents' abortion rights, for example, APA stated,

[B]y age 14 most adolescents have developed adult-like intellectual and social capacities [italics added] including specific abilities outlined in the law as necessary for understanding treatment alternatives, considering risks and benefits, and giving legally competent consent. (APA, 1989, p. 20)

However, in its amicus brief arguing against the juvenile death penalty, APA stated,

Given that 16- and 17-year-olds as a group are less mature developmentally than adults [italics added], imposing capital punishment on such adolescents does not serve the judicially recognized purposes of the sanction. (APA, 2004, p. 13)

APA responded to accusations that developmental psychologists were trying to have their scientific cake and



**Elizabeth
Cauffman**

eat it too—spinning the science for the sake of youth advocacy—by pointing out that the type of decision under consideration in *Roper* was not the same as that at issue in *Hodgson*:

We [APA] took note of the Hodgson brief in the approval process for APA's brief in [Roper] but concluded that the two cases were distinguishable in several respects. [Roper] and Hodgson, while both dealing with adolescent decision-making, involved very different legal issues and different types of decisions. Therefore the research, which was different in each of the two cases, addressed distinct aspects of adolescent behavior and attributes. (Gilfoyle, 2005, p. 1)

There is no question that the legal issues in *Hodgson* and *Roper* differed. The abortion rights case was a 14th Amendment case involving the amendment's due process clause. The central question considered in *Hodgson* was whether the state had a compelling interest in mandating that an adolescent seeking an abortion be required to first notify both her parents. Several legal issues were relevant, including whether the notification requirement placed an undue burden on adolescents (especially those whose parents were divorced or estranged) and whether providing for a judicial hearing as an alternative to parental notification (known as a "judicial bypass") was acceptable, but the most relevant for the present discussion concerned the competence of adolescents to make informed and sound health care decisions on their own. If it could be concluded that adolescents were sufficiently competent to make an informed decision about whether to terminate a pregnancy, the state's interest in requiring parental notification would be rendered less compelling. Ultimately, the Court ruled that requiring parental notification *was* constitutional so long as a bypass provision was part of the law.

The juvenile death penalty case was an 8th Amendment case involving the amendment's cruel and unusual punishments clause. A central issue in *Roper* was whether adolescents were mature enough to be held to adult levels of criminal blameworthiness and, in particular, to a level of blameworthiness that potentially warranted capital punishment; if they were not, the juvenile death penalty was excessively cruel. Under a bedrock principle of American criminal law known as "penal proportionality," the punishment a guilty party receives should be in proportion to his or her culpability for the criminal act, and certain factors are accepted as mitigating the actor's culpability. These mitigating factors include diminished decision-making capability (e.g., decision making that is impulsive or short-sighted), exposure to coercion, and evidence of the offender's otherwise good character (Steinberg & Scott, 2003). As noted earlier, the Court ruled that the inherent immaturity of adolescents, with respect to the impetuosity of their decision making, their susceptibility to coercion, and their unformed characters, made them categorically less blameworthy than the average criminal and therefore not eligible for a punishment that was reserved for only the most culpable offenders.

Whether APA in fact "flip-flopped" or, worse yet, tried to have it both ways, as its critics have contended, is an exceedingly important question, both with respect to the decisions about where to draw legal boundaries between adolescents and adults for various purposes and with respect to APA's scientific credibility more generally. As some of us have written elsewhere, "scientists' authority to enter the policy arena rests largely on the credibility of their research findings" (Grisso & Steinberg, 2005, p. 620). If APA's statements about the state of scientific knowledge are seen as advocacy masquerading as research, the integrity of the Association's scientific mission is threatened. After all, in both *Hodgson* and *Roper*, APA took a position that could be fairly characterized as, at the very least, friendly to youth advocates. It is crucial, therefore, to examine the issue empirically. That is the focus of the present article.

For the past several years, as members of the MacArthur Foundation Research Network on Adolescent Development and Juvenile Justice, we have been studying age differences in many of the cognitive and psychosocial capacities that have been at issue in the Supreme Court cases discussed above. We have been studying basic intellectual abilities, such as working memory and verbal fluency, but also aspects of psychosocial development, including impulse control (Steinberg et al., 2008), future orientation (Steinberg et al., 2009), reward sensitivity (Cauffman et al., in press), sensation seeking (Steinberg et al., 2008), and susceptibility to peer influence (Steinberg & Monahan, 2007). To our knowledge, ours is the first study to include both cognitive and psychosocial measures administered to the same sample, to include an ethnically and socioeconomically diverse group of individuals, and to span the period from preadolescence through young adulthood.



**Jennifer
Woolard**

On the basis of this work, some of which we summarize in the pages that follow, we believe that APA's seemingly contradictory positions in *Hodgson* and *Roper* are in fact quite compatible with research on age differences in cognitive and psychosocial capacities. More specifically, our findings, as well as those of other researchers, suggest that whereas adolescents and adults perform comparably on cognitive tests measuring the sorts of cognitive abilities that were referred to in the *Hodgson* brief—abilities that permit logical reasoning about moral, social, and interpersonal matters—adolescents and adults are not of equal maturity with respect to the psychosocial capacities listed by Justice Kennedy in the majority opinion in *Roper*—capacities such as impulse control and resistance to peer influence. Not only were the legal issues different in the two cases, but so are the circumstances surrounding abortion decisions and criminal behavior, and therefore, the relevant dimensions along which adolescents and adults should be compared differ as well. Unlike adolescents' decisions to commit crimes, which are usually rash and made in the presence of peers, adolescents' decisions about terminating a pregnancy can be made in an unhurried fashion and in consultation with adults.

We recognize that not all abortion decisions are deliberative, rational, and autonomous and that not all criminal decisions are impulsive, emotional, and influenced by others. After all, any decision about whether to abort a pregnancy or carry it to term has an emotional component, involves both immediate and long-term consequences, and may be influenced by the opinions of family and friends. By the same token, adolescents' crimes are occasionally strategic, planned in advance, and executed alone. In general, though, when contemplating an abortion, an adolescent has time to deliberate before making a final choice and

has an opportunity to consult with an adult expert, whereas the circumstances leading up to the typical adolescent criminal offense—robbing a convenience store, for instance—are characterized by heightened emotional arousal, time pressure, and peer influence.

For example, studies indicate that about half of all pregnant adolescents contemplating an abortion whose parents are unaware of the situation consult with a nonparental adult other than medical staff (e.g., a teacher, school counselor, clergy person, older relative, or adult friend of the family); this figure is the same among younger (under age 16) and older adolescents (Henshaw & Kost, 1992). Moreover, 35 states require all women seeking an abortion to receive some type of counseling from the abortion provider before the procedure is performed, usually including information about the specific procedure as well as the health risks of abortion and pregnancy (Guttmacher Institute, 2009). Twenty-four states mandate a waiting period of at least 24 hours between the counseling and the medical procedure (Guttmacher Institute, 2009). Thus, it does not appear as if a high proportion of pregnant teenagers decide to terminate a pregnancy under circumstances that are rushed or in the absence of adult advice. In contrast, studies indicate that adolescents' crimes are more often than not impulsive and unplanned (Farrington, 2003) and typically committed with peers (Reiss & Farrington, 1991). Thus, while some of the capabilities relevant to both decision-making contexts no doubt overlap, the circumstances that define "mature" behavior in each are clearly different. Resisting peer influence, thinking before making a decision, and considering the future consequences of one's actions are clearly more important in criminal decision making than abortion decision making, in part because society structures the latter context to promote consultation with adults and avoid hasty decision making.

The importance of maintaining a distinction between cognitive and psychosocial maturity in discussions of the legal status of adolescents is supported by other research that has examined age differences in each of these domains. Studies that have examined logical reasoning abilities in structured situations and basic information-processing skills, for instance, have found no appreciable differences between adolescents age 16 and older and adults; any gains that take place in these domains during adolescence occur very early in the adolescent decade, and improvements after this age are very small (Hale, 1990; Kail, 1997; Keating, 2004; Overton, 1990). The results of the MacArthur Foundation Research Network's earlier study of age differences in competence to stand trial, which depends on individuals' ability to understand facts about a court proceeding and to reason with those facts in a rational fashion, also were consistent with these findings. We found significant differences between the competence-related abilities of adults and those of adolescents who were 15 and younger, but no differences between the abilities of adults and those of adolescents who were 16 and older (Grisso et al., 2003). This general pattern, indicating that adolescents attain adult levels of competence to stand trial somewhere around age 15, has been reported in similar studies of



**Sandra
Graham**

decision making across a wide variety of domains (e.g., Grisso, 1980; Jacobs-Quadrel, Fischhoff, & Davis, 1993) and in many studies of age differences in individuals' competence to provide informed consent (Belter & Grisso, 1984; Grisso & Vierling, 1978; Gustafson & McNamara, 1987; Weithorn & Campbell, 1982).

In contrast, the literature on age differences in psychosocial characteristics such as impulsivity, sensation seeking, future orientation, and susceptibility to peer pressure shows continued development well beyond middle adolescence and even into young adulthood (Scott, Repucci, & Woolard, 1995; Steinberg & Cauffman, 1996), although few studies have gone much beyond adolescence (but see Cauffman & Steinberg, 2000, for an exception). Consistent with this literature, and in contrast to the pattern of age differences seen in the information-processing, logical reasoning, and informed consent literatures, studies of age differences in the sorts of risky behavior likely to be influenced by the psychosocial factors listed above—such as reckless driving, binge drinking, crime, and spontaneous unprotected sex—indicate that risky behavior is significantly more common during late adolescence and early adulthood than after (Steinberg, 2007). In other words, although adolescents may demonstrate adult-like levels of maturity in some respects by the time they reach 15 or 16, in other respects they show continued immaturity well beyond this point in development.

The MacArthur Juvenile Capacity Study

Participants

The MacArthur Juvenile Capacity Study was designed to examine age differences in a variety of cognitive and

psychosocial capacities that are relevant to debates about the relative maturity of adolescents and adults, especially as they affect judgments of criminal blameworthiness. There were five data collection sites in the study: Los Angeles; Irvine, CA; Denver; Philadelphia; and Washington, DC. Data for the present study come from 935 individuals ranging in age from 10 to 30 years ($M = 17.84$ years). Participants were recruited via newspaper advertisements and flyers posted at community organizations, Boys & Girls Clubs, churches, community colleges, and local places of business in neighborhoods targeted to have an average household education level of "some college" according to 2000 U.S. Census data. Because we were interested in characterizing the capacities of "average" adolescents and adults, we did not target individuals on the basis of their involvement with the legal system but sought instead to survey an ethnically and socioeconomically diverse sample of individuals in the age range of interest.

Individuals who were interested in the study were asked to call the research office listed on the flyer. Members of the research team described the nature of the study to prospective participants over the telephone and invited those interested to participate. Given this recruitment strategy, it is not possible to know how many potential participants saw the advertisements, what proportion responded, and whether those who responded were different from those who did not, although the education level of the sample is comparable to that of the people in the neighborhoods from which it was drawn.

Data collection took place either at one of the participating university's offices or at a convenient location in the community. Before beginning, participants were provided verbal and written explanations of the study, their confidentiality was assured, and their written consent or assent was obtained. For participants who were under the age of 18, informed consent was obtained from either a parent or a guardian.

Procedure

Prior to data collection, all site project directors and research assistants met at one location for several days of training. The project coordinators and research assistants conducted on-site practice protocol administrations prior to enrolling participants. Participants took part in a two- to two-and-one-half-hour interview that included three sets of measures: (a) a series of computerized tasks designed to assess a range of executive functions (not discussed in this report); (b) a series of questionnaires designed to measure a variety of psychosocial capacities relevant to discussions of how adolescents should be treated by the legal system; and (c) tests of basic intellectual functioning. The tasks and questionnaires were administered on a laptop computer in individual interviews. Research assistants were present to monitor the participant's progress, reading aloud the instructions as each new task was presented and providing assistance as needed. To keep participants engaged in the computer tasks, we told the participants that they would receive \$35 for participating in the study and that they could obtain up to a total of \$50 (or, for participants who



Marie Banich

were under 14, an additional prize) depending on their performance. In actuality, we paid all participants ages 14–30 the full \$50, and all participants ages 10–13 received \$35 plus a prize (approximately \$15 in value). This strategy was used to increase the motivation to perform well on the tasks but also to ensure that no participants were penalized for their performance. All procedures were approved by the institutional review board of the university associated with the data collection site.

Measures

Of interest in the present report are the demographic measures and IQ (which were used to ensure that the various age groups had comparable social and intellectual backgrounds), the measures of psychosocial capacities, and the tests of basic intellectual functioning.

Demographic variables. Participants provided information about their age, gender, ethnicity, and highest level of education within their household. For youths 17 years of age and younger, household education was based on parents' level of education, as research has indicated that parental education may be the most stable component of a family's social class (Steinberg, Mounts, Lamborn, & Dornbusch, 1991). For participants 18 years of age and older, their own educational attainment was used to index this construct. In order to have cells with sufficiently large and comparably sized subsamples for purposes of data analysis, we created age groups as follows: 10–11, 12–13, 14–15, 16–17, 18–21, 22–25, and 26–30 years. The age groups did not differ with respect to gender or ethnicity but did differ, albeit modestly, with respect to household education. Accordingly, all subsequent analyses controlled for this variable. Demographic characteristics of the sample are presented in Table 1.

IQ. The Wechsler Abbreviated Scale of Intelligence (WASI) Full-Scale IQ Two-Subtest (FSIQ-2) (Psychological Corporation, 1999) was used to produce an estimate of general intellectual ability based on two (Vocabulary and Matrix Reasoning) of the four subtests. The WASI can be administered in approximately 15 minutes and is correlated with the Wechsler Intelligence Scale for Children ($r = .81$) and the Wechsler Adult Intelligence Scale ($r = .87$). It has been normed for individuals between the ages of 6 to 89 years. Because there were small but significant differences between the age groups in mean IQ, this variable was controlled for in all subsequent analyses.

Psychosocial maturity. The battery of instruments contained self-report measures of five capacities frequently mentioned in discussions about age differences in maturity and their relevance to legal policy. Table 2 lists these measures and provides sample items from each.

Three widely used and well-validated Likert-scale-type instruments were used to assess *risk perception* (the extent to which one perceives a potentially dangerous or harmful activity as risky), *sensation seeking* (the extent to which one actively seeks experiences that provide thrills), and *impulsivity* (the extent to which one acts without thinking or has difficulty controlling impulses). Risk perception was assessed using a modified version of a widely used measure developed by Benthin, Slovic, and Severson (1993). The respondent is presented with eight potentially dangerous activities (e.g., riding in a car with a drunk driver, having unprotected sex) and asked to indicate how risky the activity is ($\alpha = .82$).¹ Sensation seeking was assessed using a subset of six items ($\alpha = .70$) from the Sensation Seeking Scale (Zuckerman, Eysenck, & Eysenck, 1978).² Impulsivity was assessed using all 18 items ($\alpha = .73$) from three six-item subscales of the Barratt Impulsiveness Scale (Patton, Stanford, & Barratt, 1995): Motor Impulsivity, Inability to Delay Gratification, and Lack of Perseverance. All three self-report measures have been shown to be significantly correlated with behavioral indices of their associated constructs. In our sample, scores on the impulsivity self-report measure were significantly negatively related to the amount of time participants waited before making their first move on a Tower of London task, and scores on the sensation-seeking questionnaire were significantly correlated with sensation-seeking behavior in a video driving game (Steinberg et al., 2008). In addition, individuals who were less likely to perceive potentially risky behaviors as risky were more likely to report engaging in high-risk behavior.

¹ The original Benthin et al. (1993) measure also contains an item concerning alcohol use. Our analyses indicated that including this item in the scale's construction adversely differentiated the reliability of the scale among the younger and older participants, most likely because the use of alcohol is risky for minors but not necessarily for adults. As a consequence, we dropped that item from our scale computation.

² Many of the items on the full Zuckerman et al. (1978) scale appear to measure impulsivity, not sensation seeking (e.g., "I often do things on impulse.") Because we have a separate measure of impulsivity in our battery, we used only the Zuckerman et al. items that clearly indexed thrill or novelty seeking (see Table 2).

Table 1
Demographic Characteristics of the Sample (N = 935)

Characteristic	Percentage
Age (in years)	
10–11	12.5
12–13	14.7
14–15	13.8
16–17	15.2
18–21	15.9
22–25	14.6
26–30	13.2
Gender	
Male	49.2
Female	50.8
Ethnicity	
African American	29.2
Asian American	15.1
Hispanic	21.2
White	24.0
Other/biracial	9.9
Household education	
High school	11.9
High school graduate	22.8
Some college	34.1
College graduate	21.4
Postcollege	9.7

Two additional psychosocial capacities, *resistance to peer influence* and *future orientation*, were assessed using new self-report measures developed for this program of work. Each used a response format introduced by Harter (1982) in which respondents are presented with two oppos-

ing statements that are both phrased in a socially acceptable fashion, asked to indicate which best describes them, and then asked whether the descriptor is “very true” or “sort of true.” (This format is presumed to reduce social desirability bias.) Resistance to peer influence (Steinberg & Monahan, 2007) was assessed using a 10-item scale ($\alpha = .76$) designed to measure the extent to which individuals change their behavior or opinions in order to follow the crowd. We have no data on the validity of this measure in the current sample, but we do in analyses of data from a large study of serious juvenile offenders. There we found that the presence of antisocial peers in an individual’s network is more highly correlated with the individual’s own criminal behavior among those who report a low ability to resist peer influence on this measure than among those who have equally antisocial peers but score high in self-reported resistance to peer influence (Monahan, Steinberg, & Cauffman, 2007). Studies of the neural underpinnings of resistance to peer influence using this measure have found neurobiological differences between same-age individuals who vary in their resistance to peer influence in ways consistent with the notion that higher scores on this instrument reflect better coordination of affect and thinking (Grosbras et al., 2007; Paus et al., 2008), a key component of psychosocial maturity in our conceptualization of the construct. Future orientation was assessed using a 15-item scale ($\alpha = .80$) that measures the anticipation of future consequences, planning ahead, and thinking about the future. The validity of this measure is supported by our finding that individuals who score high on this scale are more likely to choose a larger delayed reward over an immediate smaller one in a delay discounting task (Steinberg et al., 2009).

A composite measure of *psychosocial maturity* was formed by reverse-scoring the measures of impulsivity and

Table 2
Indices of Psychosocial Maturity

Construct	Measure	Sample item
Risk perception	Benthin et al., 1993	“If you did this activity (e.g., had unprotected sex), how much are you at risk for something bad happening?”
Sensation seeking	Zuckerman et al., 1978	“I sometimes like to do things that are a little frightening.”
Impulsivity	Patton et al., 1995	“I do things without thinking.”
Resistance to peer influence	Steinberg & Monahan, 2007	“Some people think it’s better to be an individual even if people will be angry at you for going against the crowd. BUT Other people think it’s better to go along with the crowd than to make people angry at you.”
Future orientation	Steinberg et al., 2009	“Some people take life one day at a time without worrying about the future. BUT Other people are always thinking about what tomorrow will bring.”

sensation seeking so that higher scores indicated greater maturity (i.e., more impulse control and less thrill seeking), standardizing all five measures, and averaging the standardized scores. Thus, individuals who score relatively lower on the composite characterize themselves as less likely to perceive dangerous situations as risky, more impulsive, more thrill seeking, more oriented to the immediate, and more susceptible to peer influence. This is very similar to the portrait of adolescents described by Justice Kennedy in his majority opinion in the juvenile death penalty case. A confirmatory factor analysis indicated that the composite model fit the data well (comparative fit index = .95, root mean square error of approximation = .075). The five indicators are modestly, but significantly, intercorrelated (r s range from .14 to .38; average $r = .26$).

Cognitive capacity. The test battery included several widely used tests of basic cognitive skills, including a test of resistance to interference in working memory (Thompson-Schill et al., 2002), a digit-span memory test, and a test of verbal fluency. The resistance to interference in working memory test was one in which participants saw four probe letters on the screen and then a target. They were then asked whether the target was among the four probes. On test trials, two of the four letters presented had appeared in the previous trial, providing interference with recall on the present trial. An overall accuracy score was computed by averaging the number of correct responses across all test trials. The digit-span memory test was similar to that in the Wechsler scales. Participants heard a series of 13 sequences of digits (beginning with two digits and increasing to eight) that they were asked to recall forwards and 13 sequences that they were asked to recall backwards. A memory score was computed by averaging the total number of forward trials and backward trials recalled correctly. Finally, the measure of verbal fluency asked participants to generate, in one minute, as many words as possible that either began with a specific letter (three trials) or were members of a category (e.g., fruits; three trials). A verbal fluency score was computed by averaging the number of words generated for each of the six lists.

Because the composite consisted of only three items, it was not possible to derive a reliable estimate of internal consistency. However, after examining the intercorrelations among the tests, we found them to be significant (fluency and working memory, $r = .29$; working memory and digit span, $r = .39$; digit span and verbal fluency, $r = .40$). Accordingly, scores on each of the measures were standardized, and the standard scores were averaged to create an index of *general cognitive capacity*. Not surprisingly, our composite measure of general cognitive capacity is significantly correlated with IQ ($r = .46$, $p < .001$). Unlike IQ scores, however, which are adjusted for chronological age, the measure of cognitive capacity is not. More important, because we controlled for IQ in all analyses, any observed age differences in general cognitive capacity are not due to age differences in intelligence.

In its original amicus brief in *Hodgson*, the APA (1987) made reference to the “cognitive capacity” (p. 6) of

adolescents and cited sources that referred to both information-processing abilities (Keating, 1980) and logical reasoning (Inhelder & Piaget, 1958) in support of its argument that adolescents are as cognitively competent as adults. We acknowledge that our index, which tilts heavily toward measuring how many pieces of information an individual can process or produce, does not measure logical or moral reasoning and as such is an incomplete measure of cognitive capacity as conceptualized in the APA *Hodgson* brief. Our measure assesses cognitive ability in a highly structured manner and as such does not tap aspects of executive function that may be important in novel situations. It is also important to note that our measure of general cognitive capacity does not include tests of higher order executive functioning, such as comparing short- versus long-term consequences, coordinating affect and cognition, or balancing risk and reward. Many such executive functions have both cognitive and psychosocial aspects to them, however, and given that our interest was in maintaining a distinction between general cognitive and psychosocial capacities so as to better examine their distinct developmental timetables, it was important not to conflate the two. The measures of psychosocial maturity and cognitive capacity are very modestly correlated once age is controlled, $r(922) = .15$, $p < .001$. Although our operationalization of general cognitive capacity is not identical to that used by APA in its argument, it is very clear that the authors of the *Hodgson* brief (APA, 1987) were referring to cognitive abilities and not psychosocial maturity and that the authors of the *Roper* brief (APA, 2004) were referring to psychosocial maturity and not cognitive capacity.

Results

Two analyses of covariance were conducted in order to examine age patterns in psychosocial maturity and general cognitive capacity; as noted earlier, both analyses controlled for IQ and household education.

The results of the two analyses are shown in Figures 1 and 2. Each figure presents the age group means for the standardized composites, with a value of 1.0 added to each

Figure 1
Psychosocial Maturity (Standardized Composite Scores) as a Function of Age (in Years)

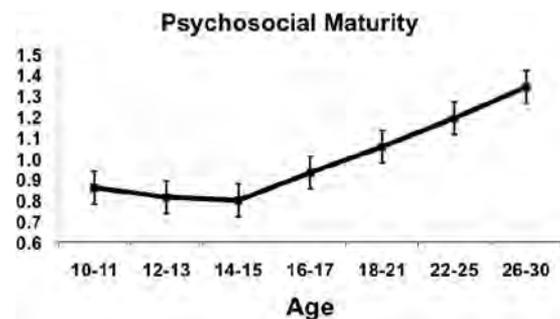
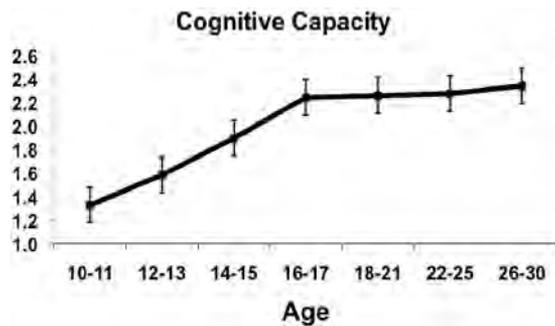


Figure 2
 General Cognitive Capacity (Standardized Composite Scores) as a Function of Age (in Years)



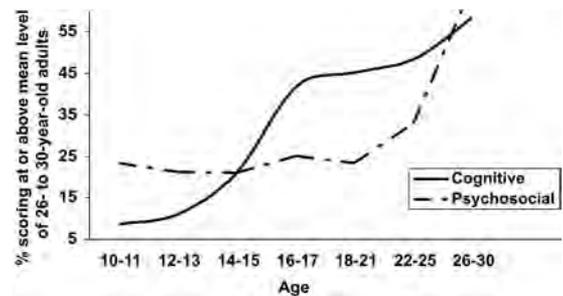
group's mean for ease of presentation (i.e., to make all values positive numbers). The analysis of age differences in psychosocial maturity indicates a significant age effect, $F(6, 900) = 12.577, p < .001$. As Figure 1 indicates, age differences in psychosocial maturity, as assessed in this study, did not emerge until mid-adolescence but were present throughout late adolescence and early adulthood. Indeed, pairwise comparisons, using a Bonferroni correction, revealed no significant differences in psychosocial maturity among the first four age groups (10–11, 12–13, 14–15, and 16–17 years) but significant differences between the 16–17-year-olds and those 22 and older, and between the 18–21-year-olds and those 26 and older. In neither case was there a significant interaction between age and gender, indicating that the patterns were the same among males and females.

The analysis of age differences in cognitive capacity shows a very different pattern. As with psychosocial maturity, there is a highly significant age effect, $F(6, 901) = 58.246, p < .001$. However, as Figure 2 indicates, age differences in cognitive capacity were evident during the first part of adolescence but not after age 16—just the opposite from the pattern seen with respect to psychosocial maturity. Pairwise comparisons using a Bonferroni correction indicated significant differences in general cognitive capacity between each of the first four age groups but no age differences after age 16.

Figure 3 presents these data in a somewhat different way. Here we show the proportion of individuals in each age group who scored at or above the mean level of the 26- to 30-year-olds in our sample on the psychosocial and cognitive composites, graphed in the same figure. As the figure indicates, general cognitive capacity reaches adult levels long before the process of psychosocial maturation is complete.

Although our measure of cognitive capacity included several of the information-processing skills noted in the APA (1987) *Hodgson* brief but did not include indices of the sort of reasoning to which APA referred, it is important to ask whether the pattern of age differences we found on this measure resembles that observed using measures of more sophisticated cognitive abilities of the sort believed to

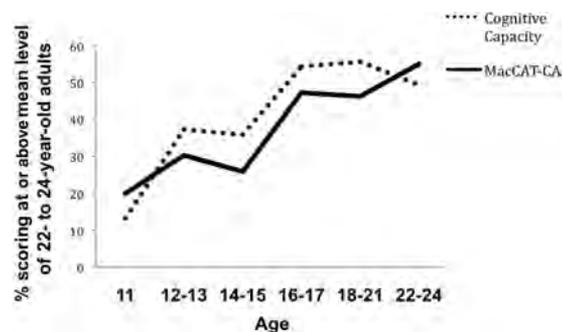
Figure 3
 Proportion of Individuals in Each Age Group Scoring at or Above the Mean for 26- to 30-Year-Olds on Indices of Cognitive Capacity and Psychosocial Maturity



influence abortion decision making. As we noted earlier, in addition to the present study, the MacArthur Network also conducted a study of age differences in capacities related to competence to stand trial (Grisso et al., 2003). The main instrument used to assess these capacities was the MacArthur Competence Assessment Tool—Criminal Adjudication (MacCAT-CA), a standardized interview that measures respondents' understanding of and reasoning about their legal situation (Poythress et al., 1999). Although the abilities necessary for competence to stand trial are not identical to those necessary for competent decision making about abortion, they are conceptually similar in that both involve being able to understand and reason with facts and appreciate the nature of one's situation.

Figure 4 presents data from the present study alongside data from the Grisso et al. (2003) study in a way

Figure 4
 Proportion of Individuals in Each Age Group Scoring at or Above the Mean for 22- to 24-Year-Olds on Index of Cognitive Capacity and on a Measure of Abilities Relevant to Competence to Stand Trial



Note. MacCAT-CA = MacArthur Competence Assessment Tool—Criminal Adjudication, Understanding and Reasoning subscales. MacCAT-CA data are from Grisso et al (2003).

comparable to that used in Figure 3, that is, in terms of the proportion of individuals of different ages who performed at or above the mean level of the adults in the sample. The Grisso et al. study included participants ages 11 to 24, drawn equally from the community and the justice system. In order to make the appropriate comparison of these data to those of the present study, we excluded the justice system subsample from the analyses (the average IQ of that subsample was 85, substantially lower than that of the present study), categorized individuals into chronological age groups that paralleled those used in the present study (11, 12–13, 14–15, 16–17, 18–21, and 22–24 years), and used the oldest group as the adult reference category. Similarly, we reanalyzed the cognitive capacity data from the present study after dropping the 10-year-olds, excluding individuals who were older than 24, and using 22- to 24-year-olds as the adult reference category.

As Figure 4 illustrates, the pattern of age differences in abilities relevant to competence to stand trial is virtually identical to the pattern seen with respect to general cognitive capacity as assessed in the present study. On both indices, scores increased between ages 11 and 16 and then leveled off, with no improvement after this age. This gives us greater confidence that the absence of age differences in cognitive capacity after age 16 observed in our study is not merely a function of the fact that our index included only measures of basic information-processing abilities. Rather, our reanalysis of the Grisso et al. (2003) data supports the argument that adolescents reach adult levels of cognitive maturity several years before they reach adult levels of psychosocial maturity.

Discussion

Developmental psychologists with expertise in adolescence are frequently called on to provide guidance about the appropriate treatment of young people under the law and about the proper placement of legal age boundaries between those who should be treated as adults and those who should not. The results of the present study suggest that it is not prudent to make sweeping statements about the relative maturity of adolescents and adults, because the answer to the question of whether adolescents are as mature as adults depends on the aspects of maturity under consideration. By age 16, adolescents' general cognitive abilities are essentially indistinguishable from those of adults, but adolescents' psychosocial functioning, even at the age of 18, is significantly less mature than that of individuals in their mid-20s. In this regard, it is neither inconsistent nor disingenuous for scientists to argue that studies of psychological development indicate that the boundary between adolescence and adulthood should be drawn at a particular chronological age for one policy purpose and at a different one for another.

Whether and how these findings should inform decisions about adolescents' treatment under the law depends on the specific legal issue under consideration. To varying degrees, such decisions rely on value judgments (e.g., about what aspects of maturity are relevant to a particular decision or about what is mature "enough" to warrant

autonomy and/or culpability), which science alone cannot dictate. Nevertheless, the legal treatment of adolescents should at the very least be informed by the most accurate and timely scientific evidence on the nature and course of psychological development. On the basis of the present study, as well as previous research, it seems reasonable to distinguish between two very different decision-making contexts in this regard: those that allow for unhurried, logical reflection and those that do not. This distinction is also in keeping with our emerging understanding of adolescent brain maturation, which suggests that brain systems responsible for logical reasoning and basic information processing mature earlier than those that undergird more advanced executive functions and the coordination of affect and cognition necessary for psychosocial maturity (Steinberg, 2008).

When it comes to decisions that permit more deliberative, reasoned decision making, where emotional and social influences on judgment are minimized or can be mitigated, and where there are consultants who can provide objective information about the costs and benefits of alternative courses of action, adolescents are likely to be just as capable of mature decision making as adults, at least by the time they are 16. Three domains of decision making that would seem to fit into this category are medical decision making (where health care practitioners can provide information and encourage adolescents to think through their decisions before acting), legal decision making (where legal practitioners, such as defense attorneys, can play a comparable role), and decisions about participating in research studies (where research investigators, guided by institutional review boards, can function similarly). Although adults in these positions cannot and should not make the decision for the adolescent, they surely can take steps to create a context in which adolescents' decision-making competence will be maximized. The position taken by APA in *Hodgson v. Minnesota* (1990), in favor of granting adolescents' access to abortion without the necessity of parental involvement, therefore seems to us to be consistent with the available scientific evidence, so long as youngsters under the age of 16 have the opportunity to consult with other, informed adults (e.g., health care practitioners, counselors).

In contrast, in situations that elicit impulsivity, that are typically characterized by high levels of emotional arousal or social coercion, or that do not encourage or permit consultation with an expert who is more knowledgeable or experienced, adolescents' decision making, at least until they have turned 18, is likely to be less mature than adults'. This set of circumstances likely characterizes the commission of most crimes perpetrated by adolescents (which are usually committed in groups and are seldom premeditated; Farrington, 2003; Zimring, 1998) and may also be typical of other situations where adolescents are emotionally aroused, in groups, absent adult supervision, and facing choices with apparent immediate rewards and few obvious or immediate costs—the very conditions that are likely to undermine adolescents' decision-making competence (Steinberg, 2007). These conditions often prevail in situa-

tions involving the purchase of alcohol and tobacco, driving, and other potentially health-compromising behaviors, such as having unprotected sex. In these cases, adolescents' relative immaturity should be acknowledged either by imposing greater restraints on their behavior than are imposed on adults (e.g., prohibiting the purchase of alcohol, restricting driving to certain hours of the day or certain conditions) or by providing added protections (e.g., prohibiting capital punishment, making condoms easily accessible). Thus, APA's argument that adolescents should not be subject to capital punishment owing to their impulsivity and susceptibility to peer pressure is consistent with the results of our own research and with other scientific studies of psychosocial development that show continued maturation of these capacities well into young adulthood (Steinberg & Scott, 2003).

In our view, then, the seemingly conflicting positions taken by APA in *Roper v. Simmons* (2005) and *Hodgson v. Minnesota* (1990) are not contradictory. Rather, they simply emphasize different aspects of maturity, in accordance with the differing nature of the decision-making scenarios involved in each case. The skills and abilities necessary to make an informed decision about a medical procedure are likely in place several years before the capacities necessary to regulate one's behavior under conditions of emotional arousal or coercive pressure from peers.

Science alone cannot dictate public policy, although it can, and should, inform it. Our data can neither "prove" nor "disprove" the appropriateness of requiring parental involvement before a teenager can obtain an abortion, but they do inform the debate. Nor do our data "prove" or "disprove" whether it is appropriate to apply the death penalty to individuals who are inherently more impulsive than adults and whose characters are not yet fully formed—although, again, they are informative. But our findings do demonstrate how the positions taken by APA in *Hodgson v. Minnesota* (1990) and in *Roper v. Simmons* (2005) are compatible with each other and consistent with the rapidly growing body of scientific evidence indicating that intellectual maturity is reached several years before psychosocial maturity.

Developmental science can and should contribute to debates about the drawing of legal age boundaries, but research evidence cannot be applied to this sort of policy analysis without a careful and nuanced consideration of the particular demands placed on the individual for "adult-like" maturity in different domains of functioning. Jurists, politicians, advocates, and journalists seeking a uniform answer to questions about where we should draw the line between adolescence and adulthood for different purposes under the law need to consider the asynchronous nature of psychological maturation, especially during periods of dramatic and rapid change across multiple domains of functioning.

REFERENCES

- American Psychological Association. (1987, March 16). [Amicus curiae brief filed in the U.S. Court of Appeals for the Eighth Circuit in *Hodgson v. Minnesota*, 497 U.S. 417 (1990)]. Retrieved February 11, 2009, from <http://www.apa.org/psyclaw/hodgson.pdf>
- American Psychological Association. (1989, September 1). [Amicus curiae brief filed in U.S. Supreme Court in *Ohio v. Akron Center for Reproductive Health, Inc.*, 497 U.S. 502 (1990) and *Hodgson v. Minnesota*, 497 U.S. 417 (1990)]. Retrieved February 11, 2009, from <http://www.apa.org/psyclaw/reproductivehealth.pdf>
- American Psychological Association. (2004, July 19). [Amicus curiae brief filed in U.S. Supreme Court in *Roper v. Simmons*, 543 U.S. 551 (2005)]. Retrieved February 11, 2009, from <http://www.apa.org/psyclaw/roper-v-simmons.pdf>
- Ayotte v. Planned Parenthood of Northern New England, 546 U.S. 320 (2006).
- Belter, R., & Grisso, T. (1984). Children's recognition of rights violations in counseling. *Professional Psychology: Research and Practice*, 15, 899–910.
- Benthin, A., Slovic, P., & Severson, H. (1993). A psychometric study of adolescent risk perception. *Journal of Adolescence*, 16, 153–168.
- Cauffman, E., Shulman, E., Steinberg, L., Claus, E., Banich, M., Graham, S., & Woolard, J. (in press). Age differences in affective decision making as indexed by performance on the Iowa Gambling Task. *Developmental Psychology*.
- Cauffman, E., & Steinberg, L. (2000). (Im)maturity of judgment in adolescence: Why adolescents may be less culpable than adults. *Behavioral Sciences and the Law*, 18, 741–760.
- Farrington, D. (2003). Developmental and life-course criminology: Key theoretical and empirical issues. *Criminology*, 41, 221–225.
- Gilfoyle, N. (2005). Understanding APA's amicus curiae brief in *Roper v. Simmons*. Retrieved February 11, 2009, from <http://www.apa.org/releases/ropervsimmons.html>
- Grisso, T. (1980). Juveniles' capacities to waive *Miranda* rights: An empirical analysis. *California Law Review*, 68, 1134–1166.
- Grisso, T., & Steinberg, L. (2005). Between a rock and a soft place: Developmental research and the child advocacy process. *Journal of Clinical Child and Adolescent Psychology*, 34, 619–627.
- Grisso, T., Steinberg, L., Woolard, J., Cauffman, E., Scott, E., Graham, S., et al. (2003). Juveniles' competence to stand trial: A comparison of adolescents' and adults' capacities as trial defendants. *Law and Human Behavior*, 27, 333–363.
- Grisso, T., & Vierling, L. (1978). Minors' consent to treatment: A developmental perspective. *Professional Psychology*, 9, 412–426.
- Grosbras, M., Jansen, M., Leonard, G., McIntosh, A., Osswald, K., Poulsen, C., et al. (2007). Neural mechanisms of resistance to peer influence in early adolescence. *Journal of Neuroscience*, 27, 8040–8045.
- Gustafson, K., & McNamara, J. (1987). Confidentiality with minor clients: Issues and guidelines for therapists. *Professional Psychology: Research and Practice*, 18, 503–508.
- Guttmacher Institute. (2009, February). Counseling and waiting periods for abortion. In *State policies in brief*. Retrieved February 11, 2009, from http://www.guttmacher.org/statecenter/spibs/spib_MWPA.pdf
- Hale, S. (1990). A global developmental trend in cognitive processing speed. *Child Development*, 61, 653–663.
- Harter, S. (1982). The Perceived Competence Scale for Children. *Child Development*, 53, 87–97.
- Henshaw, S., & Kost, K. (1992). Parental involvement in minors' abortion decisions. *Family Planning Perspectives*, 24, 196–207, 213.
- Hodgson v. Minnesota*, 497 U.S. 417 (1990).
- Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books.
- Jacobs-Quadrel, M., Fischhoff, B., & Davis, W. (1993). Adolescent (in)vulnerability. *American Psychologist*, 48, 102–116.
- Kail, R. (1997). Processing time, imagery, and spatial memory. *Journal of Experimental Child Psychology*, 64, 67–78.
- Keating, D. (1980). Thinking processes in adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 211–246). New York: Wiley.
- Keating, D. (2004). Cognitive and brain development. In R. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (2nd ed.). New York: Wiley.
- Monahan, K., Steinberg, L., & Cauffman, E. (2007). *Affiliation with antisocial peers, susceptibility to peer influence, and desistance from*

- antisocial behavior during the transition to adulthood*. Manuscript submitted for publication.
- Overton, W. (1990). Competence and procedures: Constraints on the development of logical reasoning. In W. Overton (Ed.), *Reasoning, necessity, and logic: Developmental perspectives* (pp. 1–32). Hillsdale, NJ: Erlbaum.
- Patton, J., Stanford, M., & Barratt, E. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology, 51*, 768–774.
- Paus, T., Toro, R., Leonard, G., Lerner, J., Lerner, R., Perron, M., et al. (2008). Morphological properties of the action-observation cortical network in adolescents with low and high resistance to peer influence. *Social Neuroscience, 3*, 303–316.
- Poythress, N., Nicholson, R., Otto, R., Edens, J., Bonnie, R., Monahan, J., & Hoge, S. (1999). *The MacArthur Competence Assessment Tool—Criminal Adjudication: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Psychological Corporation. (1999). *Wechsler Abbreviated Scale of Intelligence*. San Antonio, TX: Author.
- Reiss, A., & Farrington, D. (1991). Advancing knowledge about co-offending: Results from a prospective longitudinal survey of London males. *Journal of Criminal Law and Criminology, 82*, 360–395.
- Roper, D. (2004). [Brief of petitioner Donald P. Roper in *Roper v. Simmons*, 543 U.S. 551 (2005)]. Retrieved February 11, 2009, from http://supreme.lp.findlaw.com/supreme_court/briefs/03-633/03-633.mer.pet.rep.pdf
- Roper v. Simmons*, 543 U.S. 551 (2005).
- Scott, E., Reppucci, N., & Woolard, J. (1995). Evaluating adolescent decision making in legal contexts. *Law and Human Behavior, 19*, 221–244.
- Steinberg, L. (2007). Risk taking in adolescence: New perspectives from brain and behavioral science. *Current Directions in Psychological Science, 16*, 55–59.
- Steinberg, L. (2008). A social neuroscience perspective on adolescent risk taking. *Developmental Review, 28*, 78–106.
- Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Developmental Psychology, 44*, 1764–1778.
- Steinberg, L., & Cauffman, E. (1996). Maturity of judgment in adolescence: Psychosocial factors in adolescent decision-making. *Law and Human Behavior, 20*, 249–272.
- Steinberg, L., Graham, S., O'Brien, L., Woolard, J., Cauffman, E., & Banich, M. (2009). Age differences in future orientation and delay discounting. *Child Development, 80*, 28–44.
- Steinberg, L., & Monahan, K. (2007). Age differences in resistance to peer influence. *Developmental Psychology, 43*, 1531–1543.
- Steinberg, L., Mounts, N., Lamborn, S., & Dornbusch, S. (1991). Authoritative parenting and adolescent adjustment across various ecological niches. *Journal of Research on Adolescence, 1*, 19–36.
- Steinberg, L., & Scott, E. (2003). Less guilty by reason of adolescence: Developmental immaturity, diminished responsibility, and the juvenile death penalty. *American Psychologist, 58*, 1009–1018.
- Thompson-Schill, S. L., Jonides, J., Marshuetz, C., Smith, E. E., D'Esposito, M., Kan, I. P., et al. (2002). Effects of frontal lobe damage on interference effects in working memory. *Cognitive, Affective, and Behavioral Neuroscience, 2*, 109–120.
- Weithorn, L., & Campbell, S. (1982). The competency of children and adolescents to make informed treatment decisions. *Child Development, 53*, 1589–1598.
- Zimring, F. (1998). *American youth violence*. New York: Oxford University Press.
- Zuckerman, M., Eysenck, S., & Eysenck, H. J. (1978). Sensation seeking in England and America: Cross-cultural, age, and sex comparisons. *Journal of Consulting and Clinical Psychology, 46*, 139–149.

EXHIBIT 42

When Is an Adolescent an Adult? Assessing Cognitive Control in Emotional and Nonemotional Contexts

Psychological Science
 2016, Vol. 27(4) 549–562
 © The Author(s) 2016
 Reprints and permissions:
sagepub.com/journalsPermissions.nav
 DOI: 10.1177/0956797615627625
pss.sagepub.com


**Alexandra O. Cohen¹, Kaitlyn Breiner², Laurence Steinberg³,
 Richard J. Bonnie⁴, Elizabeth S. Scott⁵, Kim A. Taylor-Thompson⁶,
 Marc D. Rudolph⁷, Jason Chein³, Jennifer A. Richeson^{8,9},
 Aaron S. Heller¹⁰, Melanie R. Silverman¹, Danielle V. Dellarco¹,
 Damien A. Fair⁷, Adriana Galván², and B. J. Casey¹**

¹Department of Psychiatry, Sackler Institute for Developmental Psychobiology, Weill Cornell Medical College;

²Department of Psychology, University of California, Los Angeles; ³Department of Psychology, Temple University;

⁴University of Virginia School of Law, University of Virginia; ⁵Columbia Law School, Columbia University;

⁶New York University School of Law, New York University; ⁷Department of Behavioral Neuroscience and

Psychiatry, Oregon Health & Science University; ⁸Department of Psychology, Northwestern University;

⁹Institute for Policy Research, Northwestern University; and ¹⁰Department of Psychology, University of Miami

Abstract

An individual is typically considered an adult at age 18, although the age of adulthood varies for different legal and social policies. A key question is how cognitive capacities relevant to these policies change with development. The current study used an emotional go/no-go paradigm and functional neuroimaging to assess cognitive control under sustained states of negative and positive arousal in a community sample of one hundred ten 13- to 25-year-olds from New York City and Los Angeles. The results showed diminished cognitive performance under brief and prolonged negative emotional arousal in 18- to 21-year-olds relative to adults over 21. This reduction in performance was paralleled by decreased activity in fronto-parietal circuitry, implicated in cognitive control, and increased sustained activity in the ventromedial prefrontal cortex, involved in emotional processes. The findings suggest a developmental shift in cognitive capacity in emotional situations that coincides with dynamic changes in prefrontal circuitry. These findings may inform age-related social policies.

Keywords

adolescence, cognitive control, development, emotion, fMRI, legal policy, young adult

Received 8/6/15; Revision accepted 12/28/15

Definitions of adulthood in the United States differ according to state law and policy. Although most states set the age of majority at 18, the legal age for purchasing alcohol is 21 (Institute of Medicine & National Research Council, 2014), and the minimum age for criminal prosecution is 14 or younger in most states (Taylor-Thompson, 2014). In scientific studies, 18 is often used as the cutoff for adulthood even though government research policies, until recently, considered individuals under 21 to be minors. Thus, the legal definition of adulthood is fluid and imprecise. One consideration in defining adulthood is when behavior, and the underlying neural circuitry, can be said

to have reached maturity. Extant studies suggest that this may vary depending on the context in which adolescents are assessed. In the current study, we compared the development of cognitive control in neutral and emotionally arousing situations because the latter seem highly relevant to many policies relating to definitions of adulthood.

Corresponding Author:

B. J. Casey, Weill Cornell Medical College, Sackler Institute for Developmental Psychobiology, 1300 York Ave., Box 140, New York, NY 10065

E-mail: bjc2002@med.cornell.edu

Although a large developmental literature shows that adolescents' speed and accuracy on simple cognitive tasks can resemble adults' (Luna, Marek, Larsen, Tervo-Clemmens, & Chahal, 2015), mounting evidence suggests that contextual factors influence performance differentially as a function of age. Studies show that adolescence, typically defined as ages 13 through 17, is a time of heightened sensitivity to motivational, social, and emotional information (Casey, 2015; Steinberg, 2010). Specifically, during adolescence, cognitive-control capacities and decision making appear to be especially influenced by incentives (Galvan et al., 2006; Geier, Terwilliger, Teslovich, Velanova, & Luna, 2010; Somerville, Hare, & Casey, 2011; Van Leijenhorst et al., 2010), threats (Cohen-Gilbert & Thomas, 2013; Dreyfuss et al., 2014; Grose-Fifer, Rodrigues, Hoover, & Zottoli, 2013; Hare et al., 2008), and peers (Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Gardner & Steinberg, 2005). Behavioral regulation in response to these inputs has been shown to rely on prefrontal circuitry (Dreyfuss et al., 2014; Hare et al., 2008; Somerville et al., 2011), which shows marked change into the early 20s (Gogtay et al., 2004; Sowell et al., 2004).

Prominent neurobiological theories of adolescence suggest that dynamic and asymmetric trajectories in structural and functional development of limbic and prefrontal circuitry are implicated in motivated behavior and its control, respectively, and may lead to a propensity toward risky and impulsive actions (Casey, 2015; Casey, Getz, & Galvan, 2008; Ernst, Pine, & Hardin, 2006; Mills, Goddings, Clasen, Giedd, & Blakemore, 2014; Steinberg, 2010). Phylogenetically older brain regions, such as subcortical limbic regions, show nonlinear developmental changes and appear to be functionally sensitized during adolescence (Galvan et al., 2006; Hare et al., 2008; Raznahan et al., 2014), whereas development of prefrontal cortex (PFC) exhibits a roughly linear trajectory (Galvan et al., 2006; Gogtay et al., 2004; Sowell et al., 2004). Resting-state functional-connectivity data show prolonged development of long-range cortical connectivity that does not stabilize until the 20s (Dosenbach et al., 2011; Fair et al., 2009). Together, these results suggest continued refinement of brain circuitry, particularly prefrontal cortical circuitry, into young adulthood, but the behavioral implications of this protracted brain development remain unclear.

The current study compared the development of cognitive control under brief and prolonged states of emotional arousal and nonemotional states. We focused on the 18-to-21 age range given the protracted development of prefrontal circuitry and the particular legal and social relevance of this age group. Our key premise was that responses in emotional situations would provide insight on cognitive capacities relevant to social and legal policy,

such as those related to criminal responsibility and accountability. Prior research examining motivational and social influences on cognitive capacities in young adults has used varying age ranges and experimental manipulations that have produced mixed results (Chein et al., 2011; Cohen-Gilbert et al., 2014; Silva, Shulman, Chein, & Steinberg, 2015; Steinberg et al., 2009). We attempted to control for several of these variables by testing the impact of both brief and sustained positive and negative emotional states on cognitive control, using predefined age groups as well as age as a continuous variable. We hypothesized that there would be a developmental shift in cognitive control in emotional situations that would correspond to dynamic changes in prefrontal circuitry. Specifically, we predicted that young adults 18 to 21 years old would differ from adults over age 21 in cognitive control in emotionally arousing conditions (as teens do) but not in neutral conditions.

Method

Participants

Participants were 110 individuals from a larger sample of 147 healthy, right-handed 13- to 25-year-olds who underwent functional MRI (fMRI) while performing an adapted emotional go/no-go task (Hare et al., 2008) under sustained emotional states of threat and excitement and under nonemotional states (Cohen et al., 2016). Data from 5 participants were excluded because of their poor overall performance ($> 2 SD$ below the group's average performance as measured by d'). Data from 14 participants were excluded because of excessive head motion (more than 10% of time points within a run censored because of translational motion > 1.56 mm, or half a voxel, or rotational motion $> 1^\circ$), and data from 18 participants were excluded because of technical problems that led to errors in coding and recording of behavioral data in the scanner. A total of 110 usable scans were included in the final analyses reported here (41 teens—23 females and 18 males, ages 13–17 years, $M = 16.19$, $SD = 1.20$; 35 young adults—17 females and 18 males, ages 18–21 years, $M = 19.88$, $SD = 1.09$; 34 adults—17 females and 17 males, ages 22–25 years, $M = 24.08$, $SD = 1.04$). Portions of the data from 38 adults in this sample are included in a separate report (Cohen et al., 2016) focusing on different experimental questions.

Participants were a diverse community sample recruited from New York City and Los Angeles as part of an ongoing multisite project. They self-identified as Caucasian (32.7%), African American (27.3%), Hispanic (24.6%), Asian (12.7%) and "other" (2.7%). The recruitment target for this portion of the study was 125 participants, in anticipation of 20% attrition due to excessive

head motion, poor performance, or technical issues. Because of exclusions due to poor task performance and technical issues in the scanner environment, 22 additional participants were run. Participants reported no use of psychotropic medications or past diagnoses of or treatment for psychiatric or neurological disorders. Adults and parents provided informed written consent, and minors provided assent. The institutional review board at each site approved the study.

Experimental task

Participants completed a modified emotional go/no-go paradigm (Hare et al., 2008) called the Cognitive Control Under Emotion (CCUE) task (Cohen et al., 2016). In this task, happy, fearful, and calm emotional expressions (Fig. 1a) are presented as targets, which participants are instructed to respond to (go trials), and nontargets, which participants are instructed not to respond to (no-go trials). The task is performed in blocks of sustained anticipation of a negative event (aversive sound), a positive event (winning up to \$100), and no event; each type of block is denoted with a different background color on the screen (Fig. 1b). (Further descriptions of this task and task-related neural activations are available in other

reports: Cohen et al., 2016; Dreyfuss et al., 2014; Hare et al., 2008; Somerville et al., 2011). Participants practiced the task prior to entering the scanner, so that they understood the instructions and conditions.

We included both blocks with a sustained state of threat and blocks with a sustained state of excitement in order to dissociate effects of arousal and effects of valence. Threat was induced by telling participants that they might experience an unpredictable aversive auditory stimulus. Excitement was induced by telling participants that they had a chance of winning up to \$100. Participants were instructed that the probability of an event occurring, the volume of the noise, and the amount of money won would not be tied to their performance, but rather would be determined by the computer. They were also told that events of a given type would occur randomly, only when the background screen was a particular color (blue for one event and purple for the other). In reality, each participant heard the noise once and won \$20 once over the course of the task, and these events occurred in a pseudorandomized order. Each event always occurred near the end of an experimental run, so that these time points could be eliminated from the analyses. During blocks of a sustained neutral state (depicted with a yellow background), participants were told there

a



b

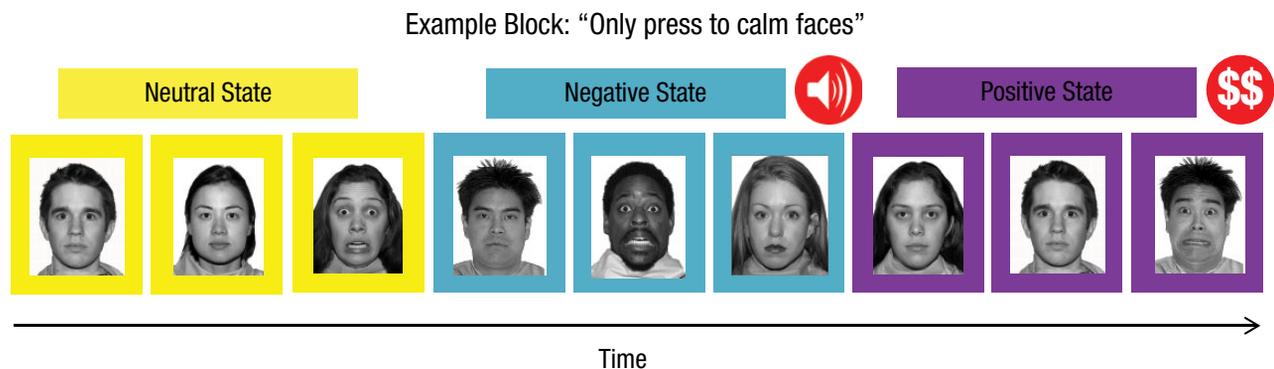


Fig. 1. The Cognitive Control Under Emotion (CCUE) paradigm (from Cohen et al., 2016): (a) examples of the fearful, happy, and calm faces used as cues and (b) schematic of one run of the task. In a given run, participants were instructed to respond to one type of cue (go trials) and not to respond to another (no-go trials). These cues were presented within blocks of sustained negative emotion (anticipation of an unpredictable aversive noise), positive emotion (anticipation of an unpredictable monetary reward), and neutral emotion (no event anticipated); the block type was indicated by the background color of the screen (yellow, blue, or purple).

was no chance of either event occurring as they performed the task. Each state (75-s duration) was induced twice during each run.

Data were acquired in six 8-min 2-s runs (total of 48 min 12 s). Each run consisted of a unique combination of the emotional expressions that served as go and no-go cues (calm-go/fearful-no go, calm-go/happy-no go, happy-go/fearful-no go, happy-go/calm-no go, fearful-go/calm-no go, fearful-go/happy-no go), in a mixed-block event-related design. Run orders were pseudocounterbalanced, and pairing of the background color and emotional state was counterbalanced. Before each run, participants were told which type of emotional expression was the target and reminded of the meaning of each colored background. We then asked participants a series of four questions to be sure they were aware of each of these contingencies. On each trial, a face appeared for 500 ms; the intertrial interval was jittered (2–7 s). A total of 114 trials were presented in each run, in a pseudorandomized order (84 go trials and 30 no-go trials). For each emotional state, we acquired data on a total of 168 go trials and 60 no-go trials.

Behavioral and psychophysiological data acquisition

Participants completed a final screening for MRI safety before being positioned in the scanner, with a five-button (New York) or four-button (Los Angeles) MR-compatible button box. The experimental task was presented using E-Prime 1.0 (New York) or 2.0 (Los Angeles; Psychology Software Tools, Inc., <http://www.pstnet.com>) and was projected onto a flat screen mounted in the scanner bore. Participants viewed the screen via a mirror mounted on a 12-channel head coil. Skin conductance response (SCR) was acquired using disposable, isotonic gel electrodes, which were attached to the first and second fingers of the left hand between the first and second phalanges. The electrode cables were grounded through a radio-frequency filter panel. During fMRI scanning, the skin conductance signal was recorded (200-Hz sampling) and amplified using a Biopac recording system and AcqKnowledge 4.0 software. E-Prime software was used to indicate the onset and offset of the emotional states during the task. SCR data were acquired from all the participants.

After exiting the scanner, participants were asked debriefing questions about the believability of task conditions. Specifically, they were asked how much they expected to win money or hear the noise during the blocks in which the background color signaled the possibility of those events (e.g., “Did you expect to win money more during the purple blocks than the blue or yellow blocks?”). Each question was answered using a 7-point Likert scale (1 = *not at all*, 7 = *very much*).

Collection of debriefing data from 2 of the 110 subjects was accidentally omitted.

fMRI data acquisition

Whole-brain fMRI data were acquired using Siemens Magnetom Trio 3.0-T scanners located at the Citigroup Biomedical Imaging Center at Weill Cornell Medical College or at the Staglin Center for Cognitive Neuroscience at the University of California, Los Angeles. Scanning parameters were identical at the two data-collection sites. A high-resolution, T1-weighted magnetization-prepared rapid-acquisition gradient-echo (MPRAGE) sequence scan was acquired using Biomedical Informatics Research Network (Jovicich et al., 2006) optimized sequences with the following parameters: repetition time (TR) = 2,170 ms, echo time (TE) = 4.33 ms, 256-mm field of view (FOV), 160 sagittal slices with a thickness of 1.2 mm. Functional images were acquired using T2*-sensitive echo planar pulse sequences covering the full brain. Thirty-eight 4-mm-thick axial slices were acquired per 2,500-ms TR (TE = 30 ms, FOV = 200 mm, flip angle = 90°, 3.1- × 3.1- × 4.0-mm voxels).

Behavioral data analysis

Behavioral data were analyzed for accuracy using the sensitivity index d' , which incorporates the rates of both hits and false alarms (Macmillan & Creelman, 2004). We calculated d' by subtracting the normalized false alarm rate from normalized accuracy on go trials. Behavioral data, stimulus timing, and emotional-state timing were extracted and calculated using MATLAB and Statistics Toolbox Release 2013b (The MathWorks, Natick, MA). All statistical analyses of the behavioral data were conducted using R (Release 3.1.0; R Core Team, 2014). We tested for age-related differences in performance (d') using analysis of variance (ANOVA) models that included sex and scanning site as between-subjects variables. To investigate performance responding to the emotional cues, without effects of emotional state, we tested for main effects of age group on performance with each cue type in the neutral state. To investigate performance during the emotional states, controlling for effects of the emotional cues, we tested for main effects of age group on performance responding to the calm face cues in each emotional state. A Bonferroni-adjusted alpha of less than .01 was used to correct for multiple comparisons in determining the statistical significance of these ANOVA results. Bonferroni-corrected post hoc t tests were used to determine the statistical significance of differences between age groups. Linear and quadratic models were also fitted to each dependent variable, with age modeled continuously. As in the age-group analyses, we used a Bonferroni-adjusted

alpha of less than .01 to determine statistical significance. All analyses were performed on the data from the 110 subjects with usable imaging and behavioral data.

We examined responses to the debriefing questions and the SCR data to assess the efficacy of our emotional-state manipulation. A 1-Hz filter was applied to the raw SCR data. Data were smoothed for each subject. Six subjects had no SCR data because of technical difficulties in the collection of these data, and 29 of the remaining 104 participants had no discernible variation in SCR across the experiment or individual runs and so were removed from the SCR analyses. SCR slope was extracted for each emotional-state block within each run and was z -scored within subjects to account for individual differences in SCR. Each individual's average slope was calculated for each emotional state (excitement, threat, and neutral). Change in skin conductance was computed as the difference between average SCR slope in an aroused state (excitement or threat) and average SCR slope in the neutral state. Given the directionality of our hypotheses with respect to these validation measures, we performed one-tailed one-sample Student's t tests to test whether responses to debriefing questions were significantly different from 1 (the lowest value on the 7-point scale) and whether SCR differences were significantly different from zero.

fMRI data analysis

Image processing. Functional imaging data were preprocessed and analyzed using Analysis of Functional NeuroImages (AFNI) software (Cox, 1996). Preprocessing of functional scans included correction for slice-time acquisition using sinc interpolation, volume registration using a 6-parameter rigid-body transformation to account for head motion, and normalization to the Montreal Neurological Institute (MNI) 152 1-mm T1 template using a 12-parameter affine transformation and nonlinear transformations (AFNI *3dQWarp* function). Data were resampled to 3-mm isotropic voxels and were smoothed using a full-width/half-maximum Gaussian kernel of 6 mm. Signal intensity of each voxel time series was normalized to percentage signal change.

Image analysis. A general linear model (GLM) was created for each participant to estimate activation in response to the emotional cues and sustained-emotional-state blocks. To disentangle the neural responses to the cues and to the sustained states, which were presented simultaneously, we included 16 regressors in each participant's GLM: 6 task regressors for correct responses to the emotional cues (fearful, happy, or calm faces on go trials and fearful, happy, or calm faces on no-go trials), 3 task regressors modeling the longer (30-TR) sustained

emotional states (i.e., the threat, excitement, and neutral sustained states), an additional regressor corresponding to trials with incorrect responses (both go and no-go trials), and 6 motion estimation parameters. Baseline trends were estimated to capture shifts in signal change. Activation in response to the face cues was modeled with a three-parameter gamma hemodynamic-response function (HRF); activation during the sustained states was modeled using a single-parameter block HRF. Time points with motion greater than half a voxel (1.56 mm) were censored, along with the preceding and following time points.

Individual-level regression coefficients for the 110 participants were submitted to group linear mixed-effects (LME) analyses using the AFNI *3dLME* function (Chen, Saad, Britton, Pine, & Cox, 2013), which is robust to small amounts of missing data. All group-level analyses included a random intercept for each participant and included sex and scanning site as between-subjects variables. Separate models were used to assess effects of transient cues (modeled as brief events) and sustained states (modeled as prolonged blocks) on brain activity. The first group-level LME model assessed effects of the transient cues (fearful, happy, and calm faces) on go and no-go trials. The second group-level LME model assessed effects of the sustained states (threat, excitement, and neutral). Age-group contrasts (general linear tests) were specified within each model to directly probe the neural correlates of behavioral findings. Two additional models assessed effects of the emotional cues and emotional states as a function of exact age as a continuous variable (i.e., interactions of emotional cues or states with exact age).

In group whole-brain analyses, individual voxels were thresholded at a p value of .005; the cluster-size threshold was a p value of .05 after correction for multiple comparisons (performed using Monte Carlo simulation via the *3dClustSim* program in AFNI). For the threat condition, given our a priori hypotheses regarding differences in prefrontal activation, we used an anatomical region of interest (ROI) for the PFC (obtained from the Harvard-Oxford probabilistic atlas in FSL; <http://fsl.fmrib.ox.ac.uk/fsl/fslwiki/>; Smith et al., 2004). Similar to the PFC ROI in previous studies (e.g., Foerde, Steinglass, Shohamy, & Walsh, 2015), this ROI combined the frontal pole, superior frontal gyrus, middle frontal gyrus, inferior frontal gyrus (angularis and opercularis), frontal medial cortex, subcallosal cortex, paracingulate gyrus, cingulate gyrus anterior division, and frontal orbital cortex bilaterally; a threshold of 50% probability was used for all subregions within the PFC. A p value of .005 was used as the threshold for individual voxels ($p < .05$ after PFC volume correction for multiple comparisons was performed using Monte Carlo simulation via the *3dClustSim* program in AFNI). Regression coefficients for individual participants

were extracted from regions with significant effects and were tested for brain-behavior correlations in R (Release 3.1.0; R Core Team, 2014).

Psychophysiological interaction analysis. Generalized psychophysiological interaction (gPPI) analyses (McLaren, Ries, Xu, & Johnson, 2012) were conducted in AFNI to examine task-dependent connectivity across the whole brain. Seed regions were the two PFC regions identified as having age-group effects. The gPPI analyses were carried out by removing sources of noise and artifact, deconvolving the neural signal, extracting the functional time course within the seed regions (5-mm spheres around peak activation), and convolving the time-course data with task timings and the canonical HRF (McLaren et al., 2012). The 16-regressor GLM used for the individual-level image analyses was implemented, but for the gPPI analyses, these models also included regressors for the seed time course and each Time Course \times Task Condition interaction, for a total of 27 regressors. The group-level LME model (controlling for sex and scanning site) was used to test the specific age-group contrasts. Specifically, group-level LME models tested the effects of transient cues (fearful, happy, and calm faces) and sustained states (threat, excitement, and neutral) separately. Age-group contrasts (general linear tests) were specified within each model. The models used a p threshold of .05, corrected for multiple comparisons at the whole-brain level using *3dClustSim*, as described previously.

Results

Behavioral results

Validation of the paradigm. Responses to the debriefing questions and SCR slope differences were tested independently, so we used a Bonferroni-adjusted alpha of less than .025 in our validation tests. These validation measures were collapsed across age. Participants expected both the money, $t(107) = 24.49$, $p < .001$, $d = 3.35$, and loud noise, $t(107) = 31.87$, $p < .001$, $d = 4.36$, to occur during the blocks in which they were led to anticipate these possibilities (Fig. 2a).

Participants' mean SCR difference scores (arousal state minus neutral state) were positive for both the excitement condition, $t(74) = 1.92$, $p = .029$, $d = 0.32$, and the threat condition, $t(74) = 1.65$, $p = .051$, $d = 0.27$ (Fig. 2b). SCR difference scores for the excitement and threat conditions were not significantly different from each other, $t(74) = 0.26$, $p > .250$, $d = 0.04$. These validation results replicate previous results for adults performing this same task (Cohen et al., 2016).

Main effects of age for each type of emotional cue.

In the neutral-state blocks, there were significant main effects of age group on performance in response to fearful cues, $F(2, 98) = 11.11$, $p < .001$, $\eta_p^2 = .16$; happy cues, $F(2, 98) = 10.90$, $p < .001$, $\eta_p^2 = .15$; and calm cues, $F(2, 98) = 7.81$, $p < .001$, $\eta_p^2 = .10$ (see Fig. 3a and Behavioral Results and Figs. S1a and S2a in the Supplemental

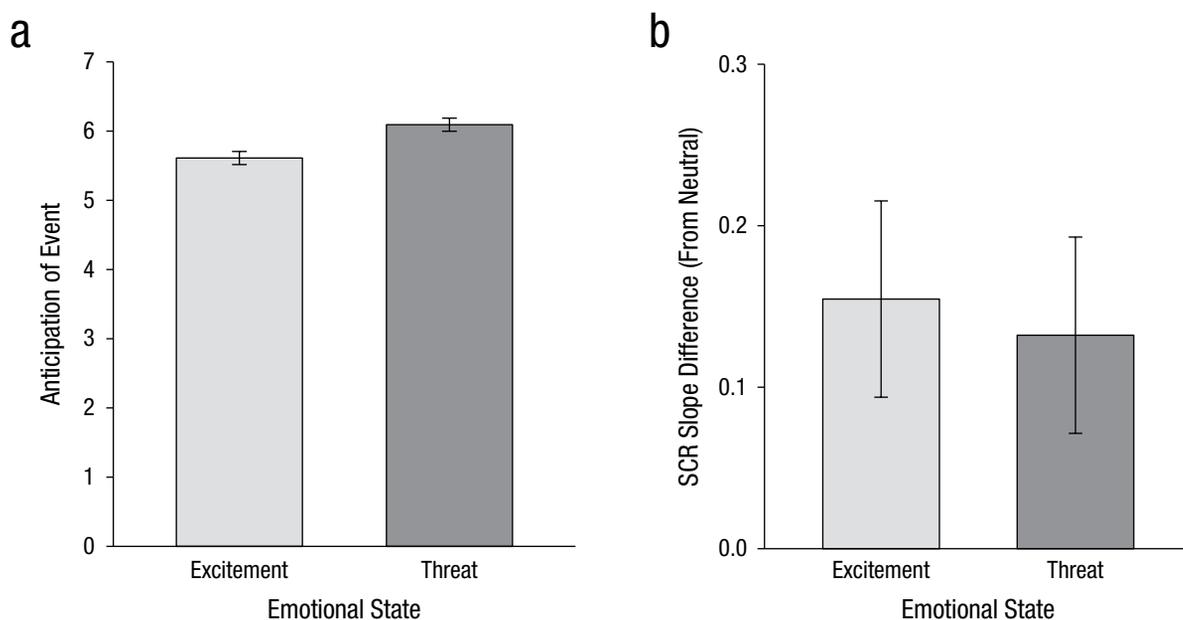


Fig. 2. Validation of the Cognitive Control Under Emotion (CCUE) paradigm: (a) participants' mean ratings of how likely they thought they were to win money and hear a loud sound in the excitement and threat blocks, respectively, and (b) participants' mean skin conductance response (SCR) during those blocks relative to the neutral blocks. Error bars represent ± 1 SE.

Material available online). Post hoc t tests revealed that teens and young adults showed diminished performance relative to adults in response to fearful cues—teens versus adults: $t(62.39) = 4.08, p < .001, d = 0.95$; young adults versus adults: $t(64.82) = 3.33, p = .0019, d = 0.80$; teens versus young adults: $t(70.09) = 0.61, p > .250, d = 0.14$. However, young adults and adults showed enhanced performance relative to teens in response to happy cues—teens versus adults: $t(71.15) = 4.14, p < .001, d = 0.96$; young adults versus adults: $t(65.77) = 1.79, p > .250, d = 0.43$; teens versus young adults: $t(73.96) = 2.55, p = .042, d = 0.59$ —and only teens and adults differed significantly in their performance with calm cues—teens versus adults: $t(64.05) = 3.54, p = .001, d = 0.82$; young adults versus adults: $t(64.60) = 1.56, p > .250, d = 0.38$; teens versus young adults: $t(71.54) = 2.14, p = .140, d = 0.49$.

We also examined effects of age as a continuous variable, fitting both linear and quadratic functions to performance with each cue type in the neutral-state blocks. Linear and quadratic functions significantly fit the data for all three cue types—fearful cues, linear: adjusted $R^2 = .12, p < .001, F(1, 108) = 15.68$; fearful cues, quadratic: adjusted $R^2 = .13, p < .001, F(2, 107) = 9.23$; happy cues, linear: adjusted $R^2 = .14, p < .001, F(1, 108) = 18.33$; happy cues, quadratic: adjusted $R^2 = .13, p < .001, F(2, 107) = 9.25$; calm cues, linear: adjusted $R^2 = .10, p < .001, F(1, 108) = 13.6$; calm cues, quadratic: adjusted $R^2 = .095, p = .002, F(2, 107) = 6.75$. However, the fit of the quadratic function completely overlapped with the fit of the linear function for the calm cues (see Fig. 4 for performance in response to calm cues in all three sustained emotional states and in response to fearful and happy cues in the neutral-state blocks).

Main effects of age for each emotional state. There were significant main effects of age group on performance in response to calm cues when participants were in emotionally arousing states of threat, $F(2, 98) = 17.57, p < .001, \eta_p^2 = .24$ (Fig. 5a), and of excitement, $F(2, 98) = 8.65, p < .001, \eta_p^2 = .13$ (Fig. S1b). Post hoc t tests revealed that, although young adults performed better than teens, teens and young adults both showed diminished performance relative to adults under the state of threat—teens versus adults: $t(60.47) = 5.40, p < .001, d = 1.24$; young adults versus adults: $t(59.51) = 2.75, p = .014, d = 0.66$; teens versus young adults: $t(73.25) = 3.25, p = .014, d = 0.64$. In contrast, only teens and adults' performance differed significantly under the state of excitement—teens versus adults: $t(58.52) = 4.28, p < .001, d = 0.98$; young adults versus adults: $t(66.95) = 2.03, p = .087, d = 0.49$; teens versus young adults: $t(61.39) = 1.83, p = .213, d = 0.42$.

We also examined effects of age as a continuous variable, fitting both linear and quadratic functions to performance in response to the calm cues in each emotional-state

condition. We found that both linear and quadratic functions significantly fit the data in both the threat condition—linear function: adjusted $R^2 = .23, p < .001, F(1, 108) = 34.08$; quadratic function: adjusted $R^2 = .24, p < .001, F(2, 107) = 17.78$ —and the excitement condition—linear function: adjusted $R^2 = .13, p < .001, F(1, 108) = 17.09$; quadratic function: adjusted $R^2 = .13, p < .001, F(2, 107) = 9.21$ (see Fig. 4).

Imaging results

To probe the neural correlates of the observed behavioral effects, we examined blood-oxygen-level-dependent (BOLD) activity in the age-group contrasts specified in the group LME models for each emotional cue and state. Specifically, general linear tests comparing brain activity (relative to implicit baseline, i.e., overall baseline brain activity) of teens and young adults with that of adults were specified for the relevant conditions. We also examined BOLD activity using group LME models in which age was modeled continuously. For these models, in the absence of any specific general linear tests, we examined activation maps showing the interactions of age with type of emotional cue and emotional-state condition.

Effects of emotional cues as a function of age. Two clusters survived whole-brain correction in the age-group analyses of response to fearful cues, showing less activity in teens and young adults than in adults: right dlPFC ($x = -41.5, y = -9.5, z = 36.5, 47$ voxels; $Z = -4.66, p < .02$, corrected; Figs. 3b and 3c) and right thalamus ($x = -20.5, y = 23.5, z = 6.5, 57$ voxels; $Z = -3.88, p < .02$, corrected). MR signal change in dlPFC was positively correlated with behavioral performance (in the neutral condition) responding to fearful cues across age, $r(108) = .203, p = .033$ (Fig. 3d), but this correlation did not remain significant when we controlled for age, $r(107) = .087, p = .365$. A general linear test corresponding to the behavioral result was performed for happy cues in the group-level emotional-cue model to compare brain activity (relative to implicit baseline) of teens with that of adults and young adults in response to happy cues. A single cluster in the right inferior frontal gyrus ($x = -32.5, y = -24.5, z = -11.5, 30$ voxels; $Z = -4.18, p < .02$, corrected) survived whole-brain correction, showing more activity in teens than in both young adults and adults (see Imaging Results and Figs. S2b and S2c in the Supplemental Material). No clusters survived whole-brain correction in the analyses of activation in response to calm cues, and no interactions of emotional cue with age group were observed.

Four clusters in the dorsal anterior cingulate cortex (dACC), parietal cortex, and right and left cerebellum survived whole-brain correction when we examined the

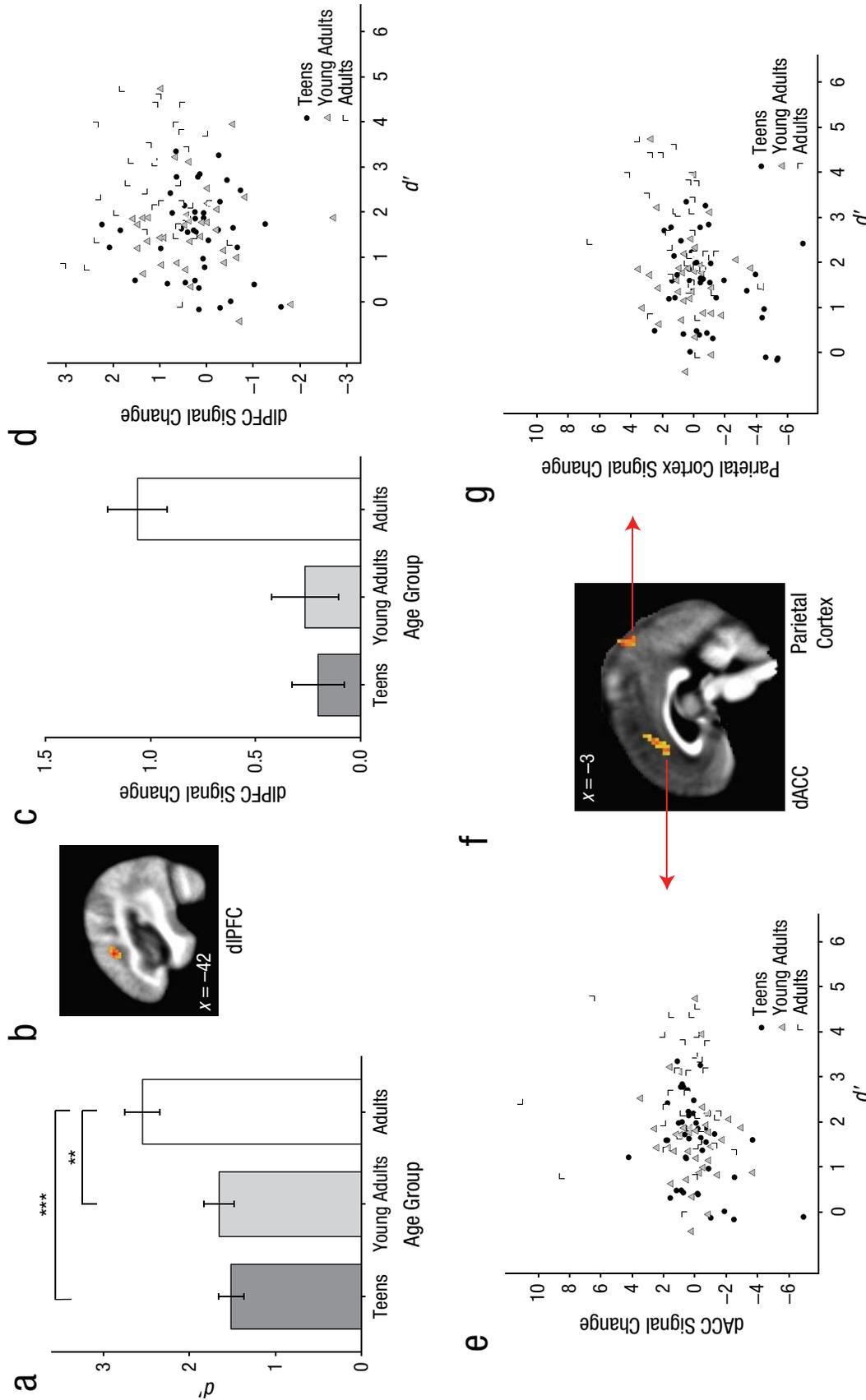


Fig. 3. Results for the fearful cues. The graph in (a) shows mean performance in response to the brief fearful cues in the neutral-state condition, as indexed by d' , for each of the age groups. The brain image in (b) shows the location of the region in the dorsolateral prefrontal cortex (dIPFC) for which signal-change results are presented. The graphs in (c) and (d) show mean signal change in the dIPFC in response to the fearful cues for each age group and as a function of d' in the neutral-state condition (separately for each age group), respectively. The brain image in (f) shows the location of the regions in the dorsal anterior cingulate cortex (dACC) and parietal cortex for which mean signal change in response to the fearful cues is graphed as a function of d' in the neutral-state condition, separately for each age group, in (e) and (g). Error bars represent ± 1 SE. Asterisks indicate significant differences (** $p < .01$, *** $p < .001$).

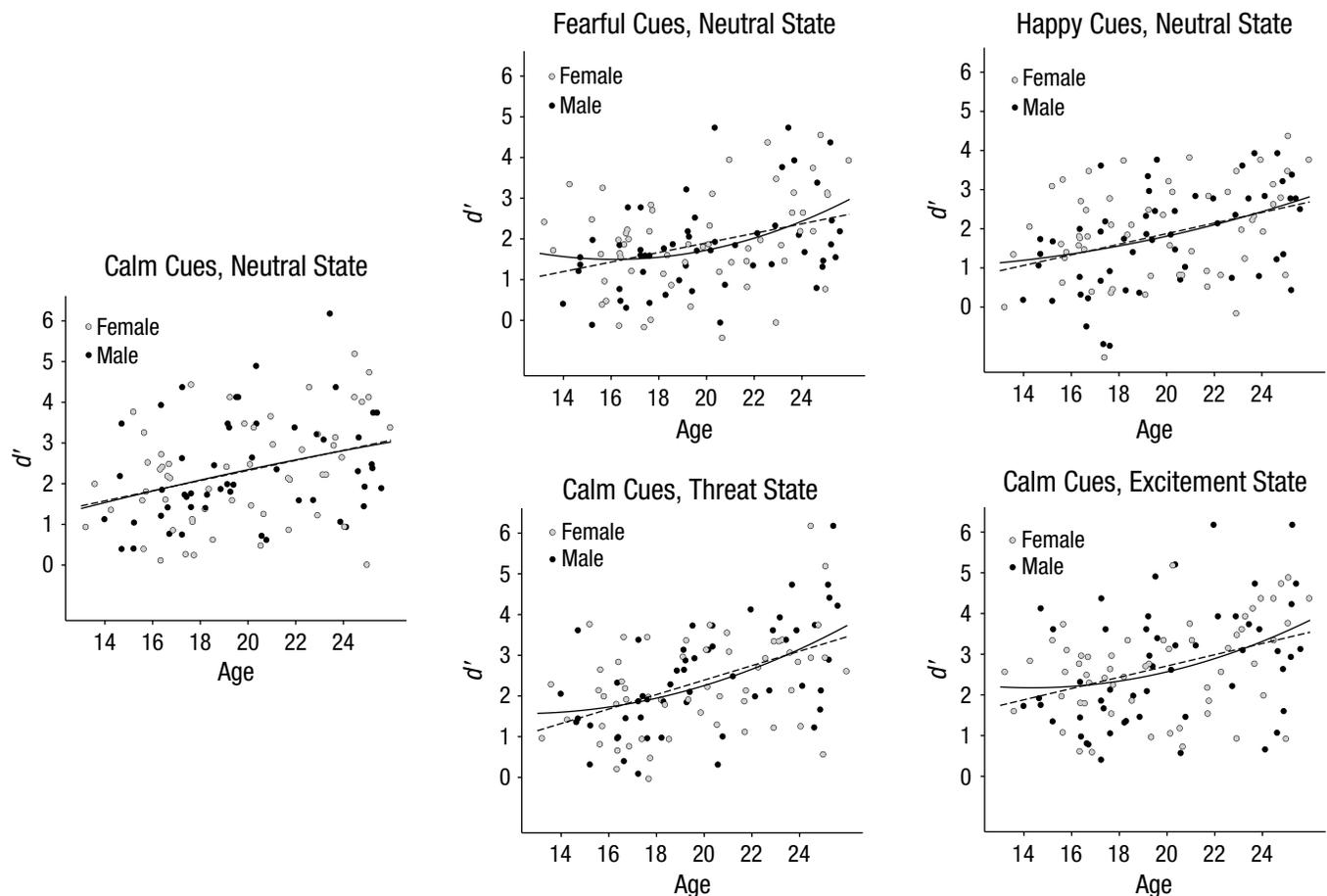


Fig. 4. Scatterplots showing male and female participants' performance, as indexed by d' , as a function of age, along with linear and quadratic functions fitted to the data. Results are shown for each kind of emotional cue in the neutral-state condition, as well as for calm cues in the threat and excitement conditions.

interaction of age as a continuous variable with type of emotional cue (see Table S1 in the Supplemental Material). In the two largest regions, the dACC and the parietal cortex (Fig. 3f), activity in response to fearful cues was positively correlated with age, $r(108) = .196, p = .040$, and $r(108) = .32, p < .001$, respectively. MR signal change in response to happy cues was negatively correlated with age in the dACC, $r(108) = -.189, p = .048$, but not in the parietal cortex, $r(108) = -.164, p = .087$. Activity in response to calm cues was not significantly correlated with age in either of these regions, $r(108) = -.088, p = .363$, and $r(108) = -.079, p = .412$, respectively.

We examined whether changes in dACC and parietal activity in response to fearful cues were correlated with behavioral performance. In both of these regions, MR signal change in response to fearful cues was positively correlated with d' in the neutral-state condition, $r(108) = .222, p = .020$, and $r(108) = .359, p < .001$, respectively (Figs. 3e and 3g). Similar patterns were observed even when we controlled for age, $r(107) = .166, p = .081$, and $r(107) = .277, p = .002$. These results suggest that these

regions are important for behavioral performance of the task.

Effects of emotional states as a function of age.

Although no activations survived whole-brain correction for the contrast of age groups in emotional states, a single cluster in the ventromedial PFC (vmPFC; $x = 3.5, y = -33.5, z = -17.5, 13$ voxels; $Z = 3.58, p < .05$, PFC corrected; Fig. 5b) survived PFC volume correction for responses in the state of threat. Teens' and young adults' BOLD activity in the vmPFC during the threat condition showed a sustained increase relative to adults' (Fig. 5c). MR signal change in this region in the threat condition was negatively correlated with behavioral performance (in response to the calm cues) in the threat condition, $r(108) = -.308, p = .001$ (Fig. 5d), and this correlation remained significant even when we controlled for age, $r(107) = -.215, p = .023$, and when we removed the one extreme outlier, $r(107) = -.253, p = .008$. No interactions of emotional state with age group were observed. In analyses for the excitement

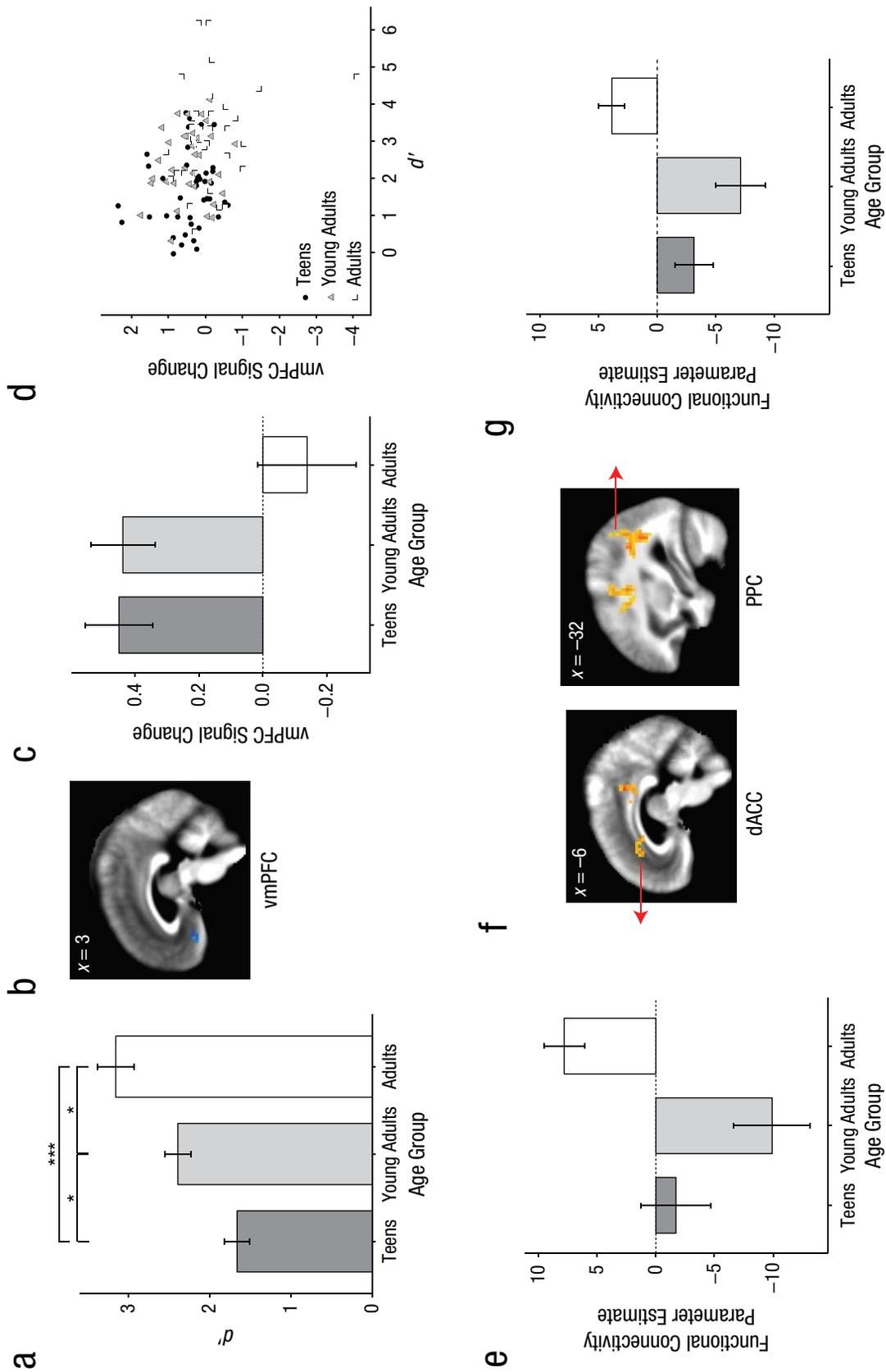


Fig. 5. Results for the sustained-threat condition. The graph in (a) shows mean performance on calm-cue trials, as indexed by d' , for each of the age groups under the sustained state of threat. The brain image in (b) shows the location of the region in ventromedial prefrontal cortex (vmPFC) for which signal-change results are presented. The graphs in (c) and (d) show mean signal change in the vmPFC in the threat condition for each age group and as a function of d' on calm-cue trials (separately for each age group), respectively. The brain images in (f) show the location of the regions in the dorsal anterior cingulate cortex (dACC) and posterior parietal cortex (PPC) for which functional coupling with the vmPFC is graphed for the three age groups in (e) and (g). The asterisk indicates a significant difference ($*p < .05$, $***p < .001$).

and neutral-state conditions, no clusters survived whole-brain or PFC volume correction.

A single cluster in the parietal cortex ($x = -2.5$, $y = 68.5$, $z = 54.5$, 29 voxels; $F = 11.90$, $p < .05$, corrected) survived whole-brain correction when we examined the interaction of emotional state and age as a continuous variable (see Fig. S3 in the Supplemental Material). MR signal change in this region showed similar positive associations with age in the threat and excitement conditions, $r(108) = .181$, $p = .058$, and $r(108) = .305$, $p = .001$, respectively, but not in the neutral-state condition, $r(108) = .151$, $p = .116$. Because BOLD activity in the threat and excitement conditions showed positive correlations with age, we collapsed the MR signal across these conditions and tested for associations between activation in this region and behavioral performance (in response to the calm cues) in these conditions. MR signal change was positively correlated with behavioral performance, $r(108) = .209$, $p = .028$ (see Fig. S3), but this correlation did not hold when we controlled for age, $r(107) = .11$, $p = .251$.

Seed-based functional connectivity with prefrontal regions in the three age groups. Whole-brain gPPI analyses were performed using the dlPFC and vmPFC regions as seeds. Nine clusters of voxels showing significantly less functional coupling with the vmPFC in teens and young adults than in adults across the threat condition were observed (see Table S2 in the Supplemental Material). Areas showing this pattern included the dACC (Figs. 5e and 5f) and posterior parietal cortex (Figs. 5f and 5g). No significant clusters were observed in the age-group contrast for fearful cues using the dlPFC seed.

Discussion

Our findings suggest a developmental shift in cognitive control in negative emotional situations during young adulthood that is paralleled by dynamic developmental changes in prefrontal circuitry. Specifically, young adults showed diminished cognitive control under both brief and prolonged negative emotional arousal relative to slightly older adults, a pattern not observed in neutral or positive situations. This behavioral pattern was paralleled by altered recruitment of lateral and medial prefrontal circuitry in young adults and adolescents, a finding consistent with structural imaging studies showing protracted development of prefrontal circuitry (Gogtay et al., 2004; Sowell et al., 2004).

Teens' and young adults' diminished cognitive control in response to negative cues was paralleled by their decreased activity in cognitive-control circuitry. When presented with fearful cues, teens and young adults showed less activity than older adults in dlPFC, a region implicated in affective and cognitive regulation (Silvers

et al., 2015; Vincent et al., 2008), and in the dACC and parietal cortex. The dlPFC and parietal cortex have reciprocal projections with the dACC, and all three regions have been implicated in cognitive control and are coactivated during cognitive-control tasks (Botvinick, Nystrom, Fissell, Carter, & Cohen, 1999; Platt & Glimcher, 1999; Roy, Shohamy, & Wager, 2012). Further, activity in these regions not only was consistently lower in younger participants, but also was positively correlated with task performance. Together, these findings are consistent with the hypothesis that lower levels of activity within this circuitry in younger individuals reflects diminished cognitive control in the face of negative emotional cues that signal potential threat in the environment.

Although under sustained states of negative emotional arousal (threat), young adults performed better than teens, they performed worse than adults. Teens' and young adults' diminished performance relative to adults in the threat condition was paralleled by increased activity in the vmPFC. This region has been implicated in various processes, including self-referential thought and integration of affective information, and is a proposed hub for affective computations and regulation (Roy et al., 2012). Increased sustained recruitment of the vmPFC under threat in teens and young adults may suggest heightened sensitivity to potential threat, leading to emotional interference and diminished cognitive control. This interpretation is supported in part by our finding of decreased functional coupling of the vmPFC with cognitive-control circuitry of the dACC and posterior parietal cortex in the threat condition among teens and young adults relative to adults. The negative functional connectivity between cognitive and emotional brain regions during this emotional state may underlie the poorer performance of the younger age groups.

Taken together, these findings suggest that young adulthood is a time when cognitive control is still vulnerable to negative emotional influences, in part as a result of continued development of lateral and medial prefrontal circuitry. This temporal developmental shift in cognitive-control capacity in negatively arousing situations relative to neutral (or positive) situations is consistent with the classic notion of developmental cascades in brain and behavior (Casey, Galván, & Somerville, 2015; Masten & Cicchetti, 2010). Accordingly, dynamic brain changes during late adolescence may enhance receptivity to or processing of emotional inputs in order to facilitate meeting changing socioemotional pressures that accompany adulthood (Casey et al., 2015).

Our findings have potential implications for informing age-related legal and social policies. Developmental findings based largely on teens have been referenced in several U.S. Supreme Court decisions regarding treatment of juvenile offenders over the past decade, with the Court

acknowledging immature cognitive functioning in juveniles as a mitigating factor in judgments of criminal culpability (Cohen & Casey, 2014; Scott, 2013; Steinberg, 2013). Scientific research has demonstrated that adolescents show heightened sensitivity to motivational and socioemotional information, which potentially renders them more vulnerable to poor decision making in these situations, compared with younger and older individuals (Chein et al., 2011; Cohen-Gilbert & Thomas, 2013; Dreyfuss et al., 2014; Galvan et al., 2006; Grose-Fifer et al., 2013; Hare et al., 2008; Somerville et al., 2011; Steinberg et al., 2009). The extension of this work to young adults, who show diminished cognitive control relative to slightly older adults in negative emotional situations, may have implications for legal policy. This is not to suggest that teens and young adults should not be held accountable for their actions, but rather, the boundaries of juvenile-court jurisdiction, criminal-court sentencing, and punishment may be informed by developmental considerations (Bonnie & Scott, 2013).

The implications of our findings must be considered within the limitations of the study. First, behaviors were measured within a controlled research setting. Although the emotionally arousing conditions may be relevant to emotional arousal in the real world, they were limited to experimentally manipulated emotional conditions that did not capture the complex real-world situations in which individuals typically make decisions. Second, the sample, although community based and representative of the racial and ethnic distribution in Los Angeles and New York City, was relatively small, with 110 participants 13 to 25 years of age; replication of these findings is warranted.

Prior research examining motivational and social influences on cognitive capacities in young adults as a unique age group has produced mixed results (Chein et al., 2011; Cohen-Gilbert et al., 2014; Silva et al., 2015; Steinberg et al., 2009). The present and previous findings suggest that teens' and young adults' cognitive capacities may be affected differently by various situations. For instance, although negative emotional arousal may diminish cognitive control in both teens and young adults, positive emotional arousal and the presence of peers may not influence young adults as strongly as teens (Chein et al., 2011). Identifying specific situations in which the behavior of young adults may differ from that of slightly older adults will be important in informing potential changes to existing policies and laws. Moreover, further examination of changes in brain structure, activity, and connectivity during this developmental period may provide clearer insights into why and when researchers may or may not observe group-level behavioral changes in young adults.

We examined the influence of emotional arousal on cognitive control from early adolescence through the mid 20s and found that negative emotional arousal, brief or

prolonged, affects this capacity in individuals ages 18 to 21 more than in older individuals. Few studies have examined cognitive capacities under emotional influences, and fewer still have taken this approach to study developmental differences in capacities of potential relevance to legal and social policies. Our findings provide support for consideration of contextual influences on behavior and brain function, such as the influence of emotional arousal, when evaluating appropriate age cut-offs for such policies. Although the data in this study do not speak directly to these policy issues, they may inform dialogues about the age of adulthood in a variety of social and policy contexts.

Author Contributions

B. J. Casey, A. Galván, and L. Steinberg developed the study concept. A. O. Cohen, K. Breiner, A. S. Heller, M. R. Silverman, and D. V. Dellarco collected the data and performed data analysis under the supervision of B. J. Casey and A. Galván. All authors contributed to interpretation of the data. A. O. Cohen and B. J. Casey drafted the manuscript, and all authors provided critical revisions and approved the final version of the manuscript for submission.

Acknowledgments

We gratefully acknowledge the assistance of Doug Ballon, Kristine Caudle, Jonathan Dyke, Hillary Raab, Ahrareh Rahdar, and the Citigroup Biomedical Imaging Center at Weill Cornell Medical College. We thank the anonymous reviewers for their constructive feedback.

Declaration of Conflicting Interests

B. J. Casey and L. Steinberg serve as paid consultants to the John D. and Catherine T. MacArthur Foundation. The authors declared that they have no other conflicts of interest with respect to their authorship or the publication of this article.

Funding

This work was supported by a National Science Foundation Graduate Research Fellowship (to A. O. Cohen). Preparation of this article was supported by a grant from the John D. and Catherine T. MacArthur Foundation to Vanderbilt University. Its contents reflect the views of the authors, and do not necessarily represent the official views of either the John D. and Catherine T. MacArthur Foundation or the MacArthur Foundation Research Network on Law and Neuroscience (www.lawneuro.org).

Supplemental Material

Additional supporting information can be found at <http://pss.sagepub.com/content/by/supplemental-data>

Open Practices

The data reported here are part of an ongoing multisite project. An optimized version of the Cognitive Control Under Emotion

(CCUE) task (both behavioral and jittered for use in the scanner) will soon be made available at https://www.sacklerinstitute.org/cornell/assays_and_tools/. The complete Open Practices Disclosure for this article can be found at <http://pss.sagepub.com/content/by/supplemental-data>.

References

- Bonnie, R. J., & Scott, E. S. (2013). The teenage brain: Adolescent brain research and the law. *Current Directions in Psychological Science*, *22*, 158–161.
- Botvinick, M., Nystrom, L. E., Fissell, K., Carter, C. S., & Cohen, J. D. (1999). Conflict monitoring versus selection-for-action in anterior cingulate cortex. *Nature*, *402*, 179–181.
- Casey, B. J. (2015). Beyond simple models of self-control to circuit-based accounts of adolescent behavior. *Annual Review of Psychology*, *66*, 295–319.
- Casey, B. J., Galván, A., & Somerville, L. (2015). Beyond simple models of adolescence to an integrated circuit-based account: A commentary. *Developmental Cognitive Neuroscience*. Advance online publication. doi:10.1016/j.dcn.2015.12.006
- Casey, B. J., Getz, S., & Galvan, A. (2008). The adolescent brain. *Developmental Review*, *28*, 62–77.
- Chein, J., Albert, D., O'Brien, L., Uckert, K., & Steinberg, L. (2011). Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry. *Developmental Science*, *14*, F1–F10.
- Chen, G., Saad, Z. S., Britton, J. C., Pine, D. S., & Cox, R. W. (2013). Linear mixed-effects modeling approach to fMRI group analysis. *NeuroImage*, *73*, 176–190.
- Cohen, A. O., & Casey, B. J. (2014). Rewiring juvenile justice: The intersection of developmental neuroscience and legal policy. *Trends in Cognitive Sciences*, *18*, 63–65.
- Cohen, A. O., Dellarco, D. V., Breiner, K., Helion, C., Rahdar, A., Pedersen, G., . . . Casey, B. J. (2016). The impact of emotional states on cognitive control circuitry and function. *Journal of Cognitive Neuroscience* *28*, 446–459.
- Cohen-Gilbert, J. E., Killgore, W. D. S., White, C. N., Schwab, Z. J., Crowley, D. J., Covell, M. J., . . . Silveri, M. M. (2014). Differential influence of safe versus threatening facial expressions on decision-making during an inhibitory control task in adolescence and adulthood. *Developmental Science*, *17*, 212–223.
- Cohen-Gilbert, J. E., & Thomas, K. M. (2013). Inhibitory control during emotional distraction across adolescence and early adulthood. *Child Development*, *84*, 1954–1966.
- Cox, R. W. (1996). AFNI: Software for analysis and visualization of functional magnetic resonance neuroimages. *Computers and Biomedical Research*, *29*, 162–173.
- Dosenbach, N. U. F., Nardos, B., Cohen, A. L., Fair, D. A., Power, D., Church, J. A., . . . Schlaggar, B. L. (2011). Prediction of individual brain maturity using fMRI. *Science*, *329*, 1358–1361.
- Dreyfuss, M., Caudle, K., Drysdale, A. T., Johnston, N. E., Cohen, A. O., Somerville, L. H., . . . Casey, B. J. (2014). Teens impulsively react rather than retreat from threat. *Developmental Neuroscience*, *36*, 220–227.
- Ernst, M., Pine, D. S., & Hardin, M. (2006). Triadic model of the neurobiology of motivated behavior in adolescence. *Psychological Medicine*, *36*, 299–312.
- Fair, D. A., Cohen, A. L., Power, J. D., Dosenbach, N. U., Church, J. A., Miezin, F. M., . . . Petersen, S. E. (2009). Functional brain networks develop from a “local to distributed” organization. *PLoS Computational Biology*, *5*(5), Article 381. doi:10.1371/journal.pcbi.1000381
- Foerde, K., Steinglass, J. E., Shohamy, D., & Walsh, B. T. (2015). Neural mechanisms supporting maladaptive food choices in anorexia nervosa. *Nature Neuroscience*, *18*, 1571–1573. doi:10.1038/nn.4136
- Galvan, A., Hare, T. A., Parra, C. E., Penn, J., Voss, H., Glover, G., & Casey, B. J. (2006). Earlier development of the accumbens relative to orbitofrontal cortex might underlie risk-taking behavior in adolescents. *The Journal of Neuroscience*, *26*, 6885–6892. doi:10.1523/JNEUROSCI.1062-06.2006
- Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: An experimental study. *Developmental Psychology*, *41*, 625–635.
- Geier, C. F., Terwilliger, R., Teslovich, T., Velanova, K., & Luna, B. (2010). Immaturities in reward processing and its influence on inhibitory control in adolescence. *Cerebral Cortex*, *20*, 1613–1629.
- Gogtay, N., Giedd, J. N., Lusk, L., Hayashi, K. M., Greenstein, D., Vaituzis, A. C., . . . Thompson, P. M. (2004). Dynamic mapping of human cortical development during childhood through early adulthood. *Proceedings of the National Academy of Sciences, USA*, *101*, 8174–8179.
- Grose-Fifer, J., Rodrigues, A., Hoover, S., & Zottoli, T. (2013). Attentional capture by emotional faces in adolescence. *Advances in Cognitive Psychology*, *9*, 81–91.
- Hare, T. A., Tottenham, N., Galvan, A., Voss, H. U., Glover, G. H., & Casey, B. J. (2008). Biological substrates of emotional reactivity and regulation in adolescence during an emotional go-nogo task. *Biological Psychiatry*, *63*, 927–934.
- Institute of Medicine & National Research Council. (2014). *Investing in the health and well-being of young adults* (R. J. Bonnie, C. Stroud, & H. Breiner, Eds.). Washington, DC: The National Academies Press.
- Jovicich, J., Czanner, S., Greve, D., Haley, E., van der Kouwe, A., Gollub, R., . . . Dale, A. (2006). Reliability in multi-site structural MRI studies: Effects of gradient non-linearity correction on phantom and human data. *NeuroImage*, *30*, 436–443.
- Luna, B., Marek, S., Larsen, B., Tervo-Clemmens, B., & Chahal, R. (2015). An integrative model of the maturation of cognitive control. *Annual Review of Neuroscience*, *38*, 151–170.
- Macmillan, N. A., & Creelman, C. D. (2004). *Detection theory: A user's guide* (2nd ed.). Mahwah, NJ: Erlbaum.
- Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, *22*, 491–495.
- McLaren, D. G., Ries, M. L., Xu, G., & Johnson, S. C. (2012). A generalized form of context-dependent psychophysiological interactions (gPPI): A comparison to standard approaches. *NeuroImage*, *61*, 1277–1286.
- Mills, K. L., Goddings, A.-L., Clasen, L. S., Giedd, J. N., & Blakemore, S.-J. (2014). The developmental mismatch in structural brain maturation during adolescence. *Developmental Neuroscience*, *36*, 147–160.

- Platt, M. L., & Glimcher, P. W. (1999). Neural correlates of decision variables in parietal cortex. *Nature*, *400*, 233–238.
- R Core Team. (2014). *R: A language and environment for statistical computing*. Retrieved from <https://cran.r-project.org/doc/manuals/r-release/fullrefman.pdf>
- Raznahan, A., Shaw, P. W., Lerch, J. P., Clasen, L. S., Greenstein, D., Berman, R., . . . Giedd, J. N. (2014). Longitudinal four-dimensional mapping of subcortical anatomy in human development. *Proceedings of the National Academy of Sciences, USA*, *111*, 1592–1597.
- Roy, M., Shohamy, D., & Wager, T. D. (2012). Ventromedial prefrontal-subcortical systems and the generation of affective meaning. *Trends in Cognitive Sciences*, *16*, 147–156.
- Scott, E. S. (2013). “Children are different”: Constitutional values and justice policy. *Ohio State Journal of Criminal Law*, *11*, 71–105.
- Silva, K., Shulman, E. P., Chein, J., & Steinberg, L. (2015). Peers increase late adolescents’ exploratory behavior and sensitivity to positive and negative feedback. *Journal of Research on Adolescence*. Advance online publication. doi:10.1111/jora.12219
- Silvers, J. A., Weber, J., Wager, T. D., & Ochsner, K. N. (2015). Bad and worse: Neural systems underlying reappraisal of high- and low-intensity negative emotions. *Social Cognitive and Affective Neuroscience*, *10*, 172–179.
- Smith, S. M., Jenkinson, M., Woolrich, M. W., Beckmann, C. F., Behrens, T. E. J., Johansen-Berg, H., . . . Matthews, P. M. (2004). Advances in functional and structural MR image analysis and implementation as FSL. *NeuroImage*, *23*, 208–219.
- Somerville, L. H., Hare, T., & Casey, B. J. (2011). Frontostriatal maturation predicts cognitive control failure to appetitive cues in adolescents. *Journal of Cognitive Neuroscience*, *23*, 2123–2134.
- Sowell, E. R., Thompson, P. M., Leonard, C. M., Welcome, S. E., Kan, E., & Toga, A. W. (2004). Longitudinal mapping of cortical thickness and brain growth in normal children. *The Journal of Neuroscience*, *24*, 8223–8231.
- Steinberg, L. (2010). A dual systems model of adolescent risk-taking. *Developmental Psychobiology*, *52*, 216–224.
- Steinberg, L. (2013). The influence of neuroscience on U.S. Supreme Court decisions involving adolescents’ criminal culpability. *Nature Reviews Neuroscience*, *14*, 513–518.
- Steinberg, L., Graham, S. J., O’Brien, L., Woolard, J., Cauffman, E., & Banich, M. (2009). Age differences in future orientation and delay discounting. *Child Development*, *80*, 28–44.
- Taylor-Thompson, K. (2014). Minority rule: Redefining the age of criminality. *N.Y.U. Review of Law & Social Change*, *38*, 143–200.
- Van Leijenhorst, L., Zanolie, K., Van Meel, C. S., Westenberg, P. M., Rombouts, S. A. R. B., & Crone, E. A. (2010). What motivates the adolescent? Brain regions mediating reward sensitivity across adolescence. *Cerebral Cortex*, *20*, 61–69.
- Vincent, J. L., Kahn, I., Snyder, A. Z., Raichle, M. E., Buckner, R. L., Philippi, C. L., . . . Raichle, M. E. (2008). Evidence for a frontoparietal control system revealed by intrinsic functional connectivity. *Journal of Neurophysiology*, *100*, 3328–3342.

EXHIBIT 43

OLD ENOUGH TO FIGHT, OLD ENOUGH TO SWIPE: A CRITIQUE OF THE INFANCY RULE IN THE FEDERAL CREDIT CARD ACT

Andrew A. Schwartz*

I. INTRODUCTION

In the 1960s and 1970s, American society came to the considered conclusion that if eighteen-year-olds can be drafted to fight and possibly die for their country, they should be treated as adults under the law. Thus, in 1971, the Twenty-Sixth Amendment to the United States Constitution, which lowered the voting age from twenty-one to eighteen, was proposed and ratified in just three months, making it the fastest amendment to be ratified in American history. The minimum age for federal and state jury service was also lowered from twenty-one to eighteen. And, with regard to contract law, every state passed legislation reducing the age of contractual capacity to eighteen. These changes overrode the centuries-old common law rule that one becomes an adult, in the eyes of the law, at age twenty-one—this being premised on the then-relevant custom that Englishmen became eligible for knighthood at that age. Despite the fact that all of these reforms remain in place, the federal Credit CARD Act of 2009 (CARD Act) established twenty-one as the minimum age to contract for a credit card.¹

* © 2011 Andrew A. Schwartz, Associate Professor of Law, University of Colorado Law School. I thank Allison Schwartz and Harry Surden for helpful comments on prior drafts, and Carolyn Black and Jane Thompson for research assistance. I also thank the moderator and my codiscussants at the AALS Section on Commercial and Related Consumer Law roundtable discussion on the Credit CARD Act of 2009 for an engaging and enlightening conversation. This Article is dedicated to a true infant, my one-year-old son, Morris Jacob Schwartz.

¹ Credit Card Accountability Responsibility and Disclosure (CARD) Act of 2009, Pub. L. No. 111-24, § 1, 123 Stat. 1734, 1734. The full text of the relevant section is as follows:

Section 127(c) of the Truth in Lending Act (15 U.S.C. 1637(c)) is amended by adding at the end the following:

(8) APPLICATIONS FROM UNDERAGE CONSUMERS.—

(A) PROHIBITION ON ISSUANCE.—No credit card may be issued to, or open end consumer credit plan established by or on behalf of, a consumer who has not attained the age of 21, unless the consumer has submitted a written application to the card issuer that meets the requirements of subparagraph (B).

(B) APPLICATION REQUIREMENTS.—An application to open a credit card account by a consumer who has not attained the age of 21 as of the date of submission of the application shall require—

(i) the signature of a cosigner, including the parent, legal guardian, spouse, or any other individual who has attained the age of 21 having a means to repay debts incurred by the consumer in connection with the account, indicating joint

This Article criticizes the “infancy rule” of the CARD Act, found in section 301, for two reasons. First, in the late twentieth century, we decided that eighteen-year-olds are adults that deserve to be treated with dignity by the law, and this view has not changed. This basic principle was the driving force behind the Twenty-Sixth Amendment to the United States Constitution, which in 1971 lowered the minimum voting age to eighteen, as well as state and federal statutes that lowered the age for jury service to eighteen, not to mention the state statutes lowering the age of contractual capacity to eighteen. In declaring all those under twenty-one to be infants, section 301 runs badly afoul of this broad societal consensus, rolls back the clock to medieval times, and undermines the dignity of eighteen-year-olds.

Second, separate and apart from the harm section 301 directly inflicts on young people, the CARD Act’s infancy rule hurts society at large. This is because the state statutory reforms of the 1970s that endowed eighteen-year-olds with the capacity to enter into binding contracts ushered in the new and hugely beneficial phenomenon of youthful entrepreneurship. Young people, aged eighteen to twenty, were now able to obtain credit and found start-up companies. Such youthful entrepreneurs included Bill Gates, who founded Microsoft at age nineteen, and Mark Zuckerberg, who founded Facebook at the same age. These and other youthful start-ups employ hundreds of thousands of people, and their products and services improve our lives. Under section 301 of the CARD Act, however, they likely never would have been launched. In short, by hampering youthful entrepreneurship, section 301 harms not only the youths themselves, but society as a whole.

This Article proceeds as follows. Part II recounts the history of legal adulthood, showing that it was originally set at twenty-one years in the Middle Ages, but was subsequently lowered in the late twentieth century. This Part focuses on four areas—voting, jury service, death eligibility and contracting—and elaborates on how extending the right to contract to eighteen-year-olds created a new class of youthful entrepreneurs. Part III describes section 301 of the CARD Act and criticizes it for contradicting our modern view of adulthood and for undermining socially beneficial youthful entrepreneurship. Part IV concludes with a call to repeal section 301.²

liability for debts incurred by the consumer in connection with the account before the consumer has attained the age of 21; or

(ii) submission by the consumer of financial information, including through an application, indicating an independent means of repaying any obligation arising from the proposed extension of credit in connection with the account.

(C) SAFE HARBOR.—The Board shall promulgate regulations providing standards that, if met, would satisfy the requirements of subparagraph (B)(ii).

CARD Act § 301.

² An alternative course would be for Congress to replace section 301 with a provision establishing a maximum credit line of, say, \$10,000 for those under twenty-one. Simple

II. EVOLVING STANDARDS OF INFANCY³

From as far back as precedents stretch, our law has always imposed a minimum age for engaging in weighty aspects of public and private life, such as serving as a juror, voting, and making contracts.⁴ This is known as the “infancy” doctrine. The underlying policy of the rule is, of course, that children lack the necessary maturity and experience to be trusted to make sensible choices on important subjects, such as whether to impose the death penalty on a fellow citizen.

But where should the line between infancy and adulthood be drawn? A four-year-old is clearly an infant, and a forty-year-old is clearly an adult. But what about close cases, like that of a precocious seventeen-year-old who lives with her parents but has already graduated from college? Courts can resolve close cases such as this, generally speaking, in one of two ways. One alternative is to draw a bright-line rule at a certain age and take no account of individual characteristics. The other is to decide on a case-by-case basis whether the specific person is mature enough to be treated by the law as an adult. Each approach has its merits and demerits.⁵ A bright-line rule is likely to be both over- and underinclusive, but also predictable and inexpensive.⁶ A flexible standard may be more fair and accurate, but also more costly to administer and difficult to predict.⁷

Beginning in the thirteenth century,⁸ the common-law courts universally embraced a bright-line rule setting legal adulthood at twenty-one years. In the eyes

repeal of section 301 would be preferable for the reasons discussed in this Article, but a provision establishing a maximum credit line would respond to the animating concern of section 301 (i.e., that those under twenty-one are too immature to handle credit) while ameliorating some of the problems of the present prohibition.

³ *Cf.* *Trop v. Dulles*, 356 U.S. 86, 101 (1958) (holding that the Eighth Amendment to the United States Constitution, which bans “cruel and unusual” punishment, “must draw its meaning from the evolving standards of decency that mark the progress of a maturing society”).

⁴ WENDELL W. CULTICE, *YOUTH’S BATTLE FOR THE BALLOT: A HISTORY OF VOTING AGE IN AMERICA* 2 (1992) (“England had adopted the legal age of 21 as the minimum voting age, and the colonies adopted the same standard.”); *see* 5 RICHARD A. LORD, *WILLISTON ON CONTRACTS* § 9:2 (4th ed. 2010) [hereinafter *WILLISTON*] (citing cases from as early as 1292).

⁵ *See, e.g.*, Pierre Schlag, *Rules and Standards*, 33 *UCLA L. REV.* 379, 383–90 (1985) (recounting and critiquing the “patterned sets of ‘canned’ pro and con arguments about the value of adopting either rules or standards in particular contexts”).

⁶ 5 *WILLISTON*, *supra* note 4, § 9:3.

⁷ *See, e.g.*, *Roper v. Simmons*, 543 U.S. 551, 601 (2005) (O’Connor, J., dissenting) (“Chronological age is not an unfailing measure of psychological development, and common experience suggests that many 17-year-olds are more mature than the average young ‘adult.’”); 5 *WILLISTON*, *supra* note 4, § 9:3 (explaining how age rather than intelligence has been used in varying degrees to signal the attainment of majority).

⁸ 5 *WILLISTON*, *supra* note 4, § 9:2 (citing an English case from 1292).

of the law, everyone under that age was an infant and everyone over that age an adult.⁹ The courts paid no attention to the actual level of maturity of the person at issue. Twenty-one was initially selected because, at the time (the medieval era), Englishmen were eligible for knighthood only upon achieving twenty-one years of age.¹⁰ Apparently, the suits of armor worn by English knights were so heavy that only at age twenty-one could most young men be expected to bear it.¹¹ Thus under the common law, a person becomes an adult, with full legal capacity, when he turns twenty-one.¹²

This rule remained remarkably stable from the Middle Ages until well into the twentieth century. But in the late 1960s and early 1970s, the idea that all persons under twenty-one were infants was widely examined and discussed—and rejected. After several years of public debate and deliberation, American society came to the collective conclusion that the legal age of majority should be reduced to eighteen. In light of this new consensus, the people amended the United States Constitution, as well as the statutory law of every state, to declare that infancy ends at eighteen. Those amendments, and the consensus behind them, remain firmly in place today.

The reduction in the age of adulthood to eighteen played out in numerous arenas, including voting, jury service, death eligibility and, most importantly for present purposes, contracting. Each will be examined in turn.

A. Suffrage

Prior to the 1970s, the right to vote in the Anglo-Saxon world was always reserved to those twenty-one and older.¹³ This was but a particular application of the common law's general bright-line rule that all persons are classified as infants by the law until they attain their majority at age twenty-one.¹⁴ The rule was so well settled that the United States Constitution did not bother to mention a minimum

⁹ *Id.* § 9:3 (“No distinction has generally been drawn so far as concerns contractual capacity between a minor of tender years and one who, having nearly attained his majority, has ample intelligence in fact.”).

¹⁰ CULTICE, *supra* note 4, at 2; *see also* Jolicoeur v. Mihaly, 488 P.2d 1, 5 (Cal. 1971); HOMER H. CLARK, JR., THE LAW OF DOMESTIC RELATIONS IN THE UNITED STATES § 8.1, at 309 (2d ed. 1988); Adam Liptak, 1971: 18-Year-Olds Get the Vote, N.Y. TIMES UPFRONT, Sept. 4, 2006, at 24.

¹¹ *Jolicoeur*, 488 P.2d at 5; S. REP. NO. 92-26 (1971) (report on “Lowering the Voting Age to 18”). Once translated into the common law, however, the rule was applied equally to both genders. *See* CULTICE, *supra* note 4, at 2.

¹² *Jones v. Jones*, 72 F.2d 829, 830 (D.C. Cir. 1934) (“[U]nder the common law infants . . . attained their majority at the age of 21 years.”); *Gastonia Pers. Corp. v. Rogers*, 172 S.E.2d 19, 20 (N.C. 1970) (“Under the common law, persons . . . are classified and referred to as *infants* until they attain the age of twenty-one years.”). To be completely accurate, one achieved majority under the common law the day before one’s twenty-first birthday. *United States v. Wright*, 197 F. 297, 298 (8th Cir. 1912). This is because the common law ignores fractions of days. *Id.*

¹³ CULTICE, *supra* note 4, at 2.

¹⁴ *See* sources cited *supra* note 12.

voting age until the post-Civil War amendments.¹⁵ In short, from the founding of this nation until quite recently, a minimum voting age of twenty-one was imposed in all state and federal elections.¹⁶

Limiting the franchise to those over twenty-one may have made sense in medieval England or pre-industrial America. But in the twentieth century, the United States Congress decreed for the first time that males aged eighteen and older were eligible to be drafted into the military.¹⁷ This created an incongruity in the law: an eighteen-year-old could be called to fight—and possibly die—for a government that he was powerless to change.¹⁸ Taxation without representation looked pretty good by comparison.

So, when many Americans (or their loved ones) enlisted or were drafted to fight in World War II and the Korean War in the 1940s and 1950s, support began to build for the idea that “if a man is old enough to fight he is old enough to vote.”¹⁹ Prior to World War II and Korea, only 17% of the public favored reducing the voting age, according to a 1939 poll.²⁰ Following those two wars, in which eighteen-year-olds were drafted and served, 58% of American adults supported lowering the voting age to eighteen.²¹ In 1942, during World War II, Georgia became the first state to lower the voting age to eighteen.²² In 1955, shortly after the Korean War, Kentucky reduced its voting age to eighteen.²³ On the federal level, President Eisenhower—who had previously served as a five-star General in the United States Army—advocated for the same outcome on the federal level, mentioning it in two State of the Union addresses.²⁴

Georgia, Kentucky, and President Eisenhower were ahead of their time, however. The prevailing view of lawmakers and their constituents in the

¹⁵ Section Two of the Fourteenth Amendment only pertained to those newly freed slaves “being twenty one years of age.” U.S. CONST. amend. XIV, § 2.

¹⁶ CULTICE, *supra* note 4, at 2–3, 6 (“England had adopted the legal age of 21 as the minimum voting age, and the colonies adopted the same standard.”); ALEXANDER KEYSSAR, *THE RIGHT TO VOTE: THE CONTESTED HISTORY OF DEMOCRACY IN THE UNITED STATES* 277 (2000) (“Since the nation’s founding, a voting age of twenty-one—a carryover from colonial and English precedents—had been a remarkable constant in state laws governing the franchise.”). See generally CULTICE, *supra* note 4, at 2 (“It is believed that all countries, colonies, and territories within the British Commonwealth in which suffrage was extended subscribed to the legal voting age of 21 years.”).

¹⁷ CULTICE, *supra* note 4, at 16 (World War I draft); *id.* at 20 (World War II draft).

¹⁸ *Id.* at 20–21 (“Mr. President, if young men are to be drafted at eighteen years of age to fight for their Government, they ought to be entitled to vote at eighteen years of age for the kind of government for which they are best satisfied to fight.” (quoting Sen. Vanderberg on the floor of the U.S. Senate, Oct. 19, 1942)).

¹⁹ *Id.* at 33 (quoting then-presidential nominee Dwight D. Eisenhower in 1952).

²⁰ *Id.* at 53.

²¹ *Id.* (“This trend of public opinion represented one of the greatest shifts ever recorded by the Gallup poll.”).

²² *Id.* at 206, 234.

²³ *Id.* at 206.

²⁴ *Id.* at 51 (1954 State of the Union); *id.* at 56 (1956 State of the Union).

immediate post-war years remained what it had been for centuries, namely that the voting age should be twenty-one.²⁵ Throughout the 1950s and 1960s, federal and state legislators repeatedly introduced bills to lower the voting age to eighteen—but such proposals were defeated, again and again.²⁶ As late as 1970, every state except four continued to restrict suffrage to those age twenty-one and older, as did federal law.²⁷

But then came the Vietnam War, which changed everything.²⁸ Once again, a military engagement called attention to the injustice of subjecting eighteen-year-olds to the draft but denying them the ballot. This time, however, the movement to lower the voting age to eighteen was carried along as part of the massive civil rights, antiwar, counterculture, and other social movements of the late 1960s and early 1970s.²⁹ “Let Us Vote” (LUV) and other youth organizations were founded on college campuses to campaign in favor of extending the franchise to eighteen-year-olds, but they were not alone.³⁰ Other influential groups, including the NAACP, the American Jewish Committee, and the United Auto Workers union, also endorsed lowering the voting age to eighteen.³¹

They took up the slogan, “Old enough to fight, old enough to vote”³² and argued that it was “surely unjust . . . to command men to sacrifice their lives for a decision which they had no part in making.”³³ This seemed particularly poignant with regard to the Vietnam War, not only because it was broadly unpopular,³⁴ but

²⁵ CULTICE, *supra* note 4, at 44–49; *see, e.g., id.* at 46 (“Eighteen to twenty-one are mainly formative years where the youth is racing forward to maturity. . . . These are rightfully the years of rebellion rather than reflection. We will be doing a grave injustice to democracy if we grant the vote to those under 21.” (quoting Rep. Emanuel Celler)).

²⁶ *Id.* at 141–59, 206; *id.* at 159 (“[T]he fifteen-state referenda held during the interim of 1943–69 resulted in only two states—Georgia and Kentucky—lowering their voting ages to 18.”).

²⁷ *See id.* at 94–95, 206.

²⁸ KEYSSAR, *supra* note 16, at 279.

²⁹ *Id.*; *see Jolicoeur v. Mihaly*, 488 P.2d 1, 7 (Cal. 1971) (“America’s youth entreated, pleaded for, demanded a voice in the governance of this nation. On campuses by the hundreds, at Lincoln’s Monument by the hundreds of thousands, they voiced their frustration at their electoral impotence and their love of a country which they believed to be abandoning its ideals.”).

³⁰ CULTICE, *supra* note 4, at 98–99.

³¹ *Id.* at 99–109.

³² *Id.* at 234.

³³ *Lowering the Voting Age to 18: Hearings Before the Subcomm. on Constitutional Amendments of the Comm. on the Judiciary*, 90th Cong. 20–21 (1968) (statement of Rep. Spencer Oliver); *accord Oregon v. Mitchell*, 400 U.S. 112, 141–42 (1970) (Douglas, J., dissenting).

³⁴ THOMAS H. NEALE, CONG. RESEARCH SERV., REPORT NO. 83–103, THE EIGHTEEN YEAR OLD VOTE: THE TWENTY-SIXTH AMENDMENT AND SUBSEQUENT VOTING RATES OF NEWLY ENFRANCHISED AGE GROUPS 8 (1983) (“[T]he claim of young Americans that they deserved the right to vote seemed more compelling in light of growing questions about

also because approximately half the casualties—about 25,000 deaths—were of servicemen aged eighteen to twenty.³⁵ Under these circumstances, it seemed absurd to many Americans that “the right to vote of Americans in the 20th century” was still governed by “the weight of armor in the 11th century.”³⁶

Furthermore, the American view of eighteen-year-olds had evolved by the late 1960s; they were no longer viewed as children, but as young adults capable of handling adult responsibilities.³⁷ The unrest on college campuses called attention to the fact that eighteen-year-olds desperately wanted, and deserved, a voice in the political process.³⁸ There was hope that young people could be “turned from a revolutionary path by their ability to vote.”³⁹

Scientific authorities, such as anthropologist Margaret Mead, opined that modern eighteen-year-olds were sufficiently mature to be entrusted with the vote.⁴⁰ Even President Nixon agreed: “The younger generation today is better educated, it knows more about politics, more about the world than many of the older people. That is why I want them to vote, not because they are old enough to fight but because they are smart enough to vote.”⁴¹ All of this was a sea change from the

United States military involvement in Indochina.”); KEYSSAR, *supra* note 16, at 279 (describing the “unpopularity” and “absence of democratic support for the war”).

³⁵ Theodore J. Hull, *Statistical Information about Casualties of the Vietnam War*, NAT’L ARCHIVES, <http://www.archives.gov/research/military/vietnam-war/casualty-statistics.html#age> (last updated Feb. 2007); see *Jolicoeur v. Mihaly*, 488 P.2d 1, 5 (Cal. 1971) (observing that congressional action to lower the voting age “was influenced by the fact that over half the deaths in Vietnam have been of men in the 18–20 age group”); JACK N. RAKOVE, *THE ANNOTATED U.S. CONSTITUTION AND DECLARATION OF INDEPENDENCE* 304 (2009) (opining that the Twenty-Sixth Amendment “was badly needed” to honor the “sacrifices and burdens borne by the younger generation, who did so much of the fighting”).

³⁶ *Lowering the Voting Age to 18: Hearings Before the Subcomm. on Constitutional Amendments of the Comm. on the Judiciary*, 91st Cong. 157 (1970) [hereinafter *Lowering the Voting Age to 18 (91st Cong.)*] (statement of Sen. Edward M. Kennedy). Even if the weight of armor were relevant, contemporary males apparently mature more quickly than their medieval counterparts and would be able to wear a knights’ armor at age eighteen, according to noted anthropologist Margaret Mead. S. REP. NO. 92–26, at 5 (1971).

³⁷ See CULTICE, *supra* note 4, at 98; BOB DYLAN, *The Times They Are A-Changin’*, on *THE TIMES THEY ARE A-CHANGIN’* (Columbia Records 1964) (“Come mothers and fathers / Throughout the land / And don’t criticize / What you can’t understand / Your sons and your daughters / Are beyond your command.”).

³⁸ See RICK PERLSTEIN, *NIXONLAND: THE RISE OF THE PRESIDENT AND THE FRACTURING OF AMERICA* 508 (2008).

³⁹ *Id.* at 582.

⁴⁰ See S. REP. NO. 92–26, at 4.

⁴¹ Lewis J. Paper, Note, *Legislative History of Title III of the Voting Rights Act of 1970*, 8 HARV. J. ON LEGIS. 123, 136 (1970); see also *Jolicoeur v. Mihaly*, 488 P.2d 1, 5 (Cal. 1971) (“[T]oday’s youth is better informed and more mature than any other generation in the nation’s history.” (citing, inter alia, President Nixon’s testimony)); PERLSTEIN, *supra* note 38, at 508–09 (recounting that President Nixon “favored the eighteen-year-old vote”).

view of eighteen-year-olds as infants that prevailed from the Middle Ages through the 1950s.

By the late 1960s, the public overwhelmingly favored lowering the voting age to eighteen.⁴² And their elected officials acted accordingly. Prominent voices from across the political spectrum—from Senator Kennedy to Senator Goldwater—supported reducing the voting age to eighteen.⁴³ By 1969, a significant majority of federal legislators agreed.⁴⁴ Hence, in 1970, a bipartisan Congress amended the Voting Rights Act to make eighteen the minimum voting age for all state and federal elections.⁴⁵ Later that year, however, the Supreme Court held that Congress lacked the power to lower the minimum age to vote in state, as opposed to federal, elections.⁴⁶ A constitutional amendment would be required.

The United States Constitution is difficult to amend, as a proposed amendment must be approved by two-thirds of both houses of Congress and then ratified by three-quarters of the states.⁴⁷ The process is time consuming and rarely successful.⁴⁸ But the Twenty-Sixth Amendment to the Constitution, which extended suffrage to all citizens “eighteen years of age or older,” was so tremendously popular that its enactment was very quick and easy.⁴⁹ In early 1971, a near-unanimous Congress voted to propose the amendment to the states.⁵⁰ Then, within just one hundred days, it was ratified by the requisite number of states.⁵¹ This was the fastest ratification in the history of the Constitution, and remains so to this day.⁵² The people had spoken, loudly and clearly: eighteen-year-olds are

⁴² NEALE, *supra* note 34, at 7 (citing a 1967 Gallup poll showing 64% in favor of reducing the voting age to eighteen and 28% opposed).

⁴³ See *Lowering the Voting Age to 18 (91st Cong.)*, *supra* note 36, at 156–58 (statement of Sen. Kennedy); *id.* at 132–33 (statement of Sen. Goldwater); S. REP. NO. 92–26, at 4 (statement of President Nixon) (asserting that modern eighteen-year-olds demonstrate “the highest qualities of mature citizenship”).

⁴⁴ CULTICE, *supra* note 4, at 108.

⁴⁵ *Id.* at 125, 137 (reporting a 64–17 vote in the Senate and a 272–132 vote in the House).

⁴⁶ *Oregon v. Mitchell*, 400 U.S. 112, 117–18 (1970); see CULTICE, *supra* note 4, at 172.

⁴⁷ U.S. CONST. art. V.

⁴⁸ CULTICE, *supra* note 4, at 214 (noting that prior to the Twenty-Sixth Amendment, the fastest ratification of a Constitutional amendment—the Twelfth—had been six months and six days); Rosalind Dixon, *Updating Constitutional Rules*, 2009 SUP. CT. REV. 319, 342 (reporting that, of eleven thousand attempts to amend the Constitution, only twenty-seven have succeeded).

⁴⁹ See CULTICE, *supra* note 4, at 214.

⁵⁰ NEALE, *supra* note 34, at 13 (noting the vote was 94–0 in the Senate and 400–19 in the House).

⁵¹ *Id.* at 14 (“The degree of acceptance of the proposed amendment was evidenced by the unprecedented speed with which the States approved it . . .”).

⁵² KEYSSAR, *supra* note 16, at 281 (“The ratification process was by far the most rapid in the history of the republic.”).

adults, not infants, and therefore must be guaranteed the right to vote. And so they are, under the law of every state.⁵³

B. Jury Service

Jury service followed a parallel trajectory to suffrage, and indeed was part and parcel of the same legal reform. As with voting, the minimum age for federal and state jury service traditionally was twenty-one years, based on the general common-law rule that a person becomes an adult at that age.⁵⁴ But when the modern view of infancy emerged in the 1960s and 1970s, which classified eighteen-year-olds as adults, not infants, it logically followed that the minimum age to serve on a jury should be lowered to eighteen. And so it was, in nearly every state and under federal law.⁵⁵

On the federal level, the federal Jury Selection and Service Act was amended in 1972 to reduce the minimum age for federal jury service from twenty-one to eighteen.⁵⁶ The legislative history of the federal amendment indicates that support for this change—which had already been made in twenty states by then—was unanimous.⁵⁷

For reasons substantially similar to those which prompted the Congress to . . . propose a constitutional amendment reducing the age to vote, and which have resulted in such a ready response among the States in the ratification process, it is now clear as a matter of policy that the 18- to 21-year-olds should no longer be barred from Federal jury service. If they are mature enough to vote . . . , they are mature enough to participate as jurors⁵⁸

As for state law, nearly every state has by now passed legislation reducing the minimum age for jury service to eighteen,⁵⁹ and even these last holdouts may soon join the majority.⁶⁰ This is all in line with our modern consensus that eighteen-

⁵³ See *Roper v. Simmons*, 543 U.S. 551, 581–82 (2005) (listing in Appendix B state statutes establishing minimum voting ages).

⁵⁴ See, e.g., 28 U.S.C. § 1865(b)(1) (1970) (stating that one must be at least twenty-one years old to serve on a federal grand or petit jury).

⁵⁵ See *infra* note 59.

⁵⁶ Act of Apr. 6, 1972, Pub. L. No. 92-269, 86 Stat. 117.

⁵⁷ See H.R. REP. NO. 92-869, at 3 (1972) (“Without exception, all of the testimony and statements supported the reduction of Federal jury eligibility to age 18.”).

⁵⁸ *Id.* at 4 (letter from Deputy Att’y Gen. Kleindienst).

⁵⁹ See *Roper v. Simmons*, 543 U.S. 551, 583–84 (2005) (listing in Appendix C state statutes establishing minimum ages for jury service). Missouri and Mississippi retain twenty-one as the minimum age for jury service; Alabama and Nebraska have reduced the minimum age to nineteen; the rest of the states have reduced it to eighteen. *Id.*

⁶⁰ See, e.g., Ria Jackson, *Pros and Cons of Lowering the Age for Jurors*, ST. LOUIS DAILY REC. & ST. LOUIS COUNTIAN, Aug. 10, 2002, at 2 (“A Missouri Senate bill

year-olds, as a class, are adults, not infants. They can be trusted to make reasonable decisions in high-stakes civil and criminal trials. As a result, this new group of eighteen- to twenty-year-old jurors has played a hand in deciding cases worth hundreds of millions of dollars⁶¹ and even deciding whether to impose (or withhold) the death penalty.⁶²

C. Death Eligibility

Being treated as an adult does not always redound to the benefit of eighteen-year-olds. Nowhere is this clearer than in the case of the ultimate criminal sanction, the death penalty. In the landmark case of *Roper v. Simmons*,⁶³ the United States Supreme Court held that the Eighth Amendment prohibits the imposition of the death penalty on a seventeen-year-old child—but permits the execution of eighteen-year-olds.⁶⁴ The Court's rationale should be familiar by now: The “age of 18 is the point where society draws the line for many purposes between childhood and adulthood,” including “voting [and] serving on juries.”⁶⁵ By the same token, eighteen-year-olds, as a class, are sufficiently mature and sophisticated to be held fully responsible for their crimes, held the Court.⁶⁶

The *Roper* decision was handed down in 2005, more than thirty years after our society rejected the old common-law view that adulthood begins at twenty-one and adopted the modern view that it begins at eighteen. Our collective decision in the 1970s to treat eighteen-year-olds as adults in the eyes of the law has become firmly embedded as a matter of law, culture, and custom.

D. Capacity to Contract

Voting and jury service are important civic rights and duties, but the protesting youth of the 1960s and 1970s wanted more than just the right to

introduced this past session sought to lower the age of jury duty to 18 instead of 21.”); Timothy J. Wilson, *Antiquated Bias Keeps Missouri's Youngest Voters from Serving on Juries*, ST. LOUIS POST-DISPATCH, Nov. 19, 2002, at B7 (arguing in favor of reducing the minimum age for jury service to eighteen).

⁶¹ See, e.g., Bruce Japsen, *Jury: Vioxx to Blame*, CHI. TRIB., Aug. 20, 2005, at 1 (quoting a twenty-year-old juror whose vote was necessary to impose a \$253 million judgment).

⁶² See, e.g., Jon Burstein, *Waffle House Robber Acquitted of Murder*, SUN SENTINEL, Feb. 14, 2004, at B1 (discussing the significant role played by an eighteen-year-old high school student juror in a capital case); Michelle Roberts, *Murderer of Gay Couple Gets Death Sentence*, OREGONIAN, July 29, 2000, at D1 (quoting an eighteen-year-old juror who was part of a jury that imposed the death penalty); see also Janan Hanna & Lisa Black, *Woman Gets Death Penalty for Brutal Addison Slayings*, CHI. TRIB., Mar. 28, 1998, at 1 (quoting a nineteen-year-old juror who was part of a jury that imposed the death penalty).

⁶³ 543 U.S. 551.

⁶⁴ *Id.* at 568.

⁶⁵ *Id.* at 570, 574.

⁶⁶ *Id.* at 569–70.

participate in their government. They also wanted “a piece of the action”—that is, an opportunity to make investments or to start a business of their own.⁶⁷ But contract law has always held that infants lack the requisite mental “capacity” to bind themselves by contract⁶⁸ and, under the traditional common-law rule, everyone under twenty-one was an infant.⁶⁹ The result of this confluence of rules was a legal prohibition on eighteen-, nineteen-, and twenty-year-olds grabbing “a piece of the action” for themselves.

That infants lack capacity to contract follows from first principles of contract law. The nature of a contractual duty is that it is assumed freely and voluntarily.⁷⁰ Therefore both parties to a contract must have the mental “capacity” to bind themselves for their agreement to be legally enforceable.⁷¹ If one of them lacked capacity at the time—she was sleepwalking or delirious, say—the contract will not be enforceable against her.⁷² Beyond these sorts of temporary incapacities that might befall anyone, certain classes of people are held as a matter of law to always lack capacity to contract,⁷³ including the mentally ill and, most notably for present purposes, infants.⁷⁴ The underlying idea is not hard to understand. Infants are, by definition, “immature in both mind and experience” and therefore need to be protected from their own poor decisions, “as well as from adults who would take advantage” of them.⁷⁵

⁶⁷ CULTICE, *supra* note 4, at 103 (“During the 1968 campaign, Nixon promised the nation’s youth ‘a piece of the action.’”); *id.* at 98 (“American youth should be given a ‘piece of the action.’” (quoting the founder of LUV, Dennis Warren)). For judicial uses of the phrase, see, for example, *Ambrosino v. Rodman & Renshaw, Inc.*, 972 F.2d 776, 787 (7th Cir. 1992) (observing that it is “common practice for a promoter or other interested party to own a piece of the action in oil prospects, generally in the form of a leasehold, working, or overriding royalty interest”).

⁶⁸ 5 WILLISTON, *supra* note 4, § 9:1.

⁶⁹ See *supra* Part II.

⁷⁰ *Johnson v. Scandia Assocs., Inc.*, 717 N.E.2d 24, 29 (Ind. 1999) (stating that contractual liability is “voluntary”; also stating that tort liability, by contrast, is “involuntary”); E. ALLAN FARNSWORTH, *CONTRACTS* § 3.1 (4th ed. 2004); Andrew A. Schwartz, *Consumer Contract Exchanges and the Problem of Adhesion*, 28 *YALE J. ON REG.* 313, 347 (2011) (“A key normative premise of the enforcement of contracts is that the legal obligation being enforced was accepted knowingly and voluntarily. . .”).

⁷¹ RESTATEMENT (SECOND) OF CONTRACTS § 12(1) (1981). The concept of capacity is limited to natural persons. *Id.* cmt. e.

⁷² *Id.* § 12(1).

⁷³ *Id.* § 12(2)(a)–(d). Married women were formerly included in this group. See *id.* cmt. d.

⁷⁴ *Id.* § 12(2)(b); accord, e.g., *Panza v. Panza*, 112 N.Y.S.2d 262, 265 (N.Y. Fam. Ct. 1952) (“Under the law, a contract made by a child, one who is under the age of 21, cannot be enforced against that child, for in law a child is incapable of entering into a valid contract.”).

⁷⁵ *Kiefer v. Fred Howe Motors, Inc.*, 158 N.W.2d 288, 290 (Wis. 1968); see also *Baker v. Lovett*, 6 Mass. (6 Tyng) 78, 80 (1809) (“Infants are supposed to be destitute of sufficient understanding to contract. The law, therefore, protects their weakness and

This is not to say that the common law prohibits infants from contracting or that a contract with an infant is void or “illegal” in some sense. Rather, the common-law infancy rule—designed as it is for the protection of the infant—holds that an infant’s contract is voidable at her election.⁷⁶ So, if a contract turns out to be good for the infant, she can enforce it against the counterparty; but if it turns out bad for the infant, the counterparty cannot enforce it against her.⁷⁷

At first blush, this seems purely beneficial to the infant. But the practical result of a judicial refusal to hold infants to their promises was that no one was willing to contract with them.⁷⁸ The common law’s paternalism toward infants excluded them from the commercial world.⁷⁹ Without the capacity to contract, one cannot purchase inventory or engage employees, let alone borrow money or enter into a stockholder agreement; entrepreneurship is out of the question.

This state of affairs persisted for centuries until the late 1960s, when eighteen- to twenty-year-olds demanded to be treated, by the law, as adults with full capacity to contract.⁸⁰ Mirroring the changing view of eighteen-year-olds as adults with respect to suffrage and jury service, Americans in the Vietnam era overwhelmingly agreed that, just as eighteen-year-olds were entitled as adults to vote and serve as jurors, they should likewise have the right to enter into contracts of their own choosing.⁸¹

imbecility, so far as to allow them to avoid all their contracts by which they may be injured.”).

⁷⁶ *Aetna Cas. & Sur. Co. v. Duncan*, 972 F.2d 523, 526 (3d Cir. 1992); 5 WILLISTON, *supra* note 4, § 9:5; *see generally id.* § 9:9 (“[I]t is now well-settled in the United States that a minor’s contract is voidable, rather than void.”).

⁷⁷ *E.g.*, *Smoot v. Ryan*, 65 So. 828, 830 (Ala. 1914). An exception exists for so-called “necessaries.” *Rodriguez v. Reading Hous. Auth.*, 8 F.3d 961, 964 (3d Cir. 1993) (“[T]he predominant rule is that a minor’s contracts are generally voidable but that contracts for what are known as ‘necessaries’ are enforceable.”). The ground for this exception is that, without it, no one would contract with infants, and they could be deprived of food or shelter. *See* 1 FARNSWORTH, *supra* note 70, § 4.5.

⁷⁸ 1 FARNSWORTH, *supra* note 70, § 4.5; *cf.* Arthur Allen Leff, *Unconscionability and the Code—The Emperor’s New Clause*, 115 U. PA. L. REV. 485, 556–57 (1967) (suggesting that, at a time when English courts of equity freely released English seamen from their contracts, “one cannot help wondering how many sailors managed to get credit at any reasonable price”).

⁷⁹ *See, e.g.*, *Zouch v. Parsons*, (1765) 97 Eng. Rep. 1103 (K.B.) 1107–08, (“[M]iserable must the condition of minors be; excluded from the society and commerce of the world.”).

⁸⁰ Legal Memorandum from the Nat’l Ass’n of Secondary Sch. Principals 2 (Jan. 1974) [hereinafter Memorandum], available at <http://www.eric.ed.gov/PDFS/ED099996.pdf> (noting “youths’ demands”).

⁸¹ *See, e.g.*, Robert G. Edge, *Voidability of Minors’ Contracts: A Feudal Doctrine in a Modern Economy*, 1 GA. L. REV. 205, 230 (1967) (arguing in favor of the enforcement of minors’ contracts); Robert S. Stubbs II, *When Is a Child a “Child”?*, 6 GA. ST. B.J. 189, 195 (1969) (criticizing the “unduly paternalistic” notion that “an eighteen-year-old who can vote and go to war must be protected from his own bad deals”); Memorandum, *supra* note 80, at 2; *see also* Irving M. Mehler, *Infant Contractual Responsibility: A Time for*

With the nation unified on the point, the old common-law rule was quickly “swept away by state legislation.”⁸² From 1970–73, thirty-nine states enacted statutes that lowered the age at which one gains capacity to contract to eighteen,⁸³ and by now all fifty states have done the same.⁸⁴ New York’s statute is typical: “A contract made on or after September first, nineteen hundred seventy-four by a person after he has attained the age of eighteen years may not be disaffirmed by him on the ground of infancy.”⁸⁵ By the late 1970s, this lowered age of contractual capacity had become so universally accepted that the 1979 Second Restatement of Contracts added a new section, not present in the 1932 original, stating as black-letter law that eighteen-year-olds possess capacity to contract.⁸⁶

Reappraisal and Realistic Adjustment?, 11 U. KAN. L. REV. 361, 361 (1963) (arguing in favor of holding an infant “legally responsible for his contractual obligations as if he were an adult”); cf. RESTATEMENT (SECOND) OF CONTRACTS § 14 reporter’s note (1981) (“The impetus for the lowering of the age of majority probably came from the widespread draft of those under twenty-one and from the lowering of the voting age to eighteen.”). Georgia-based legal journals seem to have been at the vanguard of the movement. See, e.g., Edge, *supra*; Stubbs, *supra*. This makes sense because Georgia became the first state to lower the voting age to eighteen during World War II. CULTICE, *supra* note 4, at 206, 234.

⁸² Memorandum, *supra* note 80, at 2.

⁸³ *Id.*

⁸⁴ 5 WILLISTON, *supra* note 4, § 9:3 nn.5–7 (cataloging statutes); see, e.g., W. VA. CODE § 2-3-1 (2007) (“On and after June nine, [1972], no person who is eighteen years of age or older shall lack legal capacity, by reason of his age, to enter into contracts . . .”). To be completely accurate, Alabama lowered its age of contractual capacity to nineteen, not eighteen. See ALA. CODE § 26-1-1 (2006). On the other hand, even Mississippi and Missouri, the only states that still require jurors to be twenty-one or older, see *supra* note 59, hold that eighteen-year-olds have capacity to contract. See MISS. CODE ANN. §§ 1-3-41, 93-19-13 (2006); MO. REV. STAT. §§ 431.055, 507.115 (2003).

⁸⁵ N.Y. GEN. OBLIG. LAW § 3-101 (Consol. 2011).

⁸⁶ RESTATEMENT (SECOND) OF CONTRACTS § 14 (“Unless a statute provides otherwise, a natural person has the capacity to incur only voidable contractual duties until the beginning of the day before the person’s eighteenth birthday.”); *id.* reporter’s note (“This section is new.”). The only apparent statutory exceptions to this modern rule involve alcohol and firearms, the former of which is restricted in every state to those over twenty-one, and the latter of which is commonly restricted to those over twenty-one. But these exceptions are irrelevant to the right to contract, because the purchase of alcohol or a firearm is not actually a contract, but rather a present sale. See generally FARNSWORTH, *supra* note 70, § 1.1 (explaining that a present sale is an exchange of goods for cash and no promises give, so there is no contract, such as the purchase of “apples for money”). Furthermore, these are special classes of goods that can, if abused, put third parties in immediate mortal danger, thereby making appropriate a different legal regime than ordinary contracts. And even this exception to the modern rule that adulthood begins at eighteen is under attack by a group of university presidents and others that have called for a public debate on the wisdom of the twenty-one-year-old drinking age. See Statement, AMETHYST INITIATIVE, <http://www.amethystinitiative.org/statement> (last visited Mar. 30, 2011) (signed by 136 university presidents, including those of Ohio State, the University of Massachusetts and Virginia Tech); see also Glenn Harlan Reynolds, *Old Enough to Fight*,

This change in the law of contracts confirms our modern view that adulthood begins at eighteen.⁸⁷ And perhaps even more than suffrage⁸⁸ or jury service, the change in contract law has had a profound impact on our society: it created a new class of youthful entrepreneurs.

1. *The New Class of Youthful Entrepreneurs*

For centuries, the law was clear that a person could not enter into binding contracts until reaching twenty-one years of age.⁸⁹ This had the practical effect of denying those younger than twenty-one the ability to start their own business. Even the greatest entrepreneurs in American history had to wait until reaching twenty-one (or partner with their parents) to found their ventures.

In 1810, for example, when Cornelius Vanderbilt sought to start a ferry business at the tender age of sixteen, he was not able to do so on his own, but rather was forced to partner with his father: “Per the laws of the day, young Cornelius was not free to embark upon his own enterprises until he was twenty-one. In the absence of that majority, he was little more than his father’s property”⁹⁰ And in 1858, when John D. Rockefeller was nineteen, his father partnered with him to found a commission merchant business.⁹¹ It was only a few years later, when he was twenty-three, that he finally went into the oil refining business on his own, and he did not found Standard Oil until he was thirty.⁹² Other stories could be told: Andrew Carnegie began making investments on his own

Old Enough to Drink, WALL ST. J., Apr. 13, 2011, at A17 (advocating repeal of the 1984 Federal Uniform Drinking Age Act); Megan McArdle, *America’s Drinking Problem*, ATLANTIC (Jan. 21, 2009, 9:27 AM ET), <http://www.theatlantic.com/business/archive/2009/01/america-apos-s-drinking-problem/4593> (“If you are old enough to enlist, and old enough to vote, you are old enough to [drink].”).

⁸⁷ *Citizenship for Eighteen Year Olds—Age of Majority in Washington—Ch. 292, Washington Laws of 1971*, 47 WASH. L. REV. 367, 367 (1972) (observing that Washington’s statutory reduction in the age of capacity “manifests a confidence in the maturity of persons between eighteen and twenty-one years of age and recognizes their readiness to accept the responsibilities of citizenship”).

⁸⁸ In their first presidential election in 1972, only 48.3% of eighteen- to twenty-year-olds cast a ballot, compared to 63.0% of the total voting-age population. CULTICE, *supra* note 4, at 220. This proved to be the high point of their participation as voters. *See id.* at 222–23.

⁸⁹ *See supra* Part II.D.

⁹⁰ EDWARD J. RENEHAN, JR., *COMMODORE: THE LIFE OF CORNELIUS VANDERBILT* 25–26 (2007); *see also* T.J. STILES, *THE FIRST TYCOON: THE EPIC LIFE OF CORNELIUS VANDERBILT* 23–24 (2009).

⁹¹ PETER COLLIER & DAVID HOROWITZ, *THE ROCKEFELLERS: AN AMERICAN DYNASTY* 12–13 (1976).

⁹² *Id.* at 16–22.

when he was in his twenties;⁹³ Levi Strauss opened his San Francisco dry goods store when he was twenty-four.⁹⁴

But when the age of capacity to contract was reduced to eighteen in the early 1970s, it gave rise to a new social phenomenon—that of the youthful entrepreneur. Once eighteen- to twenty-year-olds were empowered with the capacity to enter into legally binding contracts, some of them decided to launch business ventures of their own, something they never before in history had the chance to do. Many of these youths surely failed. But some youthful start-up companies have succeeded in a spectacular fashion, employing tens of thousands and creating products and services that have changed the world.

One of the first, and still among the most famous, youthful entrepreneurs is Bill Gates, the founder of Microsoft. In 1975, Gates left Harvard after his freshman year and moved to New Mexico to launch the company that would become Microsoft.⁹⁵ It all began with a licensing agreement between Gates, Paul Allen, and a company called MITS, signed on July 22, 1975—when Gates was only nineteen years old.⁹⁶ This agreement would not have been enforceable (and therefore would never have been made) under the common-law rule that the nineteen-year-old Gates was an infant.⁹⁷ But New Mexico had enacted a statute in 1971—just four years previous—that overruled the common law and empowered Gates to found one of the most successful companies of all time.⁹⁸ Microsoft, whose software noticeably increased the productivity of the American worker, is presently worth over \$200 billion⁹⁹ and employs approximately 90,000 people.¹⁰⁰

Similarly, in 1983, Michael Dell went into the computer hardware business when he was a freshman at the University of Texas.¹⁰¹ A 1973 Texas statute had endowed all persons with the legal capacity to contract at age eighteen,¹⁰² and Dell took full advantage of the opportunity denied to countless youths before him. At just eighteen years of age, Dell bid for, and won, government contracts to supply computers to the State of Texas—something that surely would have been unthinkable just a generation before.¹⁰³ Shortly thereafter, he dropped out of

⁹³ PETER KRASS, *CARNEGIE* 52, 65–66 (2002).

⁹⁴ TIFFANY PETERSON, *LEVI STRAUSS* 6, 14 (2003).

⁹⁵ STEPHEN MANES & PAUL ANDREWS, *GATES* 82–83 (1993).

⁹⁶ *See id.* at 11, 82.

⁹⁷ *See supra* Part II.D.

⁹⁸ N.M. STAT. ANN. § 28-6-1(A) (1978); *see* *Mason v. Mason*, 507 P.2d 781, 783 (N.M. 1973) (observing that the legislature lowered the age of capacity to eighteen in 1971).

⁹⁹ As of April 12, 2011, Microsoft had a market capitalization of \$215.44 billion. *Microsoft Corporation*, GOOGLE FIN., <http://www.google.com/finance?q=NASDAQ%3AMSFT> (last visited Apr. 12, 2011).

¹⁰⁰ *Facts About Microsoft*, MICROSOFT NEWS CENTER, http://www.microsoft.com/presspass/inside_ms.msp (last visited Mar. 30, 2011).

¹⁰¹ MICHAEL DELL, *DIRECT FROM DELL* 9–11 (1999).

¹⁰² S.B. 123, 63d Leg., Reg. Sess. (Tex. 1973) (this statute was repealed in 1985).

¹⁰³ *See* DELL, *supra* note 101, at 10.

college and founded Dell Computer Corp., a company that is now worth over \$25 billion¹⁰⁴ and employs nearly one hundred thousand people.¹⁰⁵

Finally, the latest, greatest story of youthful entrepreneurship is that of Facebook, founded in 2004 by Mark Zuckerberg, then a nineteen-year-old Harvard sophomore, and his classmate.¹⁰⁶ The online social network created by Facebook, which consists of five hundred million users and is growing, has changed the way in which people interact.¹⁰⁷ The recent uprisings in Egypt, which were largely planned and organized on Facebook, illustrated the revolutionary power of the site.¹⁰⁸ In economic terms, the company was recently valued at \$50 billion,¹⁰⁹ and while it only employs a few thousand people at present, its actual employment impact is far greater than that.¹¹⁰

All of this is to say that the 1970s statutory revolution that lowered the age of contractual capacity to eighteen has had a tremendously beneficial effect both for the newly empowered youths and for society as a whole. Unleashing the energy and creativity of eighteen- to twenty-year-olds into the commercial realm has led to whole new categories of products and services that never would have occurred to older entrepreneurs, and the start-up companies founded by these youthful

¹⁰⁴ As of April 12, 2011, Dell had a market capitalization of \$28.03 billion. *Dell Inc.*, GOOGLE FIN., <http://www.google.com/finance?q=NASDAQ%3ADELL> (last visited Apr. 12, 2011).

¹⁰⁵ *Our Story: Facts about Dell*, DELL.COM, <http://content.dell.com/us/en/corp/d/corp-comm/our-story-facts-about-dell.aspx> (last visited Apr. 12, 2011).

¹⁰⁶ See BEN MEZRICH, *THE ACCIDENTAL BILLIONAIRES: THE FOUNDING OF FACEBOOK, A TALE OF SEX, MONEY, GENIUS, AND BETRAYAL* 79–83 (2009).

¹⁰⁷ Peter Lattman, *Share Rules Could Push an Offering by Facebook*, N.Y. TIMES, Dec. 29, 2010, at B1 (reporting that Facebook “has more than 500 million users”); see also Alvan Balent, Note, *An Energy-Efficient Internet: The Next Revolution*, 37 FLA. ST. U. L. REV. 981, 981 (2010) (observing that Facebook is “changing basic modes of social interactions”); *THE SOCIAL NETWORK* (Columbia Pictures 2010) (film based on the meteoric rise of Facebook).

¹⁰⁸ Mansoura Ez-Eldin, *Date With a Revolution*, N.Y. TIMES, Jan. 31, 2011, at A19 (reporting that “the call arose on Facebook for an Egyptian revolution, to begin on Jan. 25”); Matt Bradley, *Rioters Jolt Egyptian Regime*, WALL ST. J., Jan. 26, 2011, at A1 (reporting on a rally in Egypt that was “planned and organized . . . on Facebook” and which attracted “[t]ens of thousands of protesters” who “clashed with police”); Similar stories could be told about Tunisia, and even Sudan. See Roger Cohen, *Facebook and Arab Dignity*, INT’L HERALD TRIB., Jan. 25, 2011, at 6 (“Tunisia was a Facebook revolution.”); Jeffrey Gettleman, *Discontent is Growing in Sudan*, N.Y. TIMES, Feb. 3, 2011, at A13 (“[I]n an unusual show of boldness, thousands of young Sudanese, many responding to the Facebook call, have braved beatings and arrests to protest against their government.”).

¹⁰⁹ Geoffrey A. Fowler & Liz Rappaport, *Corporate News: Facebook Deal Raises \$1 Billion*, WALL ST. J., Jan. 22, 2011, at B4.

¹¹⁰ See, e.g., John Letzing, *Facebook Data Center Is Boon for Oregon Town – Internet Giant Brings More Than Jobs to Prineville as It Mulls Expansion; Free High School Uniforms and Dental Care*, WALL ST. J., Jan. 21, 2011, at B7 (describing employment and other economic benefits for the town where Facebook’s data center is located).

entrepreneurs grow the economy and create jobs. Thus, while suffrage may have gotten all the attention, the biggest impact of our revised notion of infancy may be in the economic sphere rather than in the political arena.

III. INFANCY UNDER SECTION 301 OF THE CARD ACT

For centuries, the legal age at which one left infancy and entered adulthood had been twenty-one. In the 1960s and 1970s, American society came to a consensus that the age of legal majority should be lowered to eighteen, as evidenced by the Twenty-Sixth Amendment to the Constitution and statutory enactments overruling the common law in every state. This consensus remains firmly in place, as evidenced by the fact that not a single state has tinkered with the new statutory age for voting, jury service, or contracting.

In 2009, however, Congress overruled every one of these statutes by enacting section 301 of the federal Credit CARD Act of 2009.¹¹¹ That section reinstates—for credit card contracts—the ancient common-law rule that those under twenty-one are infants lacking capacity to contract.¹¹² Indeed, the Act’s prohibition is even harsher than the common-law rule. Under the common law, a contract with an infant is merely voidable by the infant,¹¹³ but the CARD Act renders a credit card contract with an infant void, even if she would have preferred to abide by it.¹¹⁴

And this change in status for eighteen- to twenty-year-olds was accomplished without any significant public deliberation, let alone the type of massive social movement observed in the 1970s. The original draft of what became the CARD Act was introduced in January 2009 in the House of Representatives with more than forty cosponsors.¹¹⁵ Section 301 in that original draft read almost exactly the same as the final version, except that it called for a minimum age of eighteen—not twenty-one—to obtain a credit card.¹¹⁶ This was, of course, consistent with the modern understanding of adulthood.¹¹⁷ The first appearance of the twenty-one year old age limit came in May 2009, after the bill was amended by the Senate,¹¹⁸ and the very next day it was approved by the House and became law.¹¹⁹ This limited

¹¹¹ See Credit Card Accountability Responsibility and Disclosure (CARD) Act of 2009, Pub. L. No. 111-24, § 301, 123 Stat. 1734, 1748.

¹¹² *Id.* (“PROHIBITION ON ISSUANCE.—No credit card may be issued to, or open end consumer credit plan established by or on behalf of, a consumer who has not attained the age of 21 . . .”).

¹¹³ See *supra* Part II.D.

¹¹⁴ See CARD Act § 301.

¹¹⁵ H.R. 627, 111th Cong. (as introduced by the House, Jan. 22, 2009).

¹¹⁶ *Id.* § 7.

¹¹⁷ See *supra* Part II.

¹¹⁸ See H.R. 627, 111th Cong. (as passed by the Senate, May 19, 2009).

¹¹⁹ See H.R. 627, 111th Cong. (enacted). For a complete timeline relating to the passage of H.R. 627, see *H.R. 627: To Amend the Truth in Lending Act to Establish Fair and Transparent Practices Relating to the Extension of Credit under an Open End Consumer Credit Plan, and for Other Purposes*, N.Y. TIMES, <http://politics.nytimes.com/>

excursion into legislative history is merely meant to show that there was no social movement to replace the modern understanding of adulthood (i.e., eighteen) with its medieval counterpart (i.e., twenty-one), simply because there was no time for one.

There are two important exceptions to the CARD Act's ban on credit cards for infants. First, an infant under twenty-one years old may contract for a credit card if someone else, twenty-one years or older, cosigns and accepts joint liability for the infant's credit card debts.¹²⁰ Second, an infant may obtain a credit card if she demonstrates "independent means of repaying" her debt.¹²¹ The upshot is that independently wealthy eighteen-year-olds, or those whose parents are willing and able to accept joint liability, will still be able to obtain a credit card. But poor and middle-income applicants may not.¹²² In short, eighteen- to twenty-year-olds are now classified by the law as adults with full capacity to enter into any contract—except a credit card agreement.

Section 301 is a mistake for at least two reasons: First, section 301 is badly out of step with the modern consensus on adulthood and harms eighteen- to twenty-year-olds by treating them as infants. Second, section 301 will suppress socially beneficial youthful entrepreneurship, particularly by those of modest backgrounds, and is therefore contrary to the public interest.¹²³

A. Section 301 Contradicts Our Modern View of Adulthood

Section 301 conflicts directly with the statutory law of every state and the national consensus that eighteen-year-olds are adults with the capacity to make legally binding contracts.¹²⁴ As discussed in Part II, *supra*, our society wrestled in

congress/bills/111/hr627 (last visited Apr. 12, 2011).

¹²⁰ H.R. 627, 111th Cong. (enacted).

¹²¹ See *id.* Federal Reserve regulations clarify that this means that the infant must be able, based on her own income, assets and current obligations, "to make the required minimum periodic payments" on the account. 12 C.F.R. §§ 226.51(b)(1)(i), (a)(1)(i) (2010).

¹²² David Migoya, *Earning Credit in College: More Students Are Signing for Younger Peers to Skirt New Credit-Card Requirements*, DENVER POST, Sept. 7, 2010, at A15 ("I don't have bad credit, but I can't get a card because my parents have the bad credit," said Estevan Torres, a 20-year-old graphic arts student at Metropolitan State College of Denver.").

¹²³ A potential third problem with section 301 is that, by imposing a national infancy rule for credit card agreements, it is inconsistent with the basic federalist notion that the states should be "laboratories of democracy." See *New State Ice Co. v. Liebmann*, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting) ("It is one of the happy incidents of the federal system that a single courageous state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country."). However, the clearly interstate commercial nature of the credit card industry significantly undermines that concern.

¹²⁴ See *supra* Part II.D.

the 1960s and 1970s with the issue of when a person crosses the legal line from infancy to adulthood—and decided on a flat rule of eighteen years.¹²⁵

Thanks to section 301, under current law an eighteen-year-old may legally bind herself to a \$10,000 loan, a \$100,000 home mortgage, or a \$1 million stock purchase agreement—but not a credit card with a \$100 limit. This is absurd. If eighteen-year-olds are sufficiently mature to make binding contracts of all other types (not to mention elect our leaders, serve as our jurors, and receive the death penalty for crimes)—and our societal consensus is that they are¹²⁶—they are surely mature enough to hold a credit card.

Supporters of section 301 argue that eighteen-year-olds lack the necessary maturity and sophistication to enter into a credit card agreement.¹²⁷ But this is nothing more than the same old paternalistic argument that has been statutorily rejected in every state. And, as is often the case, this paternalistic policy has the perverse effect of harming the very people it is intended to help. Credit cards are ubiquitous in our society:¹²⁸ More than three-quarters of all Americans have one¹²⁹ and the total amount currently borrowed is close to \$1 trillion.¹³⁰ This is because credit cards are extremely useful.¹³¹ They are ideal for the financing of consumer

¹²⁵ Indeed, this consensus has more recently become a part of international law. The United Nations Convention on the Rights of the Child, adopted in 1989, and ratified by nearly every nation in the world, defines “child” in Article 1 as someone “below the age of eighteen years.” Convention on the Rights of the Child, G.A. Res 44/25, U.N. DOC. A/44/736, at art. 1 (Nov. 20, 1989); see also David M. Rosen, *Who Is a Child? The Legal Conundrum of Child Soldiers*, 25 CONN. J. INT’L L. 81, 96 (2009) (“[H]umanitarian and human rights organizations have adopted the so-called ‘Straight 18’ position, which sets forth a universal definition of childhood as beginning at birth and ending at age eighteen.”).

¹²⁶ See *supra* Part II.

¹²⁷ See Eboni S. Nelson, *Young Consumer Protection in the “Millennial” Age*, 2011 UTAH L. REV. 369, 377 (suggesting that “young consumers generally lack financial experience and knowledge”); *id.* at 378 (claiming that “young consumers’ lack of financial knowledge impedes their ability to fully understand and consider the costs and consequences associated with credit card usage”); *id.* at 381 (asserting that “low self-control [i]s a factor contributing to young consumers’ credit card indebtedness”); Dan Serra, *Know What to Expect from New Credit Card Regulations*, MCCLATCHY-TRIBUNE NEWS SERVICE, Feb. 22, 2010, at 1 (describing section 301 as “an effort to protect young adults from falling into credit holes”).

¹²⁸ Katherine Porter, *The Debt Dilemma*, 106 MICH. L. REV. 1167, 1167 (2008).

¹²⁹ *Id.* at 1171.

¹³⁰ Mary Pilon, *Student-Loan Debt Surpasses Credit Cards*, WALL ST. J. (Aug. 9, 2010, 1:13 PM ET), <http://blogs.wsj.com/economics/2010/08/09/student-loan-debt-surpasses-credit-cards/> (“Americans owe some \$826.5 billion in revolving credit.”).

¹³¹ RONALD J. MANN, CHARGING AHEAD: THE GROWTH AND REGULATION OF PAYMENT CARD MARKETS 37–43 (2006); ROBERT D. MANNING, CREDIT CARD NATION 2 (2000) (suggesting that credit cards have “greatly enhanced our quality of life” by “offering convenient methods of payment” and “easy credit during periods of economic distress and uncertainty”).

goods and services that one wants, but cannot immediately afford.¹³² Alternatives such as “layaway”¹³³ or individual store credit¹³⁴ are clearly inferior to a single plastic card accepted essentially everywhere. Credit cards are also helpful for paying for things that one can afford, as they greatly reduce transaction costs compared to drafting a check or withdrawing cash from an ATM.¹³⁵ Section 301 takes away all of these benefits from eighteen- to twenty-year-olds.

Further, credit cards are often the first step on the road toward larger and more sophisticated debt, such as a home mortgage or a car loan, as the interest rate for such debt depends on one’s “credit history.” But by denying eighteen- to twenty-year-olds credit cards, section 301 deprives them of the ability to establish a credit history over those years. Again, children of wealthy parents need not worry, as their parents can cosign for them to ensure they start their credit history as early as possible.¹³⁶ But the children of modest backgrounds will emerge as twenty-one-year-olds without a credit history, forcing them to pay higher interest rates¹³⁷ and adversely affecting their chances of landing a job.¹³⁸ This is unfair and wrong.

Today’s youth have registered their objections to section 301.¹³⁹ Shortly after the CARD Act was passed, the University of Michigan’s student newspaper complained that it “doesn’t respect the autonomy of college-aged individuals as legal adults and hurts their financial independence” and suggested that the “federal government should reevaluate the need to treat young adults like children.”¹⁴⁰

¹³² MANN, *supra* note 131, at 42–43.

¹³³ See, e.g., *Ex Parte Alabama*, No. 1090007, 2010 WL 5185393, at *1 (Ala. Dec. 22, 2010) (describing a typical layaway plan whereby a customer makes installment payments to a store toward an item and, once the customer has paid the total purchase price, the store tenders the item).

¹³⁴ See, e.g., *Williams v. Walker-Thomas Furniture Co.*, 350 F.2d 445, 447 (D.C. Cir. 1965) (describing a notorious installment credit agreement proffered by a furniture store).

¹³⁵ MANNING, *supra* note 131, at 2; Porter, *supra* note 128, at 1170 (“[T]he transaction costs savings of card-based transactions are quite significant.”); see also *id.* (“[T]he current cost of processing paper checks in the United States equals about one-half of one percent of the gross domestic product.” (citation omitted)). Much of these transaction cost savings of credit cards are paralleled by debit cards. *Id.* at 1170 n.16.

¹³⁶ Karen Gross, *New Credit-Card Rules May Hurt Financially Insecure Students*, CHRON. HIGHER EDUC. (July 13, 2009), <http://chronicle.com/article/New-Credit-Card-Rules-May-Hurt/47039> (“[T]he requirement of a co-signature[] ensures that many middle- and upper-class students will continue to have access to credit because their parents have the means and willingness to repay any debts incurred.”).

¹³⁷ Claudia Buck, *Steps You Can Take to Build Good Credit—Get a Card*, BUFFALO NEWS, Feb. 2, 2010, at C3; Gross, *supra* note 136.

¹³⁸ Gross, *supra* note 136 (“Increasingly, credit scores are checked by employers and insurance companies as well.”).

¹³⁹ See *id.* (“For students using their cards appropriately, the new legislation can have the feel, as one financial blogger put it, of ‘credit-card paternalism.’”).

¹⁴⁰ *From the Daily: Adult Supervision Required*, MICH. DAILY (June 7, 2009), <http://www.michigandaily.com/content/daily-adult-supervision-required>. This article was later reprinted as: Ashley Goetz, *Credit Card Act Treats Adults as Children*, MINN. DAILY

Similarly, in an editorial titled “Credit Card Act Unfair to Responsible Young Adults,” an eighteen-year-old high-school senior wryly complained: “I can vote, enlist in the army, get married and do just about everything else that a legal adult can do, all without asking my parents’ permission. But now, I can only get a credit card if I ask Mommy and Daddy if they would please co-sign?”¹⁴¹

Some eighteen- to twenty-year-old college students have gone further than complaining—they figured out a way around the ban.¹⁴² Rather than applying for a card on their own, or even asking their parents to cosign, they simply “ask classmates or fraternity brothers to co-sign” their credit card application, “sometimes for a small fee.”¹⁴³ Indeed, thanks to section 301, some commentators believe a whole new industry could develop whereby enterprising college students “sell or rent out their good credit to younger students who are having trouble establishing credit for the first time.”¹⁴⁴ And while such a practice is clearly contrary to the intent of the CARD Act, its very ingenuity is evidence of the sophistication that modern eighteen- to twenty-year-olds possess.¹⁴⁵

The age of capacity was settled in the 1970s and, absent a massive social movement calling for reinstatement of the ancient common-law rule, Congress should have left it alone. Unfortunately, by treating eighteen- to twenty-year-olds as infants, section 301 harms this cohort by denying them the legal ability to obtain a credit card as the adults they are.

(June 9, 2009), <http://www.mndaily.com/2009/06/09/credit-card-act-treats-adults-children> (“Instead of allowing young adults the freedom they need to gain financial stability, the federal government seems committed to mollycoddling them. At some point, the federal government needs to realize that college students aren’t kids anymore and that they need to learn to take care of themselves.”). See also Paula Ebben, *Creatively Signing-Up For Credit Cards Can Put Students at Risk*, CBS BOSTON (Jan. 20, 2011, 6:08 PM), <http://boston.cbslocal.com/2011/01/20/creatively-signing-up-for-credit-cards-can-put-students-at-risk/> (“Molly Heilny is frustrated. [Thanks to section 301, the] 20 year old college sophomore can’t get a credit card. ‘I don’t really have anyone that could co-sign, so I could apply for a million credit cards and they’re never going to give me one,’ Heilny said.”); Timothy Rabb, *Too Much Credit Card Control*, MICH. DAILY (Jan. 12, 2011), <http://www.michigandaily.com/content/viewpoint-credit-card-control> (“It’s not fair to deprive responsible young adults from their right to a credit card . . .”).

¹⁴¹ Katie Greenberg, *Credit Card Act Unfair to Responsible Young Adults*, BUCKS COUNTY COURIER TIMES, June 11, 2009, available at 2009 WLNR 12465939.

¹⁴² Ebben, *supra* note 140 (“[E]xperts say some college students are finding loopholes and creative ways to get around the law.”).

¹⁴³ Migoya, *supra* note 122; accord Susan Tompor, *Credit Card Offers Still Contain Trouble Spots for Consumers*, DETROIT FREE PRESS, Sept. 30, 2010, at B4 (“[S]ome college students who are 18 or 19 are asking friends 21 or older to co-sign their credit card applications.”); Ebben, *supra* note 140.

¹⁴⁴ Ebben, *supra* note 140 (quoting Gerri Detweiler, author of THE ULTIMATE CREDIT HANDBOOK).

¹⁴⁵ *Id.* (“[I]t’s actually quite clever . . .” (quoting John Ulzheimer of Credit.com)).

B. Section 301 Contradicts Public Policy Favoring Entrepreneurship

The youths directly affected by section 301 of the CARD Act are not the only ones harmed by it—we all are. Entrepreneurship is in the public interest, as it drives economic growth and job creation, and modern-day entrepreneurs depend critically on credit cards to finance their start-up companies. But section 301 withholds this crucial tool from potential youthful entrepreneurs, thus making it much more difficult for them to start their own businesses. This is clearly contrary to the strong public policy favoring entrepreneurship.

1. Entrepreneurship Is in the Public Interest

All agree that entrepreneurship is vital for economic growth and job creation in modern-day America and is therefore strongly in the public interest.¹⁴⁶ As President Obama recently explained, “[E]ntrepreneurialism is the key to our continued global leadership and the success of our people.”¹⁴⁷ With respect to job creation—seen by many as our most pressing need right now¹⁴⁸—recent scholarship reveals that start-up firms in their first year have been responsible for all net job creation in the United States since at least the 1970s, having added about three million jobs per year, even during recessions.¹⁴⁹ Start-ups are similarly key to general economic growth.¹⁵⁰ True, many of these start-ups eventually fold.¹⁵¹ But those that survive are often the type of companies that create satisfying

¹⁴⁶ Barack Obama, *Toward a 21st-Century Regulatory System*, WALL ST. J., Jan. 18, 2011, at A17 (“America’s free market has . . . been the greatest force for prosperity the world has ever known.”).

¹⁴⁷ *Id.*

¹⁴⁸ See, e.g., President Barack Obama, State of the Union Address (Jan. 27, 2010), as reprinted in 156 CONG. REC. H416–20 (daily ed. Jan. 27, 2010) (stating that because “jobs must be our number one focus in 2010 . . . [w]e should start where most new jobs do—in small businesses, companies that begin when an entrepreneur takes a chance on a dream, or a worker decides it’s time she became her own boss”).

¹⁴⁹ TIM KANE, KAUFFMAN FOUND., *THE IMPORTANCE OF STARTUPS IN JOB CREATION AND JOB DESTRUCTION* 5 (2010) (noting that all “net job growth in the United States comes from firms less than one year old, formally defined as startups”); *id.* at 2 (“[W]ithout startups, there would be no net job growth in the U.S. economy.”); John C. Haltiwanger et al., *Who Creates Jobs? Small vs. Large vs. Young* 2 (Nat’l Bureau of Econ. Research, Working Paper No. 16300, 2010) (“Business startups contribute substantially to both gross and net job creation.”).

¹⁵⁰ See, e.g., 15 U.S.C. § 631a(a) (2006) (“For the purpose of preserving and promoting a competitive free enterprise economic system, Congress hereby declares that it is the continuing policy and responsibility of the Federal Government to . . . provide an opportunity for entrepreneurship, inventiveness, and the creation and growth of small businesses.”).

¹⁵¹ Steve Lohr, *To Create Jobs, Nurture Start-Ups*, N.Y. TIMES, Sept. 12, 2010, at BU3 (“Within five years, half of [start-up] businesses have folded.”).

employment opportunities and whose products or services improve our quality of life.¹⁵²

Our leaders and policy makers have long understood the importance of entrepreneurship to a thriving economy and society.¹⁵³ Congress has twice declared that “it is the continuing policy and responsibility of the Federal Government to . . . provide an opportunity for entrepreneurship . . . and the creation and growth of small businesses.”¹⁵⁴ To that end, a portion of all federal contract dollars are statutorily required to go to small businesses, and the Small Business Administration guarantees loans for small businesses and provides free counseling and training to entrepreneurs.¹⁵⁵ Similarly, state and local governments endeavor to attract entrepreneurs to their communities.¹⁵⁶

In short, entrepreneurship is in the public interest and start-up companies are actively encouraged as a matter of public policy. All of this is doubly true for youthful entrepreneurs, for in addition to all the ordinary benefits of entrepreneurship just discussed, youthful entrepreneurs add something unique: The creativity and energy of youth. Experience shows that eighteen- to twenty-year-olds are eager to challenge orthodox thinking and may be able to offer fresh, new solutions to vexing problems. Perhaps an older person could have founded Microsoft or Facebook, but their founders demonstrated a heedlessness for convention that is more commonly found in the young. And the result is that these companies have changed our world for the better.

¹⁵² *Id.* (“[T]he survivors are prime candidates to join the young, dynamic companies that make an outsize contribution to innovation, productivity gains and job growth.”).

¹⁵³ See Obama, *supra* note 146.

¹⁵⁴ 15 U.S.C. § 631a(a); *accord id.* § 631(a) (“The essence of the American economic system of private enterprise is free competition. . . . The preservation and expansion of such competition is basic not only to the economic well-being but to the security of this Nation. . . . It is the declared policy of the Congress that the Government should aid, counsel, assist, and protect, insofar as is possible, the interests of small-business concerns . . .”).

¹⁵⁵ See ERIC TYSON & JIM SCHELL, *SMALL BUSINESS FOR DUMMIES* 89 (2d ed. 2003); *What We Do*, SBA.GOV, <http://www.sba.gov/about-sba-services/what-we-do> (last visited Mar. 30, 2011).

¹⁵⁶ See, e.g., Patrick McGeehan, *Hoping to Lure Tech Jobs, City Seeks a Partner to Open Graduate School of Engineering*, N.Y. TIMES, Dec. 17, 2010, at A34 (“Worried that New York City is not spawning enough technology-based start-up companies with the potential to become big employers like Google, city officials are inviting universities around the world to create an engineering campus on city-owned land.”). The phenomenon is not limited to the United States. See, e.g., Clyde H. Farnsworth, *Russians Are Coming, but for Money*, N.Y. TIMES, Oct. 2, 1993, at A4 (reporting on “Canada’s strong desire to attract entrepreneurs”).

2. *Entrepreneurs Need Credit Card Financing*

Entrepreneurship is socially useful, but it is also notoriously risky, with as many as half of all start-up companies shutting their doors within a few years.¹⁵⁷ Thus, although start-ups “depend critically on access to credit,”¹⁵⁸ most banks and other traditional business lenders refuse to extend credit to them.¹⁵⁹ The risk/reward ratio is simply too high for banks to lend to start-up companies at any reasonable interest rate.¹⁶⁰ Once a company has established some sort of track record, a bank (or venture capitalist or angel investor) may be willing to lend¹⁶¹—but the company can obviously never reach that point unless it can launch in the first place and survive its earliest days.

The result is that entrepreneurs are often left to seek financing from their own savings and their friends and family.¹⁶² But many potential entrepreneurs have neither significant personal savings nor a “rich Uncle Joe.”¹⁶³ With the bank’s doors (understandably) closed, where can such a person go for a relatively small amount of cash to start a new company?

¹⁵⁷ Hannah Seligson, *No Jobs? Young Graduates Make Their Own*, N.Y. TIMES, Dec. 12, 2010, at BU1 (“Roughly half of all new businesses fail within the first five years, according to federal data.”).

¹⁵⁸ Shayndi Raice, *For Small Business, Slow Gains in Credit*, WALL ST. J., July 13, 2010, at A5 (“The formation and growth of small businesses depend critically on access to credit.” (quoting Federal Reserve Chairman Ben Bernanke)); *see generally* ALICIA M. ROBB & DAVID T. ROBINSON, *THE KAUFMAN FIRM SURVEY: THE CAPITAL STRUCTURE DECISIONS OF NEW FIRMS* 11 (2008) (“[D]ebt plays a paramount role in funding nascent firms.”).

¹⁵⁹ RHONDA ABRAMS, *THE OWNER’S MANUAL FOR SMALL BUSINESS* 215 (2005) (“[B]anks generally aren’t an appropriate place for start-up capital”); PERI PAKROO, *THE WOMEN’S SMALL BUSINESS START-UP KIT* 98–99 (2010) (“[B]anks are notoriously reluctant to lend start-up funds to first-time entrepreneurs”); TYSON & SCHELL, *supra* note 155, at 87; David S. Joachim, *Betting Your Retirement on Your Start-Up*, N.Y. TIMES, Sept. 30, 2008, at SPG4 (reporting that “small-business loans” for start-up companies are “scarce these days”); Kristina Shevory, *With Squeeze on Credit, Microlending Blossoms*, N.Y. TIMES, July 28, 2010, at B7 (“Most banks, large or small, do not bother granting business loans of less than \$50,000 because there’s not enough profit to balance the risk.”). The federal government does offer some funding through the Small Business Administration, but “SBA loans have a reputation for being cumbersome and subject to enormous red tape.” TYSON & SCHELL, *supra* note 155, at 89.

¹⁶⁰ ABRAMS, *supra* note 159, at 215–16.

¹⁶¹ *Id.* at 216 (“[B]anks prefer to lend money to companies that have been in business for at least one or two years.”).

¹⁶² PAKROO, *supra* note 159, at 104 (“Since start-ups are so commonly turned down by banks and other traditional funders, entrepreneurs often turn to friends and family for an injection of cash.”); TYSON & SCHELL, *supra* note 155, at 84–86.

¹⁶³ *But cf.* TYSON & SCHELL, *supra* note 155, at 84 (noting that the financing discussion “assumes” the reader’s “parents and family are financially able to help”).

A credit card, of course, which provides an immediate line of credit, with little to no questions asked: “[U]nlike bank loan officers, private angel investors, or SBA bureaucrats, credit cards do not require extensive documentation or entail second guessing of business decisions.”¹⁶⁴ Thus most entrepreneurs rely on credit cards to finance their start-up companies, particularly in their earliest days.¹⁶⁵ Even the most speculative ventures can be financed on plastic—simply because the lender places no limit on the purpose for which the credit can be used. This has greatly leveled the playing field for aspiring entrepreneurs, allowing those who hail from modest backgrounds to compete with those whose parents can provide start-up funds.¹⁶⁶

And some of these start-up acorns grow into mighty oaks. Even one of the harshest critics of credit cards acknowledges that recent American history is “replete with examples of billion-dollar companies whose entrepreneurial seeds were nurtured with . . . credit cards during their formative start-up years.”¹⁶⁷ Well-known examples include Cisco Systems,¹⁶⁸ CA Technologies,¹⁶⁹ and Spike Lee’s film production studio, 40 Acres and a Mule.¹⁷⁰ This is all to the good.

¹⁶⁴ MANNING, *supra* note 131, at 229–30; *see also* TYSON & SCHELL, *supra* note 155, at 85 (“No personal guarantees here, no bankers looking over your shoulder; just sign your name and get on with the business at hand.”).

¹⁶⁵ ABRAMS, *supra* note 159, at 217 (“According to the U.S. Small Business Administration (SBA), credit cards are the primary way entrepreneurs finance their businesses.”); *id.* at 214 (“[M]ost entrepreneurs use credit cards for many start-up expenses.”); CAITLIN FRIEDMAN & KIMBERLY YORIO, *THE GIRL’S GUIDE TO STARTING YOUR OWN BUSINESS* 64–65 (2003) (“Entrepreneurs often put start-up costs on their personal credit cards.”); MANNING, *supra* note 131, at 228 (“[C]redit cards have become the number one source of financing for small businesses—supplanting bank loans in the late 1990s.”); *id.* at 229 (“[M]ost business start-ups owe their early survival to plastic money.”); *id.* at 241 (“For most aspiring entrepreneurs, . . . credit cards [are] their most reliable source of start-up capital.”); ROBERT H. SCOTT III, *THE KAUFMAN FIRM SURVEY: THE USE OF CREDIT CARD DEBT BY NEW FIRMS 1* (2009); *see also* BD. OF GOVERNORS OF THE FED. RESERVE SYS., *REPORT TO THE CONGRESS ON THE USE OF CREDIT CARDS BY SMALL BUSINESSES AND THE CREDIT CARD MARKET FOR SMALL BUSINESSES* 28 (2010) (“In 2009, 83 percent of small firms used credit cards”); RICHARD STIM & LISA GUERIN, *RUNNING A SIDE BUSINESS: HOW TO CREATE SECOND INCOME* 69 (2009) (“Mini-entrepreneurs depend on plastic.”).

¹⁶⁶ MANNING, *supra* note 131, at 231; *see id.* at 238–56 (collecting stories of start-up companies financed with credit cards).

¹⁶⁷ *Id.* at 228.

¹⁶⁸ DAVID BUNNELL, *MAKING THE CISCO CONNECTION: THE STORY BEHIND THE REAL INTERNET SUPERPOWER* 24 (2000).

¹⁶⁹ MANNING, *supra* note 131, at 228.

¹⁷⁰ *Id.* at 227; *see also id.* at 227–28 (discussing *THE BLAIR WITCH PROJECT* (Haxan Films 1999)); SCOTT, *supra* note 165, at 2 (“*The Blair Witch Project*, a film that grossed more than \$250 million, was funded almost exclusively with credit card debt”); Miguel Helft, *For Start-Ups, Web Success on the Cheap*, N.Y. TIMES, Nov. 9, 2006, at C1 (reporting that Meebo, a successful web-based start-up company, was initially financed with the founders’ credit cards).

3. Section 301 Inhibits Youthful Entrepreneurship

By categorically withholding credit cards from eighteen- to twenty-year-olds, section 301 seriously impedes their ability to start up a business. This is clearly contrary to the strong and bipartisan public policy favoring youthful entrepreneurship.¹⁷¹ And, given the fact that credit cards are the most important method of financing early stage start-ups,¹⁷² the effect is sure to be noticeable. Even worse, the group of youthful entrepreneurs who are most in need of credit card financing—those from modest backgrounds and whose family and friends are not wealthy—will be the ones least able to find a cosigner.¹⁷³

Today's youth are excited about entrepreneurship. A recent survey found that 38% of eighteen- to twenty-one-year olds want to start a business of their own.¹⁷⁴ Despite the risks, many youths these days see entrepreneurship as “a viable career path, not a renegade choice.”¹⁷⁵ Unfortunately, section 301 is likely to defer, if not deny, their business dreams, because a credit card is a practical necessity of a start-up in most cases. Had section 301 been in effect when Microsoft or Facebook were founded, they might never have gotten off the ground.¹⁷⁶ It is impossible to predict what companies will not be founded thanks to section 301, but surely some will not, and we will all be the worse off for it.

IV. CONCLUSION

Section 301 of the Credit CARD Act, which denies credit cards to those aged eighteen to twenty-years-old, should be repealed. After much discussion in the 1960s and 1970s, our society rejected the ancient common-law rule that one is an infant until age twenty-one, and coalesced around the view that legal adulthood begins at eighteen. That consensus has not changed. Hence, by raising the age of contractual capacity to twenty-one, section 301 contradicts the well-established preferences of the public as well as the strong public policy favoring entrepreneurship. Just as eighteen-year-olds are deemed by the law to be sufficiently mature to enter into any other contract—and mature enough to be drafted, vote, serve as a juror, and be sentenced to death—then, *a fortiori*, they are mature enough to hold a credit card: Old enough to fight, old enough to swipe. Section 301 should be repealed.

¹⁷¹ See *supra* Part III.B.1.

¹⁷² See *supra* Part III.B.2.

¹⁷³ See Migoya, *supra* note 122.

¹⁷⁴ KAUFFMAN FOUND., YOUTHPULSESM 2010, at 15 (2010).

¹⁷⁵ Seligson, *supra* note 157, at BU1.

¹⁷⁶ One response might be that both Gates and Zuckerberg came from relatively wealthy families and could have had a parent cosign for a credit card, even under section 301. True enough, but do we really want to limit entrepreneurship to the sons and daughters of the wealthy?

EXHIBIT 44

Emerging Adulthood

A Theory of Development From the Late Teens Through the Twenties

Jeffrey Jensen Arnett
University of Maryland College Park

Emerging adulthood is proposed as a new conception of development for the period from the late teens through the twenties, with a focus on ages 18–25. A theoretical background is presented. Then evidence is provided to support the idea that emerging adulthood is a distinct period demographically, subjectively, and in terms of identity explorations. How emerging adulthood differs from adolescence and young adulthood is explained. Finally, a cultural context for the idea of emerging adulthood is outlined, and it is specified that emerging adulthood exists only in cultures that allow young people a prolonged period of independent role exploration during the late teens and twenties.

When our mothers were our age, they were engaged. . . . They at least had some idea what they were going to do with their lives. . . . I, on the other hand, will have a dual degree in majors that are ambiguous at best and impractical at worst (English and political science), no ring on my finger and no idea who I am, much less what I want to do. . . . Under duress, I will admit that this is a pretty exciting time. Sometimes, when I look out across the wide expanse that is my future, I can see beyond the void. I realize that having nothing ahead to count on means I now have to count on myself; that having no direction means forging one of my own. (Kristen, age 22; Page, 1999, pp. 18, 20)

For most young people in industrialized countries, the years from the late teens through the twenties are years of profound change and importance. During this time, many young people obtain the level of education and training that will provide the foundation for their incomes and occupational achievements for the remainder of their adult work lives (Chisholm & Hurrelmann, 1995; William T. Grant Foundation Commission on Work, Family, and Citizenship, 1988). It is for many people a time of frequent change as various possibilities in love, work, and worldviews are explored (Erikson, 1968; Rindfuss, 1991). By the end of this period, the late twenties, most people have made life choices that have enduring ramifications. When adults later consider the most important events in their lives, they most often name events that took place during this period (Martin & Smyer, 1990).

Sweeping demographic shifts have taken place over the past half century that have made the late teens and early twenties not simply a brief period of transition into adult roles but a distinct period of the life course, characterized by change and exploration of possible life directions. As recently as 1970, the median age of marriage in the United States was about 21 for women and 23 for men; by 1996,

it had risen to 25 for women and 27 for men (U.S. Bureau of the Census, 1997). Age of first childbirth followed a similar pattern. Also, since midcentury the proportion of young Americans obtaining higher education after high school has risen steeply from 14% in 1940 to over 60% by the mid-1990s (Arnett & Taber, 1994; Bianchi & Spain, 1996). Similar changes have taken place in other industrialized countries (Chisholm & Hurrelmann, 1995; Noble, Cover, & Yanagishita, 1996).

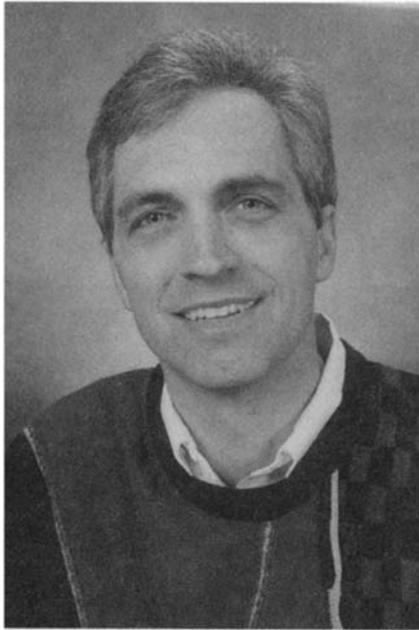
These changes over the past half century have altered the nature of development in the late teens and early twenties for young people in industrialized societies. Because marriage and parenthood are delayed until the mid-twenties or late twenties for most people, it is no longer normative for the late teens and early twenties to be a time of entering and settling into long-term adult roles. On the contrary, these years are more typically a period of frequent change and exploration (Arnett, 1998; Rindfuss, 1991).

In this article, I propose a new theory of development from the late teens through the twenties, with a focus on ages 18–25. I argue that this period, *emerging adulthood*, is neither adolescence nor young adulthood but is theoretically and empirically distinct from them both. Emerging adulthood is distinguished by relative independence from social roles and from normative expectations. Having left the dependency of childhood and adolescence, and having not yet entered the enduring responsibilities that are normative in adulthood, emerging adults often explore a variety of possible life directions in love, work, and worldviews. Emerging adulthood is a time of life when many different directions remain possible, when little about the future has been decided for certain, when the scope of independent exploration of life's possibilities is greater for most people than it will be at any other period of the life course.

For most people, the late teens through the mid-twenties are the most *volitional* years of life. However, cultural influences structure and sometimes limit the extent to

I thank the following colleagues for their comments on drafts of this article: Jack Brunner, James Coté, Shirley Feldman, Nancy Galambos, Lene Arnett Jensen, John Modell, John Schulenberg, David Skeel, Dorothy Youniss, and James Youniss.

Correspondence concerning this article should be addressed to Jeffrey Jensen Arnett, Department of Human Development, University of Maryland, 3304 Benjamin Hall, College Park, MD 20742. Electronic mail may be sent to arnett@wam.umd.edu.



**Jeffrey
Jensen Arnett**

which emerging adults are able to use their late teens and twenties in this way, and not all young people in this age period are able to use these years for independent exploration. Like adolescence, emerging adulthood is a period of the life course that is culturally constructed, not universal and immutable.

I lay out the theoretical background first and then present evidence to illustrate how emerging adulthood is a distinct period demographically, subjectively, and in terms of identity explorations. Next, I explain how emerging adulthood can be distinguished from adolescence and young adulthood. Finally, I discuss the economic and cultural conditions under which emerging adulthood is most likely to exist as a distinct period of the life course.

The Theoretical Background

There have been a number of important theoretical contributions to the understanding of development from the late teens through the twenties. One early contribution was made by Erik Erikson (1950, 1968). Erikson rarely discussed specific ages in his writings, and in his theory of human development across the life course he did not include a separate stage that could be considered analogous to emerging adulthood as proposed here. Rather, he wrote of development in adolescence and of development in young adulthood. However, he also commented on the *prolonged adolescence* typical of industrialized societies and on the *psychosocial moratorium* granted to young people in such societies “during which the young adult through free role experimentation may find a niche in some section of his society” (Erikson, 1968, p. 156). Thus, Erikson seems to have distinguished—without naming—a period that is in some ways adolescence and in some ways young adulthood yet not strictly either one, a period in

which adult commitments and responsibilities are delayed while the role experimentation that began in adolescence continues and in fact intensifies.

Another theoretical contribution can be found in the work of Daniel Levinson (1978). Levinson interviewed men at midlife, but he had them describe their earlier years as well, and on the basis of their accounts he developed a theory that included development in the late teens and the twenties. He called ages 17–33 the *novice phase* of development and argued that the overriding task of this phase is to move into the adult world and build a stable life structure. During this process, according to Levinson, the young person experiences a considerable amount of change and instability while sorting through various possibilities in love and work in the course of establishing a life structure. Levinson acknowledged that his conception of the novice phase was similar to Erikson’s ideas about the role experimentation that takes place during the psychosocial moratorium (Levinson, 1978, pp. 322–323).

Perhaps the best-known theory of development in the late teens and the twenties is Kenneth Keniston’s theory of youth. Like Erikson and Levinson, Keniston (1971) conceptualized youth as a period of continued role experimentation between adolescence and young adulthood. However, Keniston wrote at a time when American society and some Western European societies were convulsed with highly visible youth movements protesting the involvement of the United States in the Vietnam War (among other things). His description of youth as a time of “tension between self and society” (Keniston, 1971, p. 8) and “refusal of socialization” (p. 9) reflects that historical moment rather than any enduring characteristics of the period.

More importantly, Keniston’s (1971) application of the term *youth* to this period is problematic. *Youth* has a long history in the English language as a term for childhood generally and for what later became called adolescence (e.g., Ben-Amos, 1994), and it continues to be used popularly and by many social scientists for these purposes (as reflected in terms such as *youth organizations*). Keniston’s choice of the ambiguous and confusing term *youth* may explain in part why the idea of the late teens and twenties as a separate period of life never became widely accepted by developmental scientists after his articulation of it. However, as I argue in the following sections, there is good empirical support for conceiving this period—proposed here as emerging adulthood—as a distinct period of life.

Emerging Adulthood Is Distinct Demographically

Although Erikson (1968), Levinson (1978), and Keniston (1971) all contributed to the theoretical groundwork for emerging adulthood, the nature of the period has changed considerably since the time of their writings more than 20 years ago. As noted at the outset of this article, demographic changes in the timing of marriage and parenthood in recent decades have made a period of emerging adulthood typical for young people in industrialized societies. Postponing these transitions until at least the late twenties

leaves the late teens and early twenties available for exploring various possible life directions.

An important demographic characteristic of emerging adulthood is that there is a great deal of demographic variability, reflecting the wide scope of individual volition during these years. Emerging adulthood is the only period of life in which nothing is normative demographically (Rindfuss, 1991; Wallace, 1995). During adolescence, up to age 18, a variety of key demographic areas show little variation. Over 95% of American adolescents aged 12–17 live at home with one or more parents, over 98% are unmarried, fewer than 10% have had a child, and over 95% are enrolled in school (U.S. Bureau of the Census, 1997). By age 30, new demographic norms have been established: About 75% of 30-year-olds have married, about 75% have become parents, and fewer than 10% are enrolled in school (U.S. Bureau of the Census, 1997).

In between these two periods, however, and especially from ages 18 to 25, a person's demographic status in these areas is very difficult to predict on the basis of age alone. The demographic diversity and unpredictability of emerging adulthood is a reflection of the experimental and exploratory quality of the period. Talcott Parsons (1942) called adolescence the *roleless role*, but this term applies much better to emerging adulthood. Emerging adults tend to have a wider scope of possible activities than persons in other age periods because they are less likely to be constrained by role requirements, and this makes their demographic status unpredictable.

One demographic area that especially reflects the exploratory quality of emerging adulthood is residential status. Most young Americans leave home by age 18 or 19 (Goldscheider & Goldscheider, 1994). In the years that follow, emerging adults' living situations are diverse. About one third of emerging adults go off to college after high school and spend the next several years in some combination of independent living and continued reliance on adults, for example, in a college dormitory or a fraternity or sorority house (Goldscheider & Goldscheider, 1994). For them, this is a period of semiautonomy (Goldscheider & Davanzo, 1986) as they take on some of the responsibilities of independent living but leave others to their parents, college authorities, or other adults. About 40% move out of their parental home not for college but for independent living and full-time work (Goldscheider & Goldscheider, 1994). About two thirds experience a period of cohabitation with a romantic partner (Michael, Gagnon, Laumann, & Kolata, 1995). Some remain at home while attending college or working or some combination of the two. Only about 10% of men and 30% of women remain at home until marriage (Goldscheider & Goldscheider, 1994).

Amidst this diversity, perhaps the unifying feature of the residential status of emerging adults is the instability of it. Emerging adults have the highest rates of residential change of any age group. Using data from several cohorts of the National Longitudinal Study, Rindfuss (1991) described how rates of residential mobility peak in the mid-twenties (see Figure 1). For about 40% of the current generation of emerging adults, residential changes include

moving back into their parents' home and then out again at least once in the course of their late teens and twenties (Goldscheider & Goldscheider, 1994). Frequent residential changes during emerging adulthood reflect its exploratory quality, because these changes often take place at the end of one period of exploration or the beginning of another (e.g., the end of a period of cohabitation, entering or leaving college, or the beginning of a new job in a new place).

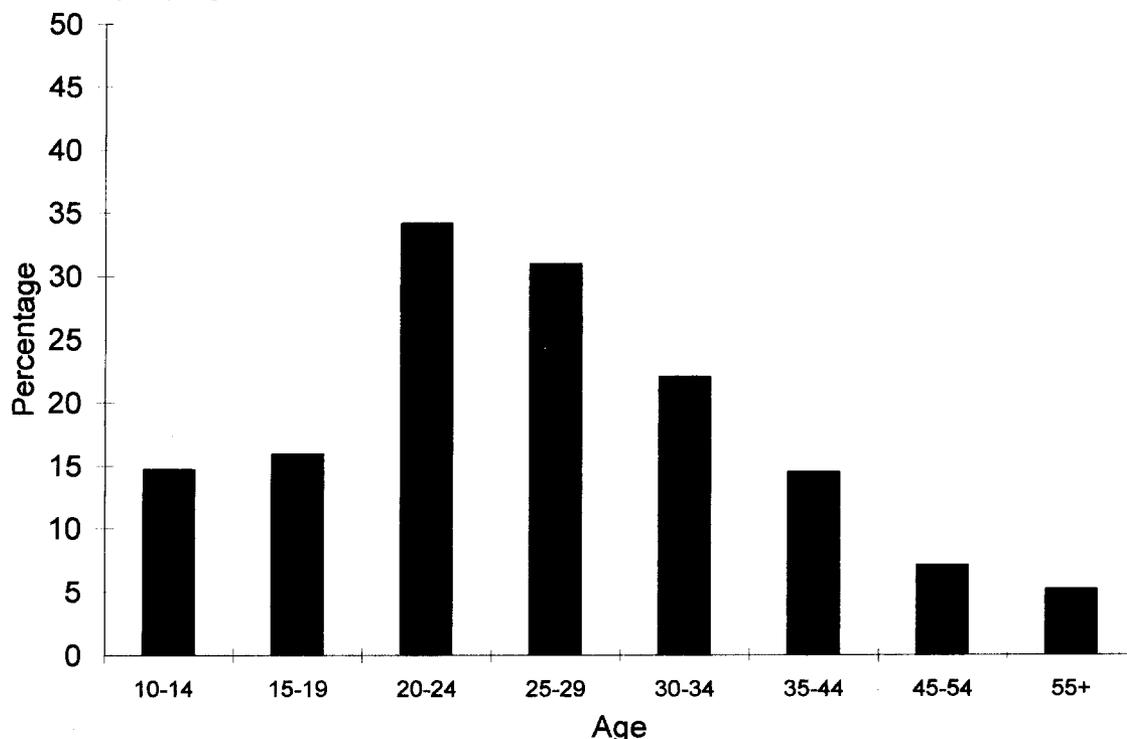
School attendance is another area in which there is substantial change and diversity among emerging adults. The proportion of American emerging adults who enter higher education in the year following high school is at its highest level ever, over 60% (Bianchi & Spain, 1996). However, this figure masks the expanding diversity in the years that follow. Only 32% of young people ages 25–29 have completed four years or more of college (U.S. Bureau of the Census, 1997). For emerging adults, college education is often pursued in a nonlinear way, frequently combined with work, and punctuated by periods of nonattendance. For those who do eventually graduate with a four-year degree, college is increasingly likely to be followed by graduate school. About one third of those who graduate with a bachelor's degree are enrolled in postgraduate education the following year (Mogelonsky, 1996). In European countries too, the length of education has become extended in recent decades (Chisholm & Hurrelmann, 1995).

Overall, then, the years of emerging adulthood are characterized by a high degree of demographic diversity and instability, reflecting the emphasis on change and exploration. It is only in the transition from emerging adulthood to young adulthood in the late twenties that the diversity narrows and the instability eases, as young people make more enduring choices in love and work. Rindfuss (1991) called the period from ages 18 to 30 “demographically dense” (p. 496) because of the many demographic transitions that take place during that time, especially in the late twenties.

Emerging Adulthood Is Distinct Subjectively

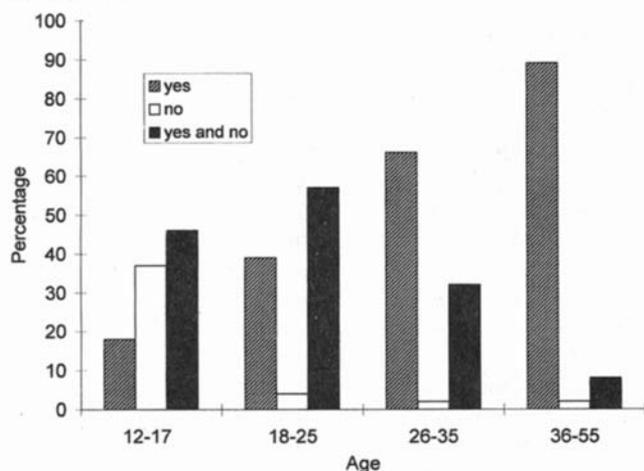
Emerging adults do not see themselves as adolescents, but many of them also do not see themselves entirely as adults. Figure 2 shows that when they are asked whether they feel they have reached adulthood, the majority of Americans in their late teens and early twenties answer neither *no* nor *yes* but the ambiguous *in some respects yes, in some respects no* (Arnett, in press). This reflects a subjective sense on the part of most emerging adults that they have left adolescence but have not yet completely entered young adulthood (Arnett, 1994a, 1997, 1998). They have no name for the period they are in—because the society they live in has no name for it—so they regard themselves as being neither adolescents nor adults, in between the two but not really one or the other. As Figure 2 shows, only in their late twenties and early thirties do a clear majority of people indicate that they feel they have reached adulthood. However, age is only the roughest marker of the subjective transition from emerging adulthood to young adulthood. As

Figure 1
Residential Change by Age, 1998



Note. Data are from "Geographic Mobility: March 1997 to March 1998," by the U.S. Bureau of the Census, 2000, *Current Population Reports* (Series P-20, No. 520), Washington, DC: U.S. Government Printing Office.

Figure 2
Subjective Conceptions of Adult Status in Response to the Question, Do You Feel That You Have Reached Adulthood?



Note. N = 519. Data are from Arnett (in press).

illustrated in Figure 2, even in their late twenties and early thirties, nearly one third did not feel their transition to adulthood was complete.

One might expect emerging adults' subjective sense of ambiguity in attaining full adulthood to arise from the demographic diversity and instability described above. Perhaps it is difficult for young people to feel they have reached adulthood before they have established a stable residence, finished school, settled into a career, and married (or at least committed themselves to a long-term love relationship). However, perhaps surprisingly, the research evidence indicates strongly that these demographic transitions have little to do with emerging adults' conceptions of what it means to reach adulthood. Consistently, in a variety of studies with young people in their teens and twenties, demographic transitions such as finishing education, settling into a career, marriage, and parenthood rank at the *bottom* in importance among possible criteria considered necessary for the attainment of adulthood (Arnett, 1997, 1998, in press; Greene, Wheatley, & Aldava, 1992; Scheer, Unger, & Brown, 1994).

The characteristics that matter most to emerging adults in their subjective sense of attaining adulthood are not demographic transitions but individualistic *qualities of*

character (Arnett, 1998). Specifically, the two top criteria for the transition to adulthood in a variety of studies have been *accepting responsibility for one's self* and *making independent decisions* (Arnett, 1997, 1998; Greene et al., 1992; Scheer et al., 1994). A third criterion, also individualistic but more tangible, *becoming financially independent*, also ranks consistently near the top.

The prominence of these criteria for the transition to adulthood reflects an emphasis in emerging adulthood on becoming a self-sufficient person (Arnett, 1998). During these years, the character qualities most important to becoming successfully self-sufficient—accepting responsibility for one's self and making independent decisions—are being developed. Financial independence is also crucial to self-sufficiency, so it is also important in emerging adults' conceptions of what is necessary to become an adult. Only after these character qualities have reached fruition and financial independence has been attained do emerging adults experience a subjective change in their developmental status, as they move out of emerging adulthood and into young adulthood. For most young people in American society, this occurs some time during the twenties and is usually accomplished by the late twenties (Arnett, in press).

Although emerging adults do not view demographic transitions as necessary for attaining adulthood, it should be noted that parenthood in particular is often sufficient for marking a subjective sense of adult status. Parenthood ranks low in young people's views of the essential criteria for adulthood for people in general, but those who have had a child tend to view becoming a parent as the most important marker of the transition to adulthood for themselves (Arnett, 1998). The explorations that occur in emerging adulthood become sharply restricted with parenthood, because it requires taking on the responsibilities of protecting and providing for a young child. With parenthood, the focus of concern shifts inexorably from responsibility for one's self to responsibility for others.

Emerging Adulthood Is Distinct for Identity Explorations

A key feature of emerging adulthood is that it is the period of life that offers the most opportunity for identity explorations in the areas of love, work, and worldviews. Of course, it is adolescence rather than emerging adulthood that has typically been associated with identity formation. Erikson (1950) designated identity versus role confusion as the central crisis of the adolescent stage of life, and in the decades since he articulated this idea the focus of research on identity has been on adolescence (Adams, 1999). However, as noted, Erikson (1950, 1968) clearly believed that industrialized societies allow a prolonged adolescence for extended identity explorations. If adolescence is the period from ages 10 to 18 and emerging adulthood is the period from (roughly) ages 18 to 25, most identity exploration takes place in emerging adulthood rather than adolescence. Although research on identity formation has focused mainly on adolescence, this research has shown that identity achievement has rarely been reached by the end of high

school (Montemayor, Brown, & Adams, 1985; Waterman, 1982) and that identity development continues through the late teens and the twenties (Valde, 1996; Whitbourne & Tesch, 1985).

The focus on identity issues in emerging adulthood can be seen in the three main areas of identity exploration: love, work, and worldviews. Identity formation involves trying out various life possibilities and gradually moving toward making enduring decisions. In all three of these areas, this process begins in adolescence but takes place mainly in emerging adulthood. With regard to love, American adolescents typically begin dating around ages 12 to 14 (Padgham & Blyth, 1991). However, because any serious consideration of marriage is a decade or more away for most 12- to 14-year-olds, young people view the early years of dating as primarily recreational (Roscoe, Dian, & Brooks, 1987). For adolescents, dating provides companionship, the first experiences of romantic love, and sexual experimentation; however, their dating relationships typically last only a few weeks or months (Feiring, 1996), and few adolescents expect to remain with their "high school sweetheart" much beyond high school.

In emerging adulthood, explorations in love become more intimate and serious. Dating in adolescence often takes place in groups, as adolescents pursue shared recreation such as parties, dances, and hanging out (Padgham & Blyth, 1991). By emerging adulthood, dating is more likely to take place in couples, and the focus is less on recreation and more on exploring the potential for emotional and physical intimacy. Romantic relationships in emerging adulthood last longer than in adolescence, are more likely to include sexual intercourse, and may include cohabitation (Michael et al., 1995). Thus, in adolescence, explorations in love tend to be tentative and transient; the implicit question is, *Who would I enjoy being with, here and now?* In contrast, explorations in love in emerging adulthood tend to involve a deeper level of intimacy, and the implicit question is more identity focused: *Given the kind of person I am, what kind of person do I wish to have as a partner through life?*

With regard to work, a similar contrast exists between the transient and tentative explorations of adolescence and the more serious and focused explorations of emerging adulthood. In the United States, the majority of high school students are employed part-time (Barling & Kelloway, 1999). Although adolescents often report that their work experiences enhance their abilities in areas such as managing their time and money (Mortimer, Harley, & Aronson, 1999), for the most part their jobs do not provide them with knowledge or experience that will be related to their future occupations (Greenberger & Steinberg, 1986; Steinberg & Cauffman, 1995). Most adolescents are employed in service jobs—at restaurants, retail stores, and so forth—in which the cognitive challenges are minimal and the skills learned are few. Adolescents tend to view their jobs not as occupational preparation but as a way to obtain the money that will support an active leisure life—paying for compact discs, concerts, restaurant meals, clothes, cars, travel, and

so forth (Bachman & Schulenberg, 1993; Shanahan, Elder, Burchinal, & Conger, 1996; Steinberg & Cauffman, 1995).

In emerging adulthood, work experiences become more focused on preparation for adult work roles. Emerging adults begin to consider how their work experiences will lay the groundwork for the jobs they may have through adulthood. In exploring various work possibilities, they explore identity issues as well: What kind of work am I good at? What kind of work would I find satisfying for the long term? What are my chances of getting a job in the field that seems to suit me best?

Emerging adults' educational choices and experiences explore similar questions. In their educational paths, they try out various possibilities that would prepare them for different kinds of future work. College students often change majors more than once, especially in their first two years, as they try on possible occupational futures, discard them, and pursue others. With graduate school becoming an increasingly common choice after an undergraduate degree is obtained, emerging adults' educational explorations often continue through their early twenties and mid-twenties. Graduate school allows emerging adults to switch directions again from the path of occupational preparation they had chosen as undergraduates.

For both love and work, the goals of identity explorations in emerging adulthood are not limited to direct preparation for adult roles. On the contrary, the explorations of emerging adulthood are in part explorations for their own sake, part of obtaining a broad range of life experiences before taking on enduring—and limiting—adult responsibilities. The absence of enduring role commitments in emerging adulthood makes possible a degree of experimentation and exploration that is not likely to be possible during the thirties and beyond. For people who wish to have a variety of romantic and sexual experiences, emerging adulthood is the time for it, because parental surveillance has diminished and there is as yet little normative pressure to enter marriage. Similarly, emerging adulthood is the time for trying out unusual work and educational possibilities. For this reason, short-term volunteer jobs in programs such as Americorps and the Peace Corps are more popular with emerging adults than with persons in any other age period. Emerging adults may also travel to a different part of the country or the world on their own for a limited period, often in the context of a limited-term work or educational experience. This too can be part of their identity explorations, part of expanding their range of personal experiences prior to making the more enduring choices of adulthood.

With regard to worldviews, the work of William Perry (1970/1999) has shown that changes in worldviews are often a central part of cognitive development during emerging adulthood. According to Perry, emerging adults often enter college with a worldview they have learned in the course of childhood and adolescence. However, a college education leads to exposure to a variety of different worldviews, and in the course of this exposure college students often find themselves questioning the worldviews they brought in. Over the course of their college years, emerging

adults examine and consider a variety of possible worldviews. By the end of their college years they have often committed themselves to a worldview different from the one they brought in, while remaining open to further modifications of it.

Most of the research on changes in worldviews during emerging adulthood has involved college students and graduate students, and there is evidence that higher education promotes explorations and reconsiderations of worldviews (Pascarella & Terenzini, 1991). However, it is notable that emerging adults who do not attend college are as likely as college students to indicate that deciding on their own beliefs and values is an essential criterion for attaining adult status (Arnett, 1997). Also, research on emerging adults' religious beliefs suggests that regardless of educational background, they consider it important during emerging adulthood to reexamine the beliefs they have learned in their families and to form a set of beliefs that is the product of their own independent reflections (Arnett & Jensen, 1999; Hoge, Johnson, & Luidens, 1993).

Although the identity explorations of emerging adulthood make it an especially full and intense time of life for many people, these explorations are not always experienced as enjoyable. Explorations in love sometimes result in disappointment, disillusionment, or rejection. Explorations in work sometimes result in a failure to achieve the occupation most desired or in an inability to find work that is satisfying and fulfilling. Explorations in worldviews sometimes lead to rejection of childhood beliefs without the construction of anything more compelling in their place (Arnett & Jensen, 1999). Also, to a large extent, emerging adults pursue their identity explorations on their own, without the daily companionship of either their family of origin or their family to be (Jonsson, 1994; Morch, 1995). Young Americans ages 19–29 spend more of their leisure time alone than any persons except the elderly and spend more of their time in productive activities (school and work) alone than any other age group under 40 (Larson, 1990). Many of them see the condition of the world as grim and are pessimistic about the future of their society (Arnett, 2000b). Nevertheless, for themselves personally, emerging adults are highly optimistic about ultimately achieving their goals. In one national poll of 18- to 24-year-olds in the United States (Hornblower, 1997), nearly all—96%—agreed with the statement, “I am very sure that someday I will get to where I want to be in life.”

Other Notable Findings on Emerging Adulthood

The three areas outlined above—demographics, subjective perceptions, and identity explorations—provide the most abundant information on the distinctiveness of emerging adulthood. However, evidence is available from other areas that suggests possible lines of inquiry for future research on emerging adulthood. One of these areas is risk behavior. Although there is a voluminous literature on adolescent risk behavior and relatively little research on risk behavior in emerging adulthood (Jessor, Donovan, & Costa, 1991), the prevalence of several types of risk behavior peaks not

during adolescence but during emerging adulthood (ages 18–25). These risk behaviors include unprotected sex, most types of substance use, and risky driving behaviors such as driving at high speeds or while intoxicated (Arnett, 1992; Bachman, Johnston, O'Malley, & Schulenberg, 1996). Figure 3 shows an example for binge drinking.

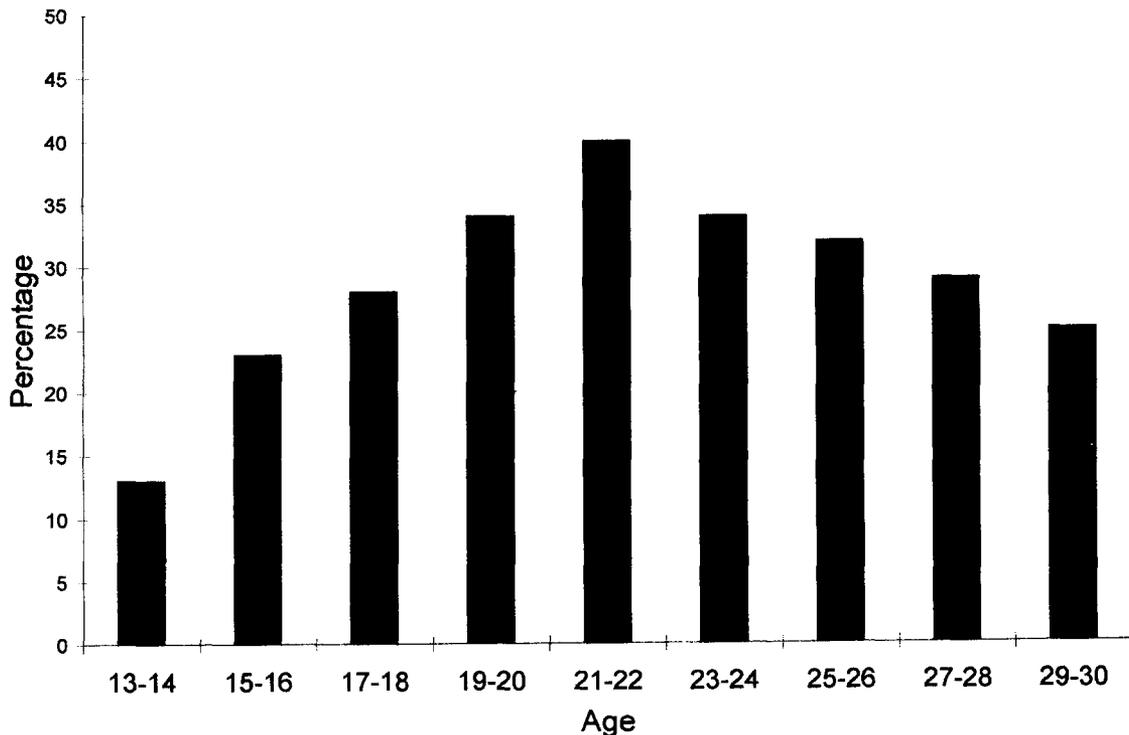
What is it about emerging adulthood that lends itself to such high rates of risk behavior? To some degree, emerging adults' risk behaviors can be understood as part of their identity explorations, that is, as one reflection of the desire to obtain a wide range of experiences before settling down into the roles and responsibilities of adult life. One of the motivations consistently found to be related to participation in a variety of types of risk behavior is sensation seeking, which is the desire for novel and intense experiences (Arnett, 1994b). Emerging adults can pursue novel and intense experiences more freely than adolescents because they are less likely to be monitored by parents and can pursue them more freely than adults because they are less constrained by roles. After marriage, adults are constrained from taking part in risk behavior by the responsibilities of the marriage role, and once they have a child, they are constrained by the responsibilities of the parenting role. In one example of this, Bachman et al. (1996) used longitudinal data to show how substance use rises to a peak

in the early twenties during the role hiatus of emerging adulthood, declines steeply and sharply following marriage, and declines further following the entry to parenthood. The responsibilities of these roles lead to lower rates of risk behavior as emerging adulthood is succeeded by young adulthood.

Research on family relationships among emerging adults has also been conducted. For American emerging adults in their early twenties, physical proximity to parents has been found to be *inversely* related to the quality of relationships with them. Emerging adults with the most frequent contact with parents, especially emerging adults still living at home, tend to be the least close to their parents and to have the poorest psychological adjustment (Dubas & Petersen, 1996; O'Connor, Allen, Bell, & Hauser, 1996). In European studies, emerging adults who remain at home tend to be happier with their living situations than those who have left home; they continue to rely on their parents as a source of support and comfort, but they also tend to have a great deal of autonomy within their parents' households (Chisholm & Hurrelmann, 1995). Thus, for emerging adults in both the United States and Europe, *autonomy* and *relatedness* are complementary rather than opposing dimensions of their relationships with their parents (O'Connor et al., 1996).

Figure 3

Rates of Binge Drinking (Five or More Alcoholic Drinks in a Row) in the Past Two Weeks at Various Ages



Note. Data are from "Transitions in Drug Use During Late Adolescence and Young Adulthood," by J. G. Bachman, L. D. Johnston, P. O'Malley, and J. Schulenberg, in *Transitions Through Adolescence: Interpersonal Domains and Context* (p. 118), by J. A. Graber, J. Brooks-Gunn, and A. C. Petersen (Eds.), 1996, Mahwah, NJ: Erlbaum. Copyright 1996 by Erlbaum. Used with permission. Data also available at <http://www.monitoringthefuture.org/data/99data/pr99i1c.pdf>.

These findings provide a foundation for research into development during emerging adulthood. Of course, much more work remains to be done on virtually every aspect of development during this period. To what extent do emerging adults rely on friends for support and companionship, given that this is a period when most young people have left their families of origin but have not yet entered marriage? To what extent are the explorations of emerging adulthood different for men and women? Do emerging adults have especially high rates of media use, given that they spend so much time alone? These and many other questions about the period await investigation. Establishing emerging adulthood as a distinct developmental period may help to promote this research.

Why Emerging Adulthood Is Not Adolescence

It is widely known that the scientific study of adolescence began with the publication of G. Stanley Hall's two-volume magnum opus nearly a century ago (Hall, 1904). What is less widely known, however, is that in Hall's view adolescence extended from age 14 to age 24 (Hall, 1904, p. xix). In contrast, contemporary scholars generally consider adolescence to begin at age 10 or 11 and to end by age 18 or 19. The cover of every issue of the *Journal of Research on Adolescence*, the flagship journal of the Society for Research on Adolescence, proclaims that adolescence is defined as "the second decade of life." What happened between Hall's time and our own to move scholars' conceptions of adolescence earlier in the life course?

Two changes stand out as possible explanations. One is the decline that has taken place during the 20th century in the typical age of the initiation of puberty. At the beginning of the 20th century, the median age of menarche in Western countries was about 15 (Eveleth & Tanner, 1976). Because menarche takes place relatively late in the typical sequence of pubertal changes, this means that the initial changes of puberty would have begun at about ages 13–15 for most people, which is just where Hall designated the beginning of adolescence. However, the median age of menarche (and by implication other pubertal changes) declined steadily between 1900 and 1970 before leveling out, so that now the typical age of menarche in the United States is 12.5 (Brooks-Gunn & Paikoff, 1997). The initial changes of puberty usually begin about 2 years earlier, thus the designation of adolescence as beginning with the entry into the second decade of life.

As for the age when adolescence ends, the change in this age may have been inspired not by a biological change but by a social change: the growth of high school attendance that made high school a normative experience for adolescents in the United States. In 1900, only 10% of persons ages 14–17 were enrolled in high school. However, this proportion rose steeply and steadily over the course of the 20th century to reach 95% by 1985 (Arnett & Taber, 1994). This makes it easy to understand why Hall would not have chosen age 18 as the end of adolescence, because for most adolescents of his time no significant

transition took place at that age. Education ended earlier, work began earlier, and leaving home took place later. Marriage and parenthood did not take place for most people until their early twenties or midtwenties (Arnett & Taber, 1994), which may have been why Hall designated age 24 as the end of adolescence. (Hall himself did not explain why he chose this age.)

In our time, it makes sense to define adolescence as ages 10–18. Young people in this age group have in common that they live with their parents, are experiencing the physical changes of puberty, are attending secondary school, and are part of a school-based peer culture. None of this remains normative after age 18, which is why it is not adequate simply to call the late teens and early twenties *late adolescence*. Age 18 also marks a variety of legal transitions, such as being allowed to vote and sign legal documents.

Although some scholars have suggested that the late teens and early twenties should be considered late adolescence (e.g., Elliott & Feldman, 1990), for the most part scholars on adolescence focus on ages 10–18 as the years of adolescent development. Studies published in the major journals on adolescence rarely include samples with ages higher than 18. For example, in 1997, 90% of the studies published in the *Journal of Research on Adolescence* and the *Journal of Youth & Adolescence* were on samples of high school age or younger. College students have been the focus of many research studies, but most often as "adults" in social psychology studies. Sociologists have studied the late teens and the twenties for patterns of demographic events viewed as part of the transition to adulthood (e.g., Hogan & Astone, 1986; Rindfuss, 1991). However, few studies have recognized the late teens through the twenties as a distinct developmental period.

Why the Forgotten Half Remains Forgotten

In 1987, a distinguished panel of scholars and public policy officials was assembled by the William T. Grant Foundation and asked to address the life situations of young people who do not attend college after high school, especially with respect to their economic prospects. They produced an influential and widely read report entitled *The Forgotten Half: Non-College-Bound Youth in America* (William T. Grant Foundation Commission on Work, Family, and Citizenship, 1988), which contained an analysis of the circumstances of the "forgotten half" and a set of policy suggestions for promoting a successful transition from high school to work.

Over a decade later, the forgotten half remains forgotten by scholars, in the sense that studies of young people who do not attend college in the years following high school remain rare. Why did the Grant commission's widely acclaimed report not inspire more enduring scholarly attention to young people not attending college in this age period? One reason is practical. Studies of college students are ubiquitous because college students are so easy to find—most scholars who teach at colleges or universities

have ready access to them. Studying young people who are not in college is more difficult because they are not readily accessible in any institutional setting. Other ways of obtaining research participants in this age period must be used, such as contacting community organizations or taking out newspaper ads, and these samples often have the liability of being nonrepresentative. The same conditions apply to research on college students after they leave college. Few studies exist of young people in their midtwenties to late twenties, in part because they are not available in any institutional setting. Notable exceptions to this rule include some excellent longitudinal studies (the National Longitudinal Studies, e.g., Rindfuss, 1991; the Monitoring the Future studies, e.g., Bachman et al., 1996; O'Connor et al., 1996; Offer & Offer, 1975).

However, the dearth of studies on young people in their late teens and twenties is not due only to the difficulty of finding samples in this age group. It also arises from the lack of a clear developmental conception of this age group. Scholars have no clearly articulated way of thinking about development from the late teens through the twenties, no paradigm for this age period, so they may not think about young people at these ages as a focus for developmental research. Emerging adulthood is offered as a new paradigm, a new way of thinking about development from the late teens through the twenties, especially ages 18–25, partly in the hope that a definite conception of this period will lead to an increase in scholarly attention to it.

Why Emerging Adulthood Is Not Young Adulthood

But (some might object) is there not already a paradigm for the years of the late teens and the twenties? Is that not what young adulthood is? The answer is *no*. There are a number of reasons why *young adulthood* is unsatisfactory as a designation for this developmental period.

One reason is that the use of *young adulthood* implies that adulthood has been reached at this point. As we have seen, most young people in this age period would disagree that they have reached adulthood. They see themselves as gradually making their way into adulthood, so *emerging adulthood* seems a better term for their subjective experience. More generally, the term *emerging* captures the dynamic, changeable, fluid quality of the period.

Also, if ages 18–25 are young adulthood, what would that make the thirties? Young adulthood is a term better applied to the thirties, which are still young but are definitely adult in a way that the years 18–25 are not. It makes little sense to lump the late teens, twenties, and thirties together and call the entire period *young adulthood*. The period from ages 18 to 25 could hardly be more distinct from the thirties. The majority of young people ages 18–25 do not believe they have reached full adulthood, whereas the majority of people in their thirties believe that they have (Arnett, in press). The majority of people ages 18–25 are still in the process of obtaining education and training for a long-term adult occupation, whereas the majority of people in their thirties have settled into a more stable

occupational path. The majority of people ages 18–25 are unmarried, whereas the majority of people in their thirties are married. The majority of people ages 18–25 are childless, whereas the majority of people in their thirties have had at least one child. The list could go on. The point should be clear. Emerging adulthood and young adulthood should be distinguished as separate developmental periods.

It should be emphasized, however, that age is only a rough indicator of the transition from emerging adulthood to young adulthood. Eighteen is a good age marker for the end of adolescence and the beginning of emerging adulthood, because it is the age at which most young people finish secondary school, leave their parents' home, and reach the legal age of adult status in a variety of respects. However, the transition from emerging adulthood to young adulthood is much less definite with respect to age. There are 19-year-olds who have reached adulthood—demographically, subjectively, and in terms of identity formation—and 29-year-olds who have not. Nevertheless, for most people, the transition from emerging adulthood to young adulthood intensifies in the late twenties and is reached by age 30 in all of these respects.

Emerging adulthood differs both from adolescence and from young adulthood in that it is, to some extent, defined by its heterogeneity. As noted, in emerging adulthood, there is little that is normative. Emerging adulthood is very much a transitional period leading to adulthood, and different emerging adults reach adulthood at different points. Also, the possibility of devoting the late teens and early twenties to explorations of various kinds is not equally available to all young people, and in any case, people vary in the degree of exploration they choose to pursue.

The heterogeneity of emerging adulthood represents both a warning and an opportunity for those who wish to study this age period. The warning is to be cautious in making sweeping statements about emerging adults. Almost always, such statements need to be qualified by mentioning the heterogeneity of emerging adulthood. The opportunity is that this heterogeneity makes emerging adulthood an especially rich, complex, dynamic period of life to study.

Emerging Adulthood Across Cultures

Thus far, the focus of this article has been on emerging adulthood among young people in the West, especially in the United States. Is emerging adulthood a period of life that is restricted to certain cultures and certain times? The answer to this question appears to be *yes*. For example, Schlegel and Barry (1991), in their comprehensive integration of information on adolescence in 186 traditional non-Western cultures, concluded that adolescence as a life stage is virtually universal, but that a further period between adolescence and adulthood (*youth*, in the terminology they used) existed in only 20% of the cultures they studied. In the cultures in their sample, adulthood was typically signified by entry into marriage, and marriage usually took place at about ages 16 to 18 for girls and at about ages 18 to 20

for boys. This early timing of marriage allowed for a period of adolescence but not for a period of emerging adulthood.

Emerging adulthood, then, is not a universal period but a period that exists only in cultures that postpone the entry into adult roles and responsibilities until well past the late teens. Thus, emerging adulthood would be most likely to be found in countries that are highly industrialized or postindustrial. Such countries require a high level of education and training for entry into the information-based professions that are the most prestigious and lucrative, so many of their young people remain in school into their early twenties and midtwenties. Marriage and parenthood are typically postponed until well after schooling has ended, which allows for a period of exploration of various relationships before marriage and for exploration of various jobs before taking on the responsibility of supporting a child financially. Table 1 shows the median ages of marriage in a range of highly industrialized countries, contrasted with the median ages of marriage in selected developing countries.

Although median marriage ages are typically calculated on a countrywide basis, it should be noted that emerging adulthood is best understood as a characteristic of cultures rather than countries. Within some highly industrialized countries, members of minority cultures may have cultural practices that lead to a shortened period of emerging adulthood or no emerging adulthood at all. For example, in the United States, members of the Mormon church tend to have a shortened and highly structured emerging adulthood. Because of cultural beliefs prohibiting premarital sex and emphasizing the desirability of large families, considerable social pressure is placed on young Mormons to marry early and begin having children. Consequently, the median ages of marriage and first childbirth are much lower among Mormons than in the American population as a whole (Heaton, 1992), and young Mormons are likely to have a much briefer period of exploration before taking on adult roles.

Limitations in educational and occupational opportunities also influence the extent to which young people can

experience their late teens and twenties as a volitional period. The young woman who has a child outside of marriage at age 16 and spends her late teens and early twenties alternating between welfare and low-paying jobs has little chance for exploration of possible life directions, nor does the young man who drops out of school and spends most of his late teens and early twenties unemployed and looking unsuccessfully for a job (Cote & Allaha, 1996). Because opportunities tend to be less widely available in minority cultures than in the majority culture in most industrialized countries, members of minority groups may be less likely to experience ages 18–25 as a period of independent exploration of possible life directions (Morch, 1995). However, social class may be more important than ethnicity, with young people in the middle class or above having more opportunities for the explorations of emerging adulthood than young people who are working class or below. Alternatively, it may be that explorations are not fewer in the working class but different, with more emphasis on work explorations and less emphasis on education. These are possibilities to be investigated.

In economically developing countries, there tends to be a distinct cultural split between urban and rural areas. Young people in urban areas of countries such as China and India are more likely to experience emerging adulthood, because they marry later, have children later, obtain more education, and have a greater range of occupational and recreational opportunities than young people in rural areas. In contrast, young people in rural areas of developing countries often receive minimal schooling, marry early, and have little choice of occupations except agricultural work. Thus in developing countries emerging adulthood is often experienced in urban areas but rarely in rural areas.

However, it should also be noted that emerging adulthood is likely to become more pervasive worldwide in the decades to come, with the increasing globalization of the world economy. Between 1980 and 1995, the proportion of young people in developing countries who attended secondary school rose sharply, and the median ages of marriage and first childbirth rose in these countries as well (Noble et al., 1996). As developing countries are becoming more integrated into a global economy, there is an increasing number of higher-paying jobs in these countries, jobs that require young people to obtain higher education. At the same time, as technology becomes increasingly available in these countries, particularly in agriculture, the labor of young people is becoming less and less necessary for family survival, making it possible for many of them to attend school instead.

These changes open up the possibility for the spread of emerging adulthood in developing countries. Economic development makes possible a period of the independent role exploration that is at the heart of emerging adulthood. As societies become more affluent, they are more likely to grant young people the opportunity for the extended moratorium of emerging adulthood, because they have no urgent need for young people's labor. Similarly, economic development is usually accompanied by increased life expectancy, and devoting years to the explorations of emerg-

Table 1
Median Marriage Age of Women in Selected Countries

Industrialized countries	Age	Developing countries	Age
United States	25.2	Egypt	21.9
Canada	26.0	Morocco	22.3
Germany	26.2	Ghana	21.1
France	26.1	Nigeria	18.7
Italy	25.8	India	20.0
Japan	26.9	Indonesia	21.1
Australia	26.0	Brazil	22.6

Note. Data are from *The World's Youth*, by J. Noble, J. Cover, and M. Yanagishita, 1996, Washington, DC: Population Reference Bureau. Copyright 1996 by the Population Reference Bureau. Reprinted with permission.

ing adulthood becomes more feasible and attractive when people can expect to live to be at least 70 or 80 rather than 40 or 50. Thus it seems possible that by the end of the 21st century emerging adulthood will be a normative period for young people worldwide, although it is likely to vary in length and content both within and between countries (Arnett, 2000a). The growth and variability of emerging adulthood in countries and cultures around the world would make an important and fascinating topic for a nascent scholarly field of emerging adulthood.

Conclusion

Emerging adulthood has become a distinct period of the life course for young people in industrialized societies. It is a period characterized by change and exploration for most people, as they examine the life possibilities open to them and gradually arrive at more enduring choices in love, work, and worldviews. Not all young people experience their late teens and twenties as years of change and exploration, even in industrialized societies. Some lack the opportunities to use those years as a volitional period; others may be inclined by personality or circumstances to limit their explorations or to seek a relatively early resolution to them. Nevertheless, as scholars we can characterize emerging adulthood as a period when change and exploration are common, even as we recognize the heterogeneity of the period and investigate this heterogeneity as one of emerging adulthood's distinguishing characteristics.

Emerging adulthood merits scholarly attention as a distinct period of the life course in industrialized societies. It is in many respects the age of possibilities, a period in which many different potential futures remain possible and personal freedom and exploration are higher for most people than at any other time. It is also a period of life that is likely to grow in importance in the coming century, as countries around the world reach a point in their economic development where they may allow the prolonged period of exploration and freedom from roles that constitutes emerging adulthood.

REFERENCES

- Adams, G. R. (1999). *The objective measure of ego identity status: A manual on theory and test construction*. Guelph, Ontario, Canada: Author.
- Arnett, J. (1992). Reckless behavior in adolescence: A developmental perspective. *Developmental Review, 12*, 339–373.
- Arnett, J. J. (1994a). Are college students adults? Their conceptions of the transition to adulthood. *Journal of Adult Development, 1*, 154–168.
- Arnett, J. (1994b). Sensation seeking: A new conceptualization and a new scale. *Personality and Individual Differences, 16*, 289–296.
- Arnett, J. J. (1997). Young people's conceptions of the transition to adulthood. *Youth & Society, 29*, 1–23.
- Arnett, J. J. (1998). Learning to stand alone: The contemporary American transition to adulthood in cultural and historical context. *Human Development, 41*, 295–315.
- Arnett, J. J. (2000a). *Emerging adulthood: Prospects for the 21st century*. Manuscript submitted for publication.
- Arnett, J. J. (2000b). High hopes in a grim world: Emerging adults' views of their futures and of "Generation X." *Youth & Society, 31*, 267–286.
- Arnett, J. J. (in press). Conceptions of the transition to adulthood from adolescence through midlife. *Journal of Adult Development*.
- Arnett, J. J., & Jensen, L. A. (1999, November). *A congregation of one: The individualization of religious beliefs among people in their twenties*. Paper presented at the annual meeting of the Society for the Scientific Study of Religion, Boston, MA.
- Arnett, J., & Taber, S. (1994). Adolescence terminable and interminable: When does adolescence end? *Journal of Youth & Adolescence, 23*, 517–537.
- Bachman, J. G., Johnston, L. D., O'Malley, P., & Schulenberg, J. (1996). Transitions in drug use during late adolescence and young adulthood. In J. A. Graber, J. Brooks-Gunn, & A. C. Petersen (Eds.), *Transitions through adolescence: Interpersonal domains and context* (pp. 111–140). Mahwah, NJ: Erlbaum.
- Bachman, J. G., & Schulenberg, J. (1993). How part-time work intensity relates to drug use, problem behavior, time use, and satisfaction among high school seniors: Are these consequences or just correlates? *Developmental Psychology, 29*, 220–235.
- Barling, J., & Kelloway, E. K. (1999). *Young workers: Varieties of experience*. Washington, DC: American Psychological Association.
- Ben-Amos, I. K. (1994). *Adolescence and youth in early modern England*. New Haven, CT: Yale University Press.
- Bianchi, S. M., & Spain, D. (1996). Women, work, and family in America. *Population Bulletin, 51*(3), 1–48.
- Brooks-Gunn, J., & Paikoff, R. (1997). Sexuality and developmental transitions during adolescence. In J. Schulenberg, J. L. Maggs, & K. Hurrelmann (Eds.), *Health risks and developmental transitions during adolescence* (pp. 190–219). New York: Cambridge University Press.
- Chisholm, L., & Hurrelmann, K. (1995). Adolescence in modern Europe: Pluralized transition patterns and their implications for personal and social risks. *Journal of Adolescence, 18*, 129–158.
- Cote, J. E., & Allaha, A. L. (1996). *Generation on hold: Coming of age in the late twentieth century*. New York: New York University Press.
- Dubas, J. S., & Petersen, A. C. (1996). Geographical distance from parents and adjustment during adolescence and young adulthood. *New Directions for Child Development, 71*, 3–19.
- Elliott, G. R., & Feldman, S. S. (1990). Capturing the adolescent experience. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 1–14). Cambridge, MA: Harvard University Press.
- Erikson, E. H. (1950). *Childhood and society*. New York: Norton.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. New York: Norton.
- Eveleth, P., & Tanner, J. (1976). *Worldwide variation in human growth*. New York: Cambridge University Press.
- Feiring, C. (1996). Concepts of romance in 15-year-olds. *Journal of Research on Adolescence, 6*, 181–200.
- Goldscheider, F., & Davanzo, J. (1986). Semiautonomy and leaving home during early adulthood. *Social Forces, 65*, 187–201.
- Goldscheider, F., & Goldscheider, C. (1994). Leaving and returning home in 20th century America. *Population Bulletin, 48*(4), 1–35.
- Greenberger, E., & Steinberg, L. (1986). *When teenagers work: The psychological and social costs of adolescent employment*. New York: Basic Books.
- Greene, A. L., Wheatley, S. M., & Aldava, J. F., IV. (1992). Stages on life's way: Adolescents' implicit theories of the life course. *Journal of Adolescent Research, 7*, 364–381.
- Hall, G. S. (1904). *Adolescence: Its psychology and its relation to physiology, anthropology, sociology, sex, crime, religion, and education* (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall.
- Heaton, T. B. (1992). Demographics of the contemporary Mormon family. *Dialogue, 25*, 19–34.
- Hogan, D. P., & Astone, N. M. (1986). The transition to adulthood. *Annual Review of Sociology, 12*, 109–130.
- Hoge, D. R., Johnson, B., & Luidens, D. A. (1993). Determinants of church involvement of young adults who grew up in Presbyterian churches. *Journal of the Scientific Study of Religion, 32*, 242–255.
- Hornblower, M. (1997, June 9). Great Xpectations. *Time, 149*, 58–68.
- Jessor, R., Donovan, J. E., & Costa, F. M. (1991). *Beyond adolescence: Problem behavior and young adult development*. New York: Cambridge University Press.
- Jonsson, B. (1994, March). *Youth life projects and modernization in Sweden: A cross-sectional study*. Paper presented at the biennial meeting of the Society for Research on Adolescence, San Diego, CA.
- Keniston, K. (1971). *Youth and dissent: The rise of a new opposition*. New York: Harcourt Brace Jovanovich.

- Larson, R. W. (1990). The solitary side of life: An examination of the time people spend alone from childhood to old age. *Developmental Review, 10*, 155–183.
- Levinson, D. J. (1978). *The seasons of a man's life*. New York: Ballantine.
- Martin, P., & Smyer, M. A. (1990). The experience of micro- and macroevents: A life span analysis. *Research on Aging, 12*, 294–310.
- Michael, R. T., Gagnon, J. H., Laumann, E. O., & Kolata, G. (1995). *Sex in America: A definitive survey*. New York: Warner Books.
- Mogelonsky, M. (1996, May). The rocky road to adulthood. *American Demographics, 18*, 26–36, 56.
- Montemayor, R., Brown, B., & Adams, G. (1985). *Changes in identity status and psychological adjustment after leaving home and entering college*. Paper presented at the biennial meeting of the Society for Research on Child Development, Toronto, Ontario, Canada.
- Morch, S. (1995). Culture and the challenge of adaptation: Foreign youth in Denmark. *International Journal of Comparative Race and Ethnic Studies, 2*, 102–115.
- Mortimer, J. T., Harley, C., & Aronson, P. J. (1999). How do prior experiences in the workplace set the stage for transitions to adulthood? In A. Booth, A. C. Crouter, & M. J. Shanahan (Eds.), *Transitions to adulthood in a changing economy: No work, no family, no future?* (pp. 131–159). Westport, CT: Praeger.
- Noble, J., Cover, J., & Yanagishita, M. (1996). *The world's youth*. Washington, DC: Population Reference Bureau.
- O'Connor, T. G., Allen, J. P., Bell, K. L., & Hauser, S. T. (1996). Adolescent–parent relationships and leaving home in young adulthood. *New Directions in Child Development, 71*, 39–52.
- Offer, D., & Offer, J. B. (1975). *From teenage to young manhood*. New York: Basic Books.
- Padgham, J. J., & Blyth, D. A. (1991). Dating during adolescence. In R. M. Lerner, A. C. Petersen, & J. Brooks-Gunn (Eds.), *Encyclopedia of adolescence* (pp. 196–198). New York: Garland.
- Page, K. (1999, May 16). The graduate. *Washington Post Magazine, 152*, 18, 20.
- Parsons, T. (1942). Age and sex in the social structure of the United States. *American Sociological Review, 7*, 604–616.
- Pascarella, E., & Terenzini, P. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco: Jossey-Bass.
- Perry, W. G. (1999). *Forms of ethical and intellectual development in the college years: A scheme*. San Francisco: Jossey-Bass. (Original work published 1970)
- Rindfuss, R. R. (1991). The young adult years: Diversity, structural change, and fertility. *Demography, 28*, 493–512.
- Roscoe, B., Dian, M. S., & Brooks, R. H. (1987). Early, middle, and late adolescents' views on dating and the factors influencing partner selection. *Adolescence, 22*, 59–68.
- Scheer, S. D., Unger, D. G., & Brown, M. (1994, February). *Adolescents becoming adults: Attributes for adulthood*. Poster presented at the biennial meeting of the Society for Research on Adolescence, San Diego, CA.
- Schlegel, A., & Barry, H., III. (1991). *Adolescence: An anthropological inquiry*. New York: Free Press.
- Shanahan, M., Elder, G. H., Jr., Burchinal, M., & Conger, R. D. (1996). Adolescent earnings and relationships with parents: The work–family nexus in urban and rural ecologies. In J. T. Mortimer & M. D. Finch (Eds.), *Adolescents, work, and family: An intergenerational developmental analysis* (pp. 97–128). Thousand Oaks, CA: Sage.
- Steinberg, L., & Cauffman, E. (1995). The impact of employment on adolescent development. In R. Vasta (Ed.), *Annals of child development* (Vol. 11, pp. 131–166). London: Kingsley.
- U.S. Bureau of the Census. (1997). *Statistical abstracts of the United States: 1997*. Washington, DC: Author.
- U.S. Bureau of the Census. (2000). *Geographic mobility: March 1997 to March 1998* (Current Population Reports, Series P-20, No. 520). Washington, DC: U.S. Government Printing Office.
- Valde, G. A. (1996). Identity closure: A fifth identity status. *Journal of Genetic Psychology, 157*, 245–254.
- Wallace, C. (1995, April). *How old is young and young is old? The restructuring of age and the life course in Europe*. Paper presented at Youth 2000: An International Conference, Middlesborough, UK.
- Waterman, A. L. (1982). Identity development from adolescence to adulthood: An extension of theory and a review of research. *Developmental Psychology, 18*, 341–358.
- Whitbourne, S. K., & Tesch, S. A. (1985). A comparison of identity and intimacy statuses in college students and alumni. *Developmental Psychology, 21*, 1039–1044.
- William T. Grant Foundation Commission on Work, Family, and Citizenship. (1988). *The forgotten half: Non-college-bound youth in America*. Washington, DC: William T. Grant Foundation.

EXHIBIT 45

DEVELOPMENTAL REVIEW 12, 339-373 (1992)

REVIEW

Reckless Behavior in Adolescence: A Developmental Perspective

JEFFREY ARNETT

University of Missouri-Columbia

A developmental theory of reckless behavior among adolescents is presented, in which sensation seeking and adolescent egocentrism are especially prominent factors. Findings from studies of automobile driving, sex without contraception, illegal drug use, and minor criminal activity are presented in evidence of this. The influence of peers is then discussed and reinterpreted in the light of sensation seeking and adolescent egocentrism. Socialization influences are considered in interaction with sensation seeking and adolescent egocentrism, and the terms narrow and broad socialization are introduced. Factors that may be responsible for the decline of reckless behavior with age are discussed. © 1992 Academic Press, Inc.

I would that there were no age between ten and three-and-twenty, or that youth would sleep out the rest; for there is nothing in between but getting wenches with child, wronging the ancientry, stealing, fighting . . .

William Shakespeare, "The Winter's Tale," Act III, Scene 3

Adolescence bears a heightened potential for recklessness compared to other developmental periods in every culture and in every time. The forms that this proclivity takes, and even whether it is allowed expression at all, depend on the characteristics of the particular culture and the particular time. "Wronging the ancientry" may not be a social problem in the late 20th century, but new forms of recklessness have arisen in our time—driving a car while under the influence of alcohol, for example. Other forms of recklessness appear and reappear across time: the delinquency and sexual recklessness alluded to centuries ago in the above quote are characteristic of adolescence in our age as well. Contemporary theory and research on adolescence have emphasized that the storm and stress popularly thought to be characteristic of adolescence have been exaggerated and that adolescence is not necessarily a tumultuous period of development, but it remains true that adolescents are overrepresented statistically in virtually every category of reckless behavior.

Correspondence and reprint requests should be addressed to Jeffrey Arnett, Ph.D., Department of Human Development and Family Studies, 31 Stanley Hall, University of Missouri-Columbia, Columbia, MO 65211.

Various forms of reckless behavior have been studied, but thus far there have been few attempts to identify the factors that might underlie all varieties of recklessness or to explain why reckless behavior is especially prevalent in adolescence. In what follows, threads from various areas that bear directly or indirectly on reckless behavior in adolescence will be drawn together in an effort to establish a developmental understanding of it.

Studies in this area have used a number of terms to describe behavior similar to what is discussed here as reckless behavior. For example, Jessor and Jessor (1977; Jessor, 1987a,b, 1990) have discussed what they term “problem behavior.” This includes behavior of interest here, such as drug use and minor criminal activity, as well as sexual activity (with or without contraceptives) and alcohol consumption (at any level). The term reckless behavior is preferred here because it carries stronger connotations of the potential for negative consequences—serious personal injury or death, an unwanted pregnancy, or arrest and conviction by the legal system. Thus, while sexual activity among adolescents may be “problem behavior,” in the sense that many adults do not approve of it, it is not considered reckless behavior here unless they engage in sex without the use of contraception. Similarly, alcohol consumption is defined as problem behavior in that it is discouraged for adolescents in the U.S. below the age of 21, but it would not be considered reckless behavior here unless it were combined with automobile driving or some other activity that raised the stakes of the potential consequences.

Other forms of reckless behavior have been referred to using the term “risk taking.” However, “risk” is a term that has been used to refer not only to acts with serious potential consequences, but also to economic calculations and gambling judgments, where the focus is on monetary gain or loss, and to behavior such as truancy and willingness to volunteer for psychological experiments, where even the worst outcome is not profound. “Recklessness” is also preferred to “thrill seeking,” since many activities (e.g., parachute jumping, rafting, rock climbing) may be thrilling but also socially acceptable, and the potential for serious consequences resulting from them is slight. Danger is recognized but deliberately minimized; with reckless behavior, on the contrary, precautions that could easily be taken are not. Still, the terms overlap considerably, and the ideas presented here are intended to apply to most forms of problem behavior and risk taking.

Adolescence will be discussed here as extending from puberty to the early 20’s. This is a wider range than typically defined, but if adolescence is the time from the beginning of puberty until adult responsibilities are taken on, it is an appropriate range for our culture. Adolescence is a bridge between childhood and adulthood, during which the individual is

gaining further education and training that will enable him/her to fulfill a useful role in adult society. The demarcation of the end of adolescence must always be somewhat arbitrary, since in most societies there is likely to be variance among individuals in the completion of that period of preparation. But certainly a young person who is in college at someone else's expense has not yet completed adolescence, nor has a young person who has chosen not to attend college but is working a variety of short-term jobs while trying to decide upon a future direction and living with his/her parents during this period. In our culture, establishing an independent household is delayed until the early 20's for most people—today only 24.3% of 18- to 24-year-olds run their own households (U.S. Department of Education, 1988)—and in general adolescence cannot be said to have been completed until this responsibility is assumed.

The goal of this paper is fivefold: (1) to argue that a variety of forms of reckless behavior have common underlying factors that are especially characteristic of adolescence as a developmental stage; (2) to present evidence indicating that sensation seeking and adolescent egocentrism are two of the most influential of these factors; (3) to reinterpret the influence of peers in the light of sensation seeking and adolescent egocentrism; (4) to consider the interactions between sensation seeking/egocentrism and socialization; and (5) to suggest directions for research on the course of reckless behavior from adolescence to young adulthood.

FORMS OF RECKLESS BEHAVIOR

In what ways does reckless behavior in adolescence manifest itself in our time? Some of the most prevalent forms are driving at high speeds and while under the influence of alcohol, engaging in sex without using contraception, using illegal and potentially dangerous drugs, and engaging in minor criminal activity. Each of them, of course, has unique features and a complex network of causes—inexperience may play a role in driving fatalities, etc. The model presented here is intended to delineate the developmental foundation of causes that these different forms of reckless behavior have in common, in addition to their unique characteristics. All of them are more common among adolescents than among any other age group. Furthermore, the theory is intended to apply to other, less common forms of reckless behavior, in addition to the four categories used here for illustration.

Driving at High Speeds and While Drunk

Reckless driving behavior is among the most pervasive and damaging social problems of American society, and it is a problem that is especially

characteristic of adolescents. Adolescents are not only more likely than those in other age groups to drive after drinking (Jonah & Wilson, 1984), but they also drive faster, drive closer to vehicles in front of them, and use seat belts less frequently (Jonah, 1986). This is a lethal combination. In 1986, adolescents (aged 16–24) comprised 18.7% of the licensed drivers, but 38.7% of the drunk drivers involved in fatal accidents (U.S. Bureau of the Census, 1987). Drivers aged 16–19 have the highest rate of involvement in accidents resulting in injuries (Jonah, 1984) and fatalities (Williams, 1985) of any age group, and over half of the fatally injured drivers aged 16–25 have been found to have blood alcohol levels above the legal limit (Beirness, Haas, Walsh, & Donelson, 1985). Automobile accidents are the leading cause of death among people aged 16 to 24 (U.S. Department of Education, 1988).

Sex without Contraception

In recent years in the U.S. over a million unmarried girls aged 15 to 19 have become pregnant each year, the highest number and the highest rate of premarital pregnancies of any age group. These statistics are predictable in light of the finding that over two-thirds of unmarried girls have had sex by age 19, and only one-third of sexually active girls aged 15–19 use contraceptives consistently (Zelnik & Kantner, 1980). Young women aged 15–24 have both the highest abortion rate (Tietze, 1983) and the highest out-of-wedlock birth rate (U.S. Department of Education, 1988) of any age group.

Illegal Drug Use

The use of illegal drugs can be considered reckless in a number of different ways. The more powerful drugs, such as heroine and cocaine, carry the risk of a fatal overdose. Another risk is contained in the fact that most illegal drugs are potentially addictive. And even the more benign illegal drugs, such as marijuana, carry by definition the risk that the user will be arrested and prosecuted for using them.

Adolescents have the highest rate of use of virtually every kind of illegal drug. Persons 12–25 years old are five times more likely than persons over 26 to be current users of marijuana; five times more likely to be current users of hallucinogens; and six times more likely to be users of stimulants (U.S. Bureau of the Census, 1987). Heroin use is also highest among 18- to 25-year-olds (Fishburne, Abelson, & Cisin, 1980). Furthermore, drug use among adolescents is not restricted to a phase in early adolescence; use of alcohol, marijuana, and cocaine increases throughout early to mid adolescence and declines sharply only after the early 20's (Gans, Blyth, Elster, & Gaveras, 1990).

Delinquency and Crime

Studies of the prevalence of delinquency and criminal activity such as minor theft and vandalism have found the proportion of adolescents who have recently engaged in such activity in some form to range from about one-quarter (Levine & Kozak, 1979) to over three-quarters (Farrington, 1989) depending on factors such as the time interval in question and urban or nonurban location. The prevalence rates in this area are especially high in early adolescence (Farrington, 1989; Levine & Kozak, 1979; Murphy, 1986). Statistics of arrests underestimate the prevalence of minor criminal activity among adolescents, as offenders in this age group are more likely than older offenders to be cautioned rather than prosecuted (Murphy, 1986). Nevertheless, arrests for offenses such as vandalism and larceny theft are also far more common for adolescents than for adults (Wilson & Herrnstein, 1985, p. 130). What is true for minor criminal activity is also true for crime generally, with regard to age differences, although most other crime is less normative and more characteristic of a highly reckless subgroup of adolescents. Even when factors such as education, occupation, family size, and quality of home life are taken into account, the association of age with criminal behavior is preeminent (Rowe & Tittle, 1977).

MULTIPLE RECKLESS BEHAVIOR

Among adolescents, a propensity for recklessness tends to be reflected not just in one type of behavior, but in a variety of forms. Elster, Lamb, and Tavare (1987) found that among a national sample of adolescent males, those who had fathered a child by age 19 were also more likely to report marijuana use, police involvement, shoplifting, and antisocial aggression. Similar findings were reported for a national sample of adolescent females: self-reported behaviors at age 15–17 such as fighting and use of marijuana and other drugs were predictive of bearing a child by age 21 (Elster, Ketterlinus, & Lamb, 1989). Other studies have noted correlations between delinquency and drug use (Levine & Singer, 1988); premarital pregnancy and drug use (Yamaguchi & Kandel, 1987); sexual behavior, delinquency, drug use, and school misbehavior (Hundleby, 1987); and problem drinking, marijuana use, delinquency, and early sexual intercourse (Donovan, Jessor, & Costa, 1988). An understanding of any of these problems might be fostered by identifying factors that underlie all of them.

The focus in this paper is on reckless behavior from a developmental perspective. Reckless behavior is analyzed as a common feature of the adolescent age period, not as aberrant or deviant behavior and not as an indication of psychopathology. These kinds of behavior certainly are ab-

errant and deviant when set against the adult standard of acceptable behavior, but with half or more adolescents reporting that they have experienced drunk driving (Arnett, 1990a), sex without contraception (Zelnik & Kantner, 1980), illegal drug use (U.S. Department of Education, 1988), and some form of minor criminal activity (Farrington, 1989), reckless behavior becomes virtually a normative characteristic of adolescent development. It is true that reckless behavior may be in some cases a reflection of psychopathology (Brill & Cristie, 1974) or of pathogenic family conditions (Dembo, Dertke, laVoie, & Bonders, 1987), or at least partly a response to parental neglect, hostility, or absence (Davis & Cross, 1973; Hansson, O'Conner, Jones, & Blocker, 1981; Johnson, Shontz, & Locke, 1984; Stern, Northmn, & Van Slyck, 1984). But the very prevalence of reckless behavior calls into question the common assumption that it necessarily arises from pathological personal characteristics or from pathogenic socialization practices or that reckless behavior is always deviant behavior for adolescents. Because reckless behavior is so pervasive among adolescents, other explanations are called for that explain it in terms of factors that are features of adolescence as a developmental stage. On the other hand, it is not being suggested here that all adolescents are reckless, only that adolescents as a group engage in a disproportionate amount of reckless behavior.

FACTORS PROMOTING RECKLESS BEHAVIOR

Sensation Seeking

In part, reckless behavior in adolescence can be viewed as a manifestation of what Zuckerman (1979a) terms "sensation seeking." Sensation seeking is a dimension of personality that is characterized by "the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences" (Zuckerman, 1979a, p. 10). The implication of this is that people who are high in sensation seeking are willing, even eager, to engage in reckless behavior in order to produce intense and/or novel sensation. And adolescents, as a group, are especially high in sensation seeking. Scores on the Sensation Seeking Scale (Zuckerman, Eysenck, & Eysenck, 1978) are highest at age 16 (the lowest age included in the development of the scale), and there is a steady decline with age.

In the Sensation Seeking Scale (SSS), there are four subscales. The Thrill and Adventure Seeking (TAS) subscale concerns the individual's inclination to engage in novel and intense recreation such as water skiing or mountain climbing. The Disinhibition (Dis) subscale concerns social drinking, enjoyment of loud and lively parties, and sexual attitudes. Items on the Boredom Susceptibility (BS) subscale tap the degree of the indi-

vidual's aversion to repetition, routine, and unexciting people. The Experience Seeking (ES) subscale focuses on desire for travel, pursuit of a nonconforming way of life, and generally the seeking of unusual experiences through the mind and senses. Age differences are strongest for the TAS and Dis subscales; for females, there is a steady decline with age on all subscales, but for males only scores on the TAS and Dis subscales decline significantly with age (Zuckerman et al., 1978).

Sensation seeking has been found to be directly and indirectly related to reckless behavior in a variety of studies. One study has confirmed its relation to drunk driving among adolescents (Arnett, 1990a), and it has also been shown in separate studies to be related to alcohol use (Schwartz, Burkhart, & Green, 1978; Zuckerman, Bone, Neary, Mangelsdorff, & Brustman, 1972) and to dangerous driving practices (Zuckerman and Neeb, 1980). An early study (Goldstein & Mosel, 1958) found positive attitudes toward speed and risk taking while driving to be predictive of the number of traffic violations and accidents in which the individual had been involved. Sensation seeking has also been found to be related to sex without contraception among adolescents (Arnett, 1990b) and to a variety of sexual experiences (Zuckerman et al., 1972; Zuckerman, Tushup, & Fenner, 1976). In the area of drug use, Satinder and Black (1984) found sensation seeking to be related to the use of marijuana and LSD on all four subscales of the SSS and on the total score. Also, SSS scores have been found to be related to the number of different drugs used by drug abusers (Spotts & Shontz, 1984; Sutker, Archer, & Allain, 1978). Indirectly, adolescents report sensation seeking motives—"out of curiosity;" "to see what it was like"—overwhelmingly as their strongest motive for trying illegal drugs (Levine & Kozak, 1979). With regard to crime and delinquency, Perez and Torrubia (1985) reported a significant relation between sensation seeking and antisocial behavior for a sample of Spanish medical students for the total SSS score and all four subscales. Also, use of an early form of the SSS indicated that prisoners who were high in sensation seeking were guilty of more criminal behavior, for both males (Farley, 1973) and females (Farley & Farley, 1972). Indirectly, Wilson and Herrnstein (1985), noting the small potential gains involved in property crimes committed by juveniles, suggest that these adolescents are motivated partly by "sheer adventurousness" (p. 133), which may be taken to indicate a high level of sensation seeking.

The biological basis of sensation seeking, which has received considerable research attention (see Zuckerman, 1984), provides further insight into the prevalence of reckless behavior during adolescence. Table I summarizes the evidence connecting biological factors to sensation seeking and reckless behavior. Scores on the SSS have been found to be related to Average Evoked Potential (AEP) augmenting-reducing, which is a

TABLE I
BIOLOGICAL FACTORS IN SENSATION SEEKING AND RECKLESS BEHAVIOR

Biological factor	Age differences	Relation to sensation seeking	Relation to reckless behavior
AEP augmenting-reducing	Younger augment; older reduce	SS positively related to augmenting	Augmenting related to alcohol and depressant drug use, delinquency, criminality
MAO levels	Increase with age or no difference	SS negatively related to MAO levels	Low MAO related to drug and alcohol use, criminality
Sex hormone levels	Testosterone declines with age	Dis subscale positively related to testosterone and estrogen levels	Testosterone levels related to violent crime, sexual attitudes and experience

measure of the brain's tendency to respond to a strong visual or auditory stimulus by augmenting the stimulus (increasing its intensity) or reducing it (responding less to a highly intense stimulus than to a slightly less intense stimulus). Augmenting is considered to indicate a "strong" nervous system, while reducing represents a "weak" one (Zuckerman, 1984). A number of studies (Buchsbaum, 1971; Coursey, Buchsbaum, & Frankel, 1975; Lukas & Siegel, 1981) have shown SSS scores to be positively related to augmenting, especially the Disinhibition subscale, and it has also been shown that younger subjects tend to be augmenters, while older subjects tend to be reducers (Buchsbaum, 1974). Also, augmenting has been found to be related to delinquency (Silverman, Buchsbaum, & Stierlin, 1973) and criminality (Blackburn, 1978; Emmons & Webb, 1974), which indicates a common biological basis for sensation seeking and these manifestations of reckless behavior. More directly, both augmenting and high scores on the Disinhibition subscale have been found in sociopaths, delinquents, and drug users (Zuckerman, 1984).

Monoamine oxidase (MAO) is an enzyme that is related to the synaptic sensitivity of neurons; the higher the MAO level, the less sensitive the neurons. Platelet MAO levels have been found to be negatively correlated with SSS scores (Murphy, Belmaker, Buchsbaum, Wyatt, Martin, & Ciaranello, 1977; Schooler, Zahn, Murphy, & Buchsbaum, 1978); high sensation seekers tend to have low MAO levels and low sensation seekers tend to have high MAO levels. In relation to reckless behavior, a study of 18-year-old Swedish draftees found that low-MAO males were higher in

SSS scores than high-MAO males, and the low-MAO males were also more likely to report reckless behavior such as drug use and criminality (von Knorring, Oreland, & Winbald, 1983). Low MAO levels are also characteristic of alcoholics (Major & Murphy, 1978) and chronic marijuana users (Stillman et al., 1978). Since MAO is negatively correlated with sensation seeking and sensation seeking is negatively correlated with age, one might reasonably expect to find that MAO levels increase with age; one study (Robinson, Davis, Nies, Ravaris, & Sylvester, 1971) bears this out, although another (Murphy, Wright, Buchsbaum, Nichols, Costa, & Wyatt, 1976) reports no age differences in MAO levels.

Sensation seeking has also been demonstrated to be related to levels of sex hormones. Daitzman, Zuckerman, Sammelwitz, and Ganjam (1978) found levels of androgen and estrogen to be positively related to scores on the Dis subscale, even when age, height, weight, and recency of orgasm were controlled. Testosterone levels, like sensation seeking, decline steadily with age from the 20's onward (Harman, 1978). Testosterone levels have also been found to be related directly and indirectly to reckless behavior. Directly: although there is not a clear correlation between aggressiveness and testosterone in the normal range, male prisoners who have committed especially violent crimes tend to have higher testosterone levels than other prisoners (Rose, 1978). Indirectly: Daizman and Zuckerman (1980) report that testosterone level is positively correlated with variety of sexual experiences and with permissiveness in sexual attitudes.

It is worth noting in this context that there are clear sex differences in sensation seeking, the reckless behavior associated with it, and the biological factors that underlie it. Scores on the SSS are higher among males than among females at all ages (Zuckerman et al., 1978). Males are higher on most types of reckless behavior (including drunk driving (Clark & Midanik, 1980), drug use (U.S. Bureau of the Census, 1987, p. 112), and property crimes such as vandalism (Wilson & Herrnstein, 1985)). Males are also different than females on some biological markers in ways that point to a higher level of sensation seeking. They have higher testosterone levels (Daitzman & Zuckerman, 1980) and lower levels of platelet MAO (Murphy et al., 1976; Robinson et al., 1971), although the findings concerning the relation between augmenting-reducing and gender are mixed (see Zuckerman, 1983).

It should be added that there are certain psychometric limitations of the Sensation Seeking Scale, in its construction and in how it has been used. The phrasing of some items is awkward and lends itself to misreading, and certain words in it are anachronistic (e.g., "hippies," "jet set") and reflective of the late 1960s-early 1970s period when the scale was developed. Also, some of the studies that have purported to demonstrate the relationship between sensation seeking and behavior have failed to ac-

knowledge the potential for item overlap between the SSS and the behavior it is said to predict. For example, numerous studies (Satinder & Black, 1984; Spotts & Shontz, 1984; Sutker et al., 1978) have reported a significant relation between drug use and scores on the SSS, while failing to note that 3 of the 40 items on the SSS directly concern drug use and apparently neglecting to delete those items. Nevertheless, the SSS has proven useful in establishing the personality trait of sensation seeking and its relation to a wide range of behaviors. Sensation seeking is rich as a theoretical construct and holds the potential for further operationalizing in relation to reckless behavior. (See Arnett (1992) for an alternative scale.)

In summary, sensation seeking may form a large part of the foundation of reckless behavior among adolescents. Scores on the Sensation Seeking Scale are highest in adolescence, and research evidence suggests that sensation seeking is related to various forms of reckless behavior. The biological factors related to sensation seeking—Average Evoked Potential, MAO levels, and gonadal hormones—help to explain the particular intensity of sensation seeking (and, in turn, of reckless behavior) during adolescence.

Cognitive Factors

In some respects, cognitive development is considered to be complete by the time the individual reaches mid adolescence. In Piaget's formulation, the stage of formal operations begins at age 12–13 and is consolidated, if not complete, by the age of 15–16. Research has accumulated, however, to show that the attainment of formal operations is not nearly as universal as was once thought (Flavell, 1985) and that even adults who possess it may use it only in special circumstances (Keating, 1980; Moshman, 1979). Adults are for the most part not entirely rational thinkers, and the deficiencies of reasoning that afflict adults are even more acute among adolescents (Kuhn, Phelps, & Walters, 1985).

Chief among these deficiencies, for an understanding of reckless behavior in adolescence, may be Elkind's (1967, 1968, 1985) conception of adolescent egocentrism. Egocentrism among younger children is characterized, in Piagetian theory, by a failure to differentiate between subject and object, a failure to understand clearly where the self ends and the other begins. In Elkind's view, this is a cognitive deficiency that has not been entirely overcome by adolescence.

In adolescence, the advent of formal operations confers the ability to consider thoughts as objects, both one's own thoughts and the thoughts of others. But egocentrism persists: adolescents are likely to confuse the two, so that they are prone to attribute to others many of the thoughts that

are in fact their own. In particular, they may believe that others are as preoccupied with their behavior and appearance as they are; they construct an imaginary audience, in Elkind's terminology, that is constantly monitoring and evaluating their behavior.

How is this related to reckless behavior? The existence of the imaginary audience leads adolescents to conclude that there is something unique and unparalleled about their lives; it must be so, since so many others are preoccupied with their behavior. This, in turn, leads to a conviction that—by virtue of the fact that their lives are so exceptional—they are invulnerable to the consequences of reckless behavior. As Elkind puts it, "Perhaps because he believes he is of importance to so many people, the imaginary audience, he comes to regard himself . . . as something special and unique. Only he can suffer with such agonized intensity, or experience such exquisite rapture . . . This belief in personal uniqueness becomes a conviction that he will not die, that death will not happen to him" (1967, p. 1031). This is the personal fable, "a story which he tells himself and which is not true" (p. 1031).

The concept of the personal fable has important applications to reckless behavior in adolescence. But Elkind puts more emphasis on the imaginary audience than on the personal fable in his theory of adolescent egocentrism, so the personal fable bears some expansion and elaboration here. First, it is necessary to describe how the attainment of formal operations fosters the development of the personal fable. One of the hallmarks of formal operations is that there is a new conception of the real vs the ideal. Adolescents are capable of thinking in terms of hypothetical situations to a degree that younger children are not. This fosters the idealism that is highly characteristic of adolescents; they are capable of imagining an ideal world, a world free from the multiple ills that afflict the present one. As Piaget notes, the egocentrism of the adolescent makes it difficult for him/her to recognize the inevitable real-world impediments to idealistic visions of how things ought to be: "Adolescent egocentricity is manifested by a belief in the omnipotence of reflection, as though the world should submit itself to idealistic schemes rather than to systems of reality. It is the metaphysical age *par excellence*: the self is strong enough to reconstruct the universe and big enough to incorporate it" (Piaget, 1967, p. 64).

Applied to adolescents on a personal level, it might be argued that this expanded imaginative capacity inspires an ideal vision of their own lives. In the same way they can imagine a just and contented world, they may imagine the course of their lives as smooth and sure, an untrammelled path to success and happiness. Clearly, that ideal does not include being afflicted with disasters. And in the same way that the adolescent's conception of an ideal society overlooks the potential flaws in it, and does not follow completely the complex implications and consequences of it, so the

adolescent's conception of the course of his own life is unsullied by the possibility that some calamity will befall him as a consequence of behaving recklessly. Adolescents are not fully aware that the world inherently holds the potential for irremediable tragedy as well as for ultimate triumph. The personal fable is precisely the adolescent's conviction that he/she is exempt from the disastrous consequences that sometimes result—for others—from reckless behavior.

Another, related way that cognitive factors can be understood to play a role in reckless behavior is in the adolescent's capacity for probability reasoning. It is possible to think of reckless behavior as resulting partly from a failure of probability reasoning. The personal fable may underlie this failure. One could say that the personal fable leads adolescents to distort the perceived risk of a given behavior in their favor: one set of probabilities applies to others, and another, unique set applies to themselves. So, for example, in considering the risks of driving while under the influence of alcohol, an adolescent may consider the possibility of getting a ticket or getting into an accident to be relatively high for others, relatively low or nonexistent for him/herself. As Piaget and Inhelder (1975) point out, in every judgement of probability there is a reference, implicit or explicit, to a system of distributions or frequencies. Adolescents' perceptions of these systems are skewed by their desire for sensation and by the personal fable that convinces them of their immunity from disaster.

Understanding probability and chance is one of the most sophisticated and difficult mental challenges there is, even for the person who has reached formal operations. In contrast to deductive determinations, for which a certain answer is obtainable, the outcomes of events involving probability are, by their very nature, uncertain (Piaget & Inhelder, 1975). Even if one knows that an event has a 90% chance of occurring under a given set of conditions, on a particular occasion it is impossible to say with absolute certainty that the event will occur. It is this elusive quality of probability reasoning that makes it especially vulnerable to the distortions of egocentrism. If Piaget and Inhelder (1975) are correct, the adolescent contemplating some form of reckless behavior has in mind a system of distributions or frequencies that describe the likelihood that the contemplated act will result in a disastrous outcome. The probability judgement of adolescents is poor (Ross & DeGrot, 1982; Wavering, 1984); but, even if an adolescent were exceptionally proficient at estimating probabilities, on a given occasion the likelihood of disaster resulting from drunk driving, or sex without contraception, or illegal drug use, or delinquency/crime is, in fact, statistically small—even when applied to others. Applied to the self, and seen through the dual lens of sensation seeking and egocentrism, the perceived probability fades even further.

Tversky and Kahneman (1973; Kahneman & Tversky, 1972) describe

two common heuristics for judging probability, both of which have applications in this context. Probability reasoning is inherently difficult, they note, and so when faced with a task that requires it, people employ heuristics to assess them. One of these heuristics they term *representativeness*. This refers to the tendency to judge an event as probable “to the extent that it represents the essential features of the parent population When judging the probability of an event by representativeness, one compares the essential features of the event to those of the structure from which it originates” (Tversky & Kahneman, 1973, pp. 207–208). For our present purposes, then, when adolescents consider the probability that disaster will result from reckless behavior, they (implicitly) imagine a probability distribution. But when applied to themselves, the “essential feature” that is different is that it is “me” that is being considered, not some anonymous other. So even in situations where adolescents have an accurate understanding of the statistical probability of negative consequences resulting from reckless behavior, they may regard that distribution as being only very weakly representative of their own probability of suffering those consequences.

This kind of thinking is demonstrated most clearly in the research concerning sex without contraception. A perplexing finding in that area is that there is apparently little relationship between what adolescent girls know about fertility, conception, and contraception and whether or not they use contraception. Some studies do find a relationship between knowledge and use of contraception (Furstenberg, 1976; Oskamp & Mindick, 1981), but to the puzzlement and dismay of those who would advocate early and comprehensive sex education for children, there simply is not a strong relationship between knowledge of contraception and the use of contraception; studies just as numerous find no relationship between them (Cvetkovich, Grote, Bjorseth, & Sarkissian, 1975; Cvetkovich & Grote, 1981; Gerrard, McCann, & Fortini, 1983; Kane & Lachenbruch, 1973). Representativeness makes sense of this paradox. Even when adolescents learn about the general probability of becoming pregnant, they may not consider their own fate to be strongly represented by that distribution.

The other heuristic described by Tversky and Kahneman is *availability*. Probability judgements are influenced by the ease with which relevant instances come to mind: “Classes whose instances are easy to construct or imagine will be perceived as more frequent than classes of the same size whose instances are less available” (Tversky & Kahneman, 1973, p. 211). Tversky and Kahneman present a number of experiments supporting this idea. For example, subjects are asked to suppose that a word is selected at random. Is K more likely to be the first letter or the third letter of that word? Since words in which K is the first letter come to mind more

easily than words in which K is the third letter, words with K as the first letter should be judged as more frequent, and indeed they are. With regard to reckless behavior, we might say that when an adolescent considers the likelihood that negative consequences will result from a reckless act, at that tender age occasions where negative consequences have indeed occurred are unlikely to be readily available. Simply knowing someone else who suffered negative consequences is unlikely to have much affect, because of adolescent egocentrism (although it may depend on the proximity of the relation). As with representativeness, the influence of a memory of a similar situation depends on the perceived similarity between the past situation and the current one. If the two are seen to be similar, then one might expect that what happened in the past will recur—but if the past situation involved someone else, it is unlikely that adolescents will perceive it as being sufficiently similar to a current situation involving “me.”

In fact, for most adolescents the available precedents may even act to strengthen their conviction of exemption from disaster. The adolescent him/herself may in fact have driven a car while intoxicated, had sex without contraception, taken illegal drugs, or committed acts of delinquency many times without suffering for it. “Getting away with it” very likely bolsters and inflates whatever cognitive distortion existed to begin with. Winston Churchill observed that “nothing in life is so exhilarating as to be shot at without result.” Most adolescents would, in their own way, heartily agree.

Studies supporting this model of the influence of cognitive factors on reckless behavior can be found in the areas of driving behavior, sex without contraception, and criminal behavior. In the area of automobile driving, it has been reported in several studies that adolescents take greater risks when driving and estimate their likelihood of getting into an accident, drunk or sober, as lower than their peers. Arnett (1990a) reported that high school-age males who have driven while drunk estimate the likelihood of an accident resulting from drunk driving as lower than do their peers who have not driven while drunk. Finn and Bragg (1986) found that younger drivers (18–24 years old) estimated their likelihood of getting into an accident as lower than that of their peers and lower than that of older drivers (38–50), in general and for a variety of specific driving situations, including driving after consuming six beers within 1 h. Older drivers were less likely to show this tendency to rate themselves as superior to their peers. In a study by Matthews and Moran (1986), adolescent/young adult (18–25) and older adult (35–50) subjects were asked to make ratings of accident likelihood on a questionnaire of driving situations and after observing a variety of videotaped driving sequences. On both the questionnaire and the videotape ratings, the younger subjects

consistently rated themselves as less likely to be involved in an accident in those situations than their peers, and also rated their ability to handle the situations in a manner similar to that of the older drivers. Again, older drivers did not exhibit as strongly biased a judgment of themselves in relation to their peers.

Concerning sex without contraception, a number of studies have provided evidence of the role of egocentrism and probability misjudgment. Kalmuss (1986) found that the perceived probability of becoming pregnant (from engaging in sexual activity without using birth control) is the strongest predictor of birth control use. Similarly, Gerrard et al. (1983) found that "ineffective" contraceptive users (those sexually active adolescent females who use unreliable contraception or none at all) are more likely than effective users to view their probability of becoming pregnant as low. Also, among the sexually active female adolescents studied by Oskamp and Mindick (1981), those who used contraception were less likely to believe that they could not get pregnant easily than those who did not use contraception. It should be noted, however, that in most research on sex without contraception, methodological problems call the results into question. Subjects typically have been drawn from girls who come to birth control clinics. Nevertheless, a study of a normal cross-section of high school-age females found this same pattern, with girls who had had sex without contraception estimating the likelihood of pregnancy resulting from that activity as lower than girls who had not (Arnett, 1990b).

Several studies of probability judgments in relation to crime also have implications in this area. A number of studies find that criminal behavior is inversely related to the perceived risk of formal sanctions (Erikson, Gibbs, & Jensen, 1977; Grasmick & Milligan, 1976; Jensen, Gibbs, & Erikson, 1978), and it has also been found that the perceived probability that negative consequences will result from crime increases with age (Piliavin, Thornton, Gartner, & Matsueda, 1986).

In summary, both theory and research suggest that cognitive factors play a role in reckless behavior among adolescents. Theoretically, the notion of adolescent egocentrism, and in particular the personal fable, provides a potential framework for understanding and describing the role of cognitive factors in reckless behavior. Also, the probability constructs of representativeness and availability presented by Tversky and Kahneman (1973) have strong implications for an understanding of reckless behavior. Research supports the assertion that cognitive factors are influential in reckless behavior. Furthermore, two studies on probability judgments related to driving and one on crime indicate that the gap between the probabilities one perceives for others for negative consequences from reckless behavior and the probabilities one perceives for oneself diminishes once the adolescent reaches adulthood.

One study (Zuckerman, 1979b) has examined the interaction of sensation seeking and cognitive factors in risk taking, which might be considered to be a close cousin of reckless behavior. Sensation seeking had been found to be positively related to risk taking behavior such as participation in unusual psychological experiments and travel to unusual places, but it remained to be tested whether sensation seekers are more likely to take risks because they appraise risk differently or because the quality of the arousal produced by risk is experienced as pleasurable. The results of the study indicate that both factors are involved.

Zuckerman (1979b) notes that risk taking is influenced by the interaction of sensation seeking and anxiety. Confronted with a potentially risky situation, whether or not the person takes the risk depends on which is higher, the level of sensation seeking or the level of anxiety. Zuckerman found that people who are high in sensation seeking report less anxiety when faced with risks, both for risks involving participation in psychological experiments (taking an "unknown" drug) and for hypothetical travel-related risks. One reason for this, it was found, is that high sensation seekers tend to appraise novel situations as less risky than low sensation seekers do across a wide variety of risks. The operation of the personal fable is evident here in that the conviction that a negative outcome from taking a given risk "wouldn't happen to me" would lead naturally to a lower perception of risk, and a low perception of risk would in turn lead to a low level of anxiety. But even for situations where the high and low sensation seekers judged the level of risk equally, the high sensation seekers were less likely to respond with anxiety at the thought of entering the situation and more likely to anticipate that it would be enjoyable. High sensation seekers, then, not only appraise risk differently (i.e., lower), but they also anticipate risky situations with pleasure even (perhaps especially) when they acknowledge the risk involved.

Peer Influences, Reinterpreted

It has long been recognized that adolescence is the time of greatest susceptibility to peer influences (Berndt, 1979; Clasen & Brown, 1985; Steinberg & Silverberg, 1986). This seems to be especially true for transgressive (and sometimes reckless) behavior. Peer influences have been cited as a factor in the use of illegal drugs (Galambos & Silbereisen, 1987; Halebsky, 1987; Meier, Burkett, & Hickman, 1984), alcohol use (Dishion & Loeber, 1985; McLaughlin, Baer, Burnside, & Porkorny, 1985), sexual behavior (Collins & Harper, 1985), cigarette smoking (Chasin, 1985; Hirschman, Leventhal, & Glynn, 1984), and delinquency (Gomme, 1985). Some short-term longitudinal studies indicate that involvement with deviant peers precedes and leads to deviant behavior (Brook, Whitman, Gordon, & Nomura, 1986; Hirschman et al., 1984), while others indicate that deviant adolescents seek each other out as friends because of the

proclivity for deviant behavior they have in common (Galambos & Silbereisen, 1987; Meier et al., 1984). Kandel (1985) reports on the basis of her longitudinal studies that adolescent friends tend to share characteristics such as drug use or nonuse before they become friends, but also that the likelihood of sharing this characteristic increases with the duration of the friendship.

In the context of sensation seeking and adolescent egocentrism, peer influences on reckless behavior might be interpreted in the following way. It can be expected that adolescents who share a high level of sensation seeking would be attracted to each other as friends on the basis of this similarity. In such a group of friends, the adolescent who is highest in sensation seeking might be likely to emerge as the leader of the group, especially with regard to reckless behavior. (Ozeran (1973) found that in groups, high sensation seekers tend to speak more and tend to be selected as group leaders.) Because high sensation is an inherent part of reckless behavior, the highest sensation seeker in the group would be most attracted to the prospect of engaging in reckless behavior. The rest of the group may go along with the highest sensation seeker on a reckless adventure, partly out of conformity and partly on behalf of their own sensation seeking propensities. For the followers, their sensation seeking propensities might not be high enough for them to initiate reckless behavior in most circumstances, but high enough for them to go along once a leader initiates it.

Peer influences may also contribute to reckless behavior by mediating adolescent egocentrism in that the personal fable is likely to be strengthened when it is shared by a group of adolescents. Imagine, for example, a group of adolescents out drinking alcohol together. The evening comes to an end, and it is time to drive home. The driver for the group, however, realizes that he has had too much to drink and doubts his ability to drive them all home safely. His own personal fable comes to the rescue: "Oh, it'll be OK; nothing bad will happen." But it is also reinforced and inflated by his observations of his friends: clearly, they are not worried; none of them is mentioning any concern over the potential danger of driving in this condition. Perhaps each of them is thinking this on some level: "None of them seem to be worried; of course nothing bad will happen." The personal fable of each thus strengthened by their assumptions about the personal fables of their peers, or, one could say, by their participation in their collective fable, they proceed to drive home—and perhaps dodge the bullet, perhaps not.

SENSATION SEEKING AND EGOCENTRISM IN THE CONTEXT OF A COMPREHENSIVE MODEL

In the theory presented here, sensation seeking and adolescent egocentrism have been argued to be two influential factors promoting reckless

behavior in adolescence. Both of these influences have been argued to arise developmentally in the sense that a predisposition toward a heightened level of both sensation seeking and egocentrism exists as a normal part of adolescent development.

However, sensation seeking and egocentrism are by no means the only factors involved in reckless behavior. Rather, they should be understood in the context of a comprehensive model which includes socialization influences. The socialization environment is crucial for how (and even whether) the developmental predispositions for sensation seeking and egocentrism are expressed, and socialization also directly influences participation in reckless behavior. If the socialization to which an adolescent is exposed is characterized by insistence on allegiance to the family and/or community and adherence to group traditions, by clear expectations and responsibilities, and by a clearly and unambiguously communicated standard of conduct, with swift, certain, and forceful sanctions (verbal or physical) for any deviation from that standard—characterized, that is, by what will here be termed *narrow socialization*—then there is less allowance or tolerance for either predisposition to be expressed in its fullest form. If, in contrast, the socialization of the cultural environment promotes and encourages independence and autonomy, allows adolescents to determine right and wrong for themselves to a large extent, does not have a clearly articulated standard of conduct, and is inconsistent and lenient in enforcing such standard as there is—here termed *broad socialization*—then sensation seeking and egocentrism for those adolescents will be expressed more fully and will on average be higher. Adolescents' participation in reckless behavior will vary accordingly.

Narrow and broad socialization differ from terms that have been applied to socialization such as permissive/authoritarian/authoritative, laissez-faire/democratic/autocratic, in that they apply not just to parenting but to the entire ecological context of socialization (Bronfenbrenner, 1977), including neighborhood and community, institutions such as school and the legal system, the media (where existing), and ethnic, tribal, or national traditions: the whole culture. This conceptualization is perhaps especially appropriate for discussing socialization with regard to adolescents because by adolescence direct familial influences in socialization typically have diminished, while extrafamilial influences have risen in prominence (Emmerich, 1978; Floyd & South, 1972; Sebald & White, 1980).

In addition to affecting adolescent participation in reckless behavior through moderating sensation seeking and egocentrism, the narrowness or breadth of an adolescent's socialization affects the likelihood of reckless behavior in a number of direct ways within the ecological context. The family environment affects reckless behavior through family policies

which impede or allow reckless behavior (Arnett, 1989), such as a nightly curfew, restrictions on automobile use, or requirements for performing family-related responsibilities. Communities affect reckless behavior through their sheer size (Mott & Haupin, 1987); in a smaller community there may be more of a fear of social censure for reckless transgressions than in a larger community and perhaps more of a sense of responsibility to one's neighbors, since one knows many of them personally. The society as a whole also influences reckless behavior, through the media (including television, movies, popular music, and advertising), which provide models of indulgence or restraint (Bandura, 1973; Bandura & Walters, 1963), and through laws and the legal system, which may (or may not) threaten and carry out punishment for reckless behavior.

The terms *narrow* and *broad* should be taken not as evaluative terms, in a positive or negative sense, but as terms indicating the amount of variance likely to exist among the adolescents in a given culture. For adolescents in a culture or family where socialization is narrow, a clear set of beliefs concerning good and bad, right and wrong, praiseworthy and unacceptable behavior is taught. There are clear expectations and responsibilities, and any deviation from the prescribed standard of conduct is strongly condemned and swiftly punished (physically or with disapproval and criticism). As a result, there is less deviance from this standard and less variance within the group. The range of individual predispositions for sensation seeking and egocentrism is pressed toward the low end of the distribution by this form of socialization, resulting in a narrower range and an overall lower level of these characteristics and of reckless behavior. (This is true *within* the community or culture; sensation seeking, egocentrism, and reckless behavior may still be allowed expression outward, toward enemies.) For adolescents in a culture or family where socialization is broad, it is left more to the individual to form principles of good and bad, right and wrong. There are fewer expectations and responsibilities, and there are fewer sanctions against deviating from such expectations and responsibilities as there are. Under this type of socialization, the variance among adolescents in their sensation seeking and egocentrism is likely to be great, as the entire range of individual predispositions is allowed to be expressed. The result is an overall higher level of reckless behavior. This has implications in three respects: between cultures, for a single culture over time, and within any given culture.

Between cultures, it can be expected that cultures with relatively narrow socialization will have adolescents who are less egocentric because they have been socialized strongly to contribute to and rely upon the family and/or the community. Also, they will have their propensities for sensation seeking directed outward (toward their enemies) or toward so-

cially constructive ends, or even suppressed. In addition, adolescents in these cultures will have their behavior restricted directly by family, community, and society, through methods ranging from family rules to community censure to the legal system. As a consequence, the adolescents will engage in a lower rate of reckless behavior within the community. In contrast, adolescents in cultures with relatively broad socialization will be more egocentric on average because a primary concern with the self has not been discouraged or has even been encouraged, and their propensities for sensation seeking will be less socialized. There will also be fewer direct family, community, or societal restrictions on their behavior. As a consequence, they will engage in a higher rate of reckless behavior, i.e., behavior that holds the possibility of long-term adverse consequences to themselves and possibly to others within their community.

Narrow socialization is more likely to be characteristic of unindustrialized cultures, where communities are small and tightly integrated. One example of this can be found in the work of Herdt (1987) with the Sambia of New Guinea. Herdt describes a process of narrow socialization for male children beginning at age 7, when they are taken away from their mothers and initiated into the male group, where they are prohibited from interaction with females until marriage. This initiation is the first of six stages of initiation, extending into young adulthood when the young man's first child is born. The initiations, especially in the early stages, involve thrashings, nose bleedings, and other painful and unpleasant surprises and humiliations. They also involve exhortations from the elders, concerning the necessity of maintaining the ritual practices, the prohibition against adultery, and the ideals of manhood for which they should strive. Children may resist but cannot avoid the initiations, at any stage. They are encouraged, coerced, and if necessary dragged into compliance.

As a consequence, there is very little reckless behavior among male Sambian adolescents, in the sense of behavior which is viewed as anti-social and disruptive by adults. The Sambia have no jails; none are needed. There is, however, one important avenue through which recklessness may be expressed: toward neighboring tribes. Significantly, it is part of the tradition at the close of the third stage of initiation for those who have just completed this initiation—the adolescents, 14 or 15 years old—to celebrate their new status by going together on a warring expedition. An adolescent who successfully kills an enemy during this expedition is lauded and viewed as having great promise. In later battles, adolescents may distinguish themselves by their recklessness, by displaying enjoyment of aggressive confrontations with other groups and a willingness to stand in the front lines of battle. Sensation seeking and egocentrism are evident here, but they have been socialized in such a way

that they are not harmful to the group and may even be beneficial in defending it.

In another study, Whiting and Whiting (1975) compared children in six cultures which varied in cultural complexity (indicated by features such as occupational specialization, a cash economy, and a centralized political and legal system) from simple to highly complex. They did not study adolescents, but what they found has implications for adolescence. They observed distinct differences in the kind of socialization that was characteristic of the different cultures. In particular, parents in what they termed simpler cultures were, in general, more strict with their children, requiring them to be responsible for important duties from an early age (such as child care of younger siblings, food preparation, and tending of livestock and fowl), and punishing disobedience swiftly and severely. As a consequence, their children were relatively dependable, responsible, and obedient compared to children in more complex cultures. Parents in what they termed complex cultures, in contrast, were generally more lenient with their children, more tolerant of disobedience, and required less work from them (because in a more complex society much of the simple and menial work around the home is done by automation). As a consequence, children in these cultures were observed to be relatively competitive and self-oriented, and less responsible and nurturant toward others.

It is plain how the idea of narrow and broad socialization applies to these findings. The narrow socialization of simpler societies results in less variance in the behavior of their children; because disobedience is closely monitored and swiftly and severely punished, and work on behalf of the group is required from an early age, there is less disobedience, less concern with the self, and more concern for others. In studying adolescence across cultures, it could be expected that a similar pattern would apply: narrow socialization, in simpler societies, results in lower levels of egocentrism and, consequently, less reckless behavior.

This is not meant to imply that narrow socialization is somehow superior or preferable to broad socialization. There may be trade-offs with both narrow and broad socialization. In the simpler societies described by the Whitings, characterized by narrow socialization, one reason children in these societies are able to contribute so much help to the family is that they do not attend school. In complex societies, the cost of providing universal education and encouraging competitiveness is a lesser concern for others and, it might be argued, greater egocentrism. Competition may prepare a child well for participation in a highly complex economy, but as the Whitings note, "competition for good grades is training for egoism and does not encourage a child to consider the needs of others" (Whiting & Whiting, 1975, p. 107).

It is possible that narrow socialization exacts a cost not only in lower education, but also in less creative and independent thinking; perhaps in cultures with narrow socialization, not only reckless behavior but also new ideas are inhibited and constrained because new ideas may challenge the tradition, the established order. This kind of analysis on a cultural level has yet to be performed, but within American culture adolescents in families which are strongly constraining and suppressive have been found to be inhibited, conventional, and less imaginative (Block, 1971; Schedler & Block, 1990). Broad socialization, in highly technological societies, may result in a higher rate of reckless behavior but also in the kind of independent and creative thinking that leads to social and technological innovation. As Irwin (1990) and Zuckerman (1983) note, the willingness to take risks that is so strong among adolescents has great potential benefits as well as potential dangers. There is a cost to allowing this tendency too free a rein, in damage to the lives of adolescents and those around them, but there may also be a certain cost to constraining it tightly.

In addition to predicting differences in sensation seeking, egocentrism, and reckless behavior among adolescents of different cultures according to their narrow or broad socialization of adolescents, the theory presented here would also predict changes in these characteristics among adolescents in a single culture over time, as the narrowness or breadth of that culture's socialization changes. Recent trends in American society arguably provide one illustration. The past three decades have witnessed a dramatic and disquieting rise in the rate of reckless behavior among American adolescents. The rate of arrests for drunk driving among people aged 18–24 increased by almost 800% between 1965 and 1985 (U.S. Department of Education, 1988). Drug-related arrests for this age group increased by an appalling 1000% during this same period. The rates of single motherhood and abortion have also increased steeply and steadily. From 1950 to 1981, the proportion of first-born children conceived out of wedlock among girls 15–19 rose from 18 to 60% (O'Connell & Rogers, 1984), and from 1972 to 1983 the abortion rate for this group more than doubled (U.S. Department of Education, 1988). Crime and delinquency among adolescents have also risen markedly during this period. In 1950, the arrest rate for persons aged 14–24 was under 10 per 1000 persons; by 1985, it had risen to over 100 per 1000 persons (U.S. Department of Education, 1988). Simultaneously with the rise of these rates of reckless behavior, many observers have argued that this period has been marked by a growth in permissiveness among American parents and in American society generally (see Ehrenreich, 1989), including education, the media, and the legal system. This increasingly broad socialization may be one of the factors responsible for the rise in reckless behavior among adolescents. It should be noted, however, that these observations of increased

permissiveness are largely unempirical; a more systematic sociocultural analysis awaits.

In any case, more telling than a post-hoc test of the theory would be to observe a culture currently in the process of changing its socialization of adolescents. Eastern Europe provides several such examples. The political changes taking place in those countries may result in socialization changes as well, most likely in the direction of broader socialization, with corresponding changes in sensation seeking, egocentrism, and reckless behavior among adolescents.

Although it may be useful to describe societies according to broad or narrow socialization, it is of course acknowledged that variance exists in every society, according to the practices of particular families. (Still, it might be noted that societies with narrow socialization are likely to be characterized by less variance among families because deviance from the norm by families will be censured as surely as deviance from the norm by adolescents. It should also be emphasized that, by adolescence, the family is only one influence among many in the milieu of socialization.) In families as in cultures, the model presented here would predict that adolescents who are subjected to narrow socialization will engage in relatively less reckless behavior, while adolescents whose families are characterized by broad socialization will engage in relatively more. To be specific, adolescents' sensation seeking, egocentrism, and reckless behavior will be in part predicted by the extent to which parents (1) share a certain clear set of beliefs about right and wrong and communicate these beliefs to their children, (2) expect their children to perform certain clearly specified duties for the family, duties which the parents communicate as important to the functioning of the family, and (3) enforce the rules and expectations based on these beliefs and duties consistently and forcefully.

Support for this prediction exists in research on the relationship between reckless behavior and parental beliefs, parental practices, and divorce. In a study of Jessor and Jessor (1977), parental beliefs were directly related to adolescents' reckless behavior in important ways. The authors defined a variable termed maternal ideology, which referred to mothers' beliefs about the social order, religion, and morality and was considered to reflect her socialization of her child. It was found that traditionalism/conventionality in maternal ideology, i.e., mothers' beliefs in the absoluteness of right and wrong, the importance of obeying the law, and the wrongness of socially disapproved behavior such as stealing, lying, drug use, and extramarital sex, was inversely related to her adolescent's participation in problem behavior. Conversely, lack of parental disapproval of problem behavior was associated with relatively greater participation in it. From the perspective of the present theory, it is argued

that this demonstrates the influence of narrow and broad socialization on adolescents' reckless behavior.

Other research on parenting also supports the model, indicating that a lack of involvement and monitoring by parents is related to recklessness among adolescents. Block (1971; Schedler & Block, 1990), in a longitudinal study following individuals from early adolescence to their 30's, reported that adolescents whose parents were characterized as uninvolved and neglecting were significantly more undercontrolled and impulsive than other adolescents. Although attitudes and personality characteristics, not behavior, were the focus of this study, it might reasonably be argued that the characteristics of being undercontrolled and impulsive would lead to reckless behavior. A longitudinal study in Finland (Pulkkinen, 1982) produced comparable results: low parental involvement in childhood was predictive of deviant behavior in early adolescence, in particular truancy, alcohol consumption, and smoking. Also Patterson (1982), from extensive work with delinquent adolescents, connects a lack of parental monitoring of children to adolescent delinquent behavior such as stealing and social aggressiveness. This pattern of association between parental fecklessness or neglect and adolescent delinquency/reckless behavior has been found consistently over several decades (Glueck & Glueck, 1950; Hirschi, 1969; Levine & Kozak, 1979; McCord & McCord, 1959). The present theory would predict that sensation seeking and egocentrism would be found to be two of the mediating variables between uninvolved parenting and reckless behavior. Parenting that is uninvolved and that fails to provide limits, sanctions, and a moral structure does not socialize the developmental propensities for sensation seeking and egocentrism, which may be expressed as reckless behavior.

One might expect broader socialization in divorced families than in nondivorced families because the multiple burdens—financial, occupational, emotional—which fall upon the custodial parent would make it more difficult to summon the time and energy necessary for narrow socialization. This expectation is supported in research on reckless behavior, where parents' divorce has been found to be related to drug use (Johnson et al., 1984), sexual behavior (Eberhardt & Schill, 1984), and delinquency (Stumphauer, 1976). It might be argued that reckless behavior in the aftermath of divorce could be an externalization of adolescents' unhappiness and confusion surrounding divorce, except that for adolescents in divorced families it is probable that the divorce took place many years ago in most cases (although age of child at divorce is a variable rarely considered in research on adolescence). Still, it should be noted that there is likely to be a great deal of variance in divorced families. In some divorced families, the duties and expectations for the children may increase, and also the closeness of the children to their custodial parent

(Weiss, 1979), resulting in effect in narrower socialization and less reckless behavior. These variations, and whether sensation seeking and egocentrism mediate their connections to reckless behavior, remain to be studied.

COMPARISON TO JESSOR AND JESSOR'S PROBLEM BEHAVIOR THEORY

Jessor and Jessor (1977; Jessor, 1987a,b; Jessor, 1990) have presented the most fully articulated theory of reckless behavior (or, as they term it, problem behavior) in adolescence. Many factors are included in their model (see Jessor, 1987a), but the developmental basis of the theory is that adolescents engage in problem behavior more than other age groups primarily because it serves as a mark of adult status (Jessor, 1987a, p. 339). Certain behavior in our society, such as alcohol consumption and sexual activity, is socially approved for adults but not adolescents, according to the legal and/or moral standards of society. Adolescents violate the prohibitions and engage in the prohibited behavior because it signifies the adult status they wish to attain. Problem behavior diminishes after adolescence because it is no longer necessary as a declaration of adulthood.

They tested this theory in a large scale longitudinal study of high school and college students, examining a wide variety of personality and social environment variables in relation to five types of problem behavior: sexual activity, drinking, problem drinking (which concerned not behavior per se but the experience of negative *consequences* as a result of excessive drinking), marijuana use, and general deviance (including lying, stealing, and vandalism). The study was among the first to consider a number of these kinds of behavior together, as a syndrome, rather than in isolation and remains an important empirical contribution to the area. The model presented in the theory contains elements such as parental control and parental ideology which are important to recognize and which have been applied to the present theory as part of the ideas of broad and narrow socialization.

However, both the design and the results refute the developmental theory that underlies the study. They argue that the desire to achieve a more adult status is “the developmental role played by the initiation of problem behavior during adolescence” (Jessor, 1987a, p. 339). A case could perhaps be made that adolescents wish to engage in sexual activity and alcohol consumption partly because these are activities that are approved for adults and proscribed for adolescents, and adolescents desire to signify their attainment of adulthood. Lying, stealing, and vandalism, however, which are also part of the syndrome of problem behavior they have identified, are no more socially acceptable for adults than for ado-

lescents; marijuana use is arguably even *less* socially acceptable behavior for adults than for adolescents. Including marijuana use and general deviance in the design along with sexual activity and alcohol use is an implicit recognition that developmental factors other than the pursuit of adult status are involved.

The results of the study also contradict the theoretical model. If problem behavior theory were accurate, it might have been expected that behavior prohibited for adolescents but approved for adults (sexual activity and moderate drinking) would have been found to be unrelated to behavior prohibited at any age (marijuana use, general deviance). In fact, however, the various kinds of problem behavior were found to be highly correlated. This is more consistent with the model presented here, in which it is argued that a wide variety of forms of reckless behavior sprout from the common developmental soil of sensation seeking and egocentrism.

It should be added that, although the Jessor's theory proposes the desire to achieve adult status as the developmental basis for the prevalence of problem behavior in adolescence, neither their original study nor subsequent studies have included measurements or evaluations of the presence of this characteristic.

The theories also differ in what they would predict concerning the prevalence among adolescents of problem/reckless behavior in areas where adolescents are allowed access to activities that signify adulthood but which are also potentially reckless. It might be predicted from Jessor and Jessor's theory that the prevalence of problem behavior would be low for adult-like behavior in which adolescents are allowed to participate. The present theory, in contrast, would predict that adolescents will be most reckless in the areas where they are given the most unsocialized and unmonitored opportunity to be reckless—in the areas which are *least*, rather than most, restricted to them.

Perhaps the best test of this contrast in predictions is in the area of automobile driving. Driving is age-graded in the U.S., but the age of entry into socially approved driving is earlier (16 in most states) than that for other kinds of age-graded behavior (for example, the legal drinking age is 21 in most states). It might be expected on the basis of problem behavior theory, then, that the rate of problem behavior associated with driving would be low. In fact, however, just the opposite is true. Driving-related reckless behavior is a pervasive form of reckless behavior among adolescents (U.S. Department of Education, 1988). This is true long past the age of 16, when adolescents are first allowed to drive; adolescents 20–24 also have significantly higher rates of accidents and fatalities than older age groups (U.S. Bureau of the Census, 1987). Even adolescents who do not

behave recklessly in other ways tend to drive at high speeds (Arnett, 1990c). This is consistent with what would be predicted by the present theory.

THE DECLINE OF RECKLESS BEHAVIOR

How and why does reckless behavior finally diminish? Thus far, few studies have examined the decline of reckless behavior as adolescents enter adulthood. However, there are a number of theoretical and empirical suggestions that point the way for future research.

Elkind (1967) suggests that the personal fable is overcome by the entrance into Erikson's (1963) intimacy stage: in the course of establishing a long-term intimate relationship (typically, marriage) with another person, we discover that others have similar feelings and describe similar agonies and raptures. This discovery punctures the belief that our own experiences are unique and unparalleled. It might also be added that marriage diminishes the likelihood of reckless behavior in a number of specific ways. For example, sex without contraception no longer has connotations of recklessness once the person is married, and most people are married by their late 20's. Also, marriage, with its attendant responsibilities and restrictions, probably contributes to a decline in reckless driving, crime, and drug use as well. Statistically, it is true that young married adults have a lower rate of driving offenses and crime than young unmarried adults (U.S. Bureau of the Census, 1987).

Another reason reckless behavior declines with age may be that the biological "engine" that drives it slows down. Biological measures associated with sensation seeking (AEP, sex hormone levels) show a pattern in relation to age that reflects a decline in energy and intensity; the decline in relation to sensation seeking may also underlie a decline in relation to reckless behavior. Zuckerman et al. (1978) observe: "What is the basis of the increasing cautiousness and conservatism of age? It might simply reflect the mellowing effect of accumulated experience. But many biological changes also occur with age, including a slowing of cortical activity and a diminution of gonadal output . . . It can be hypothesized that the same biological factors that are prominent in aging effect the sensation seeking tendency" (p. 148). This, however, remains to be tested directly.

Piaget cites the importance of work experience for attenuating adolescent egocentrism. Work requires the individual to bend his/her ideal vision of things to fit the real: "In other words, the job leads thinking away from the dangers of formalism back to reality" (Inhelder & Piaget, 1958, p. 346). Steinberg, Greenberger, Jacobi, and Garduque (1981) also suggest that work experience leads to the decline of adolescent egocentrism and

support that contention with interviews with high school students who have part-time jobs. However, several studies (Bachman, Johnston, & O'Malley, 1982; Ruggiero, Greenberger, & Steinberg, 1982; Shannon, 1982) have found that working may actually promote reckless behavior by providing adolescents with the money to engage in it, by creating stress that adolescents may ameliorate through substance use, and by providing an additional venue for stealing money and property. If work does attenuate reckless behavior, it may be only in a job that is viewed as a potential step to a career, so that the adolescent is highly motivated to avoid reckless behavior that might jeopardize it.

Tversky and Kahneman's (1973) notion of availability also applies to the decline of reckless behavior. As adolescents grow older, into the late 20's and early 30's, the cumulative likelihood of suffering the consequences of reckless behavior rises. Somewhere in the course of years of reckless behavior, adolescents may get a ticket for driving wildly or under the influence of alcohol or may have a serious automobile accident; they may be involved in an unintentional pregnancy; they may have a bad experience with drugs; they may have an embarrassing or career-threatening experience with the law. It is probably not necessary to suffer disaster in order to develop out of adolescent egocentrism, but in many cases it may be sufficient. Thus far, no studies have examined the influence of negative experiences on reckless behavior through adolescence to young adulthood.

Finally, reckless behavior may decrease with age among populations partly because some of the most reckless members of any cohort will die young. Extreme recklessness is not a good prescription for survival. By midlife, a fatal automobile accident, a violent death related to crime, or an accidental death resulting from some other variant of reckless behavior has claimed a substantial number of those who exhibited an especially high level of reckless behavior in adolescence. Current data charting the decline of reckless behavior with age are mostly cross-sectional; more longitudinal studies are needed.

CONCLUSION

Reckless behavior in adolescence is manifested in our time in driving at high speeds and while drunk, sex without contraception, illegal drug use, delinquency and crime, and countless other less common varieties. Sensation seeking and adolescent egocentrism are normative developmental features of adolescence that are implicated in the high level of reckless behavior during that age period. Considerable research evidence supports the relation between these factors and the various prominent forms of reckless behavior in adolescence. The narrowness or breadth of an adolescent's socialization environment is also an important factor in reckless

behavior, directly and in interaction with the developmental factors of sensation seeking and egocentrism. One of the clearest findings in the area is that reckless behavior does decline after adolescence. Why this is true remains to be established, although it is probable that the biologically based decline in sensation seeking, increasing cognitive maturity, and the assumption of greater personal and occupational responsibilities are involved.

REFERENCES

- Arnett, J. (1989, April). *Understanding reckless behavior in adolescence*. Paper presented at the biennial meeting of the Society of Research in Child Development, Kansas City.
- Arnett, J. (1990a). Drunk driving, sensation seeking, and egocentrism among adolescents. *Personality and Individual Differences*, *11*, 541–546.
- Arnett, J. (1990b). Contraceptive use, sensation seeking and adolescent egocentrism. *Journal of Youth of Adolescence*, *19*, 171–180.
- Arnett, J. (1990c). *The development of reckless behavior in adolescence, ages 15–18*. Unpublished data.
- Arnett, J. (1992, April). Sensation seeking and adolescent reckless behavior: A new conceptualization and a new scale. Poster presented at the biennial meeting of the Society for Research on Adolescence, Washington, D.C.
- Bachman, J., Johnston, L., & O'Malley, P. (1982). Smoking, drinking and drug use among American high school students. *American Journal of Public Health*, *71*, 59–69.
- Bandura, A. (1973). *Aggression: A social learning analysis*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A., & Walters, R. H. (1963). *Social learning and personality development*. New York: Holt, Rinehart & Winston.
- Beirness, D. J., Haas, G. C., Walsh, P. J., & Donelson, A. C. (1985). *Alcohol and fatal road accidents in Canada: A statistical look at its magnitude and persistence*. Ottawa, Ontario, Canada: Department of Justice.
- Berndt, T. J. (1979). Developmental changes in conformity to peers. *Developmental Psychology*, *15*, 608–616.
- Blackburn, R. (1978). Psychopathy, arousal, and the need for stimulation. In R. D. Hare and D. Schalling (Eds.), *Psychopathic behavior*. New York: Wiley.
- Block, J. (1971). *Lives through time*. Berkeley, CA: Bancroft.
- Brill, H. Q., & Christie, R. L. (1974). Marijuana use and psychosocial adaptation: Follow-up study of a collegiate population. *Archives of General Psychiatry*, *31*, 713–719.
- Bronfenbrenner, U. (1977). Ecological factors in human development in retrospect and prospect. In H. McGurk (Ed.), *Ecological factors in human development*. Amsterdam: North-Holland.
- Brook, J., Whiteman, M., Gordon, A., & Nomura, C. (1986). Onset of adolescent drinking: A longitudinal study of intrapersonal and interpersonal antecedents. *Advances in Alcohol and Substance Abuse*, *5*, 91–110.
- Buchsbaum, M. S. (1971). Neural events and the psychophysical law. *Science*, *172*, 502.
- Buchsbaum, M. S. (1974). Average evoked response and stimulus intensity in identical and fraternal twins. *Physiological Psychology*, *2*, 365–370.
- Chassin, L. (1985). Changes in peer and parent influence during adolescence: Longitudinal versus cross-sectional perspectives on smoking initiation. *Developmental Psychology*, *22*, 327–334.
- Clark, W. B., & Midanik, L. (1980). *Alcohol use and alcohol problems among U.S. adults*:

- Results of the 1979 National Survey* (Working Paper F122). Berkeley, CA: Alcohol Research Group.
- Clasen, D., & Brown, B. (1985). The multidimensionality of peer pressure in adolescence. *Journal of Youth and Adolescence*, 14, 451–468.
- Collins, J. K., & Harper, J. F. (1985). Sexual behavior and peer pressure in adolescent girls. *Australian Journal of Sex, Marriage, and Family*, 6, 137–142.
- Coursey, R. D., Buchsbaum, M., & Frankel, B. L. (1975). Personality measures and evoked responses from chronic insomnias. *Journal of Abnormal Psychology*, 84, 239–249.
- Cvetkovich, G., & Grote, B. (1981). Adolescent development and teenage fertility. In D. Byrne & W. A. Fisher (Eds.), *Adolescents, sex, and contraception* (109–123). New York: McGraw–Hill.
- Cvetkovich, G., Grote, B., Bjorseth, A., & Sarkissian, J. (1975). On the psychology of adolescents' use of contraceptives. *Journal of Sex Research*, 11, 256–270.
- Daitzman, R. J., & Zuckerman, M. (1980). Disinhibitory sensation seeking personality, and gonadal hormones. *Personality and Individual Differences*, 1, 103–110.
- Daitzman, R. J., Zuckerman, M., Sammelwitz, P. H., & Ganjam, V. (1978). Sensation seeking and gonadal hormones. *Journal of Bioscience*, 10, 401–408.
- Davis, G. L., & Cross, H. J. (1973). College student drug users' memories of their parents. *Adolescence*, 7, 475–480.
- Dembo, R. L., Dertke, M., laVoie, L., & Bonders, S. (1987). Physical abuse, sexual victimization, and illicit drug use: A structural analysis among high risk adolescents. *Journal of Adolescence*, 10, 13–34.
- Dishion, T. J., & Loeber, R. (1985). Adolescent marijuana and alcohol use: The role of parents and peers revisited. *American Journal of Drug and Alcohol Abuse*, 11, 11–25.
- Donovan, J. E., Jessor, R., & Costa, F. M. (1988). Syndrome of problem behavior in adolescence: A replication. *Journal of Consulting and Clinical Psychology*, 56, 762–765.
- Eberhardt, C. A., & Schill, T. (1984). Differences in sexual attitudes and likelihood of sexual behaviors of black lower socioeconomic father-present vs. father-absent female adolescents. *Adolescence*, 19, 99–105.
- Ehrenreich, B. (1989). *Fear of falling: The inner life of the middle class*. New York: Pantheon.
- Elkind, D. (1967). Egocentrism in adolescence. *Child Development*, 38, 1025–1034.
- Elkind, D. (1968). Cognitive structure and adolescent experience. *Adolescence*, 2, 427–434.
- Elkind, D. (1985). Egocentrism redux. *Developmental Review*, 5, 218–226.
- Elster, A. B., Lamb, M. E., & Tavaré, J. (1987). Association between behavioral and school problems and fatherhood in a national sample of adolescent youths. *Journal of Pediatrics*, 111, 932–936.
- Elster, A. B., Ketterlinus, R., & Lamb, M. E. (1989). *The association between parental status and problem behavior among female adolescents*. Paper presented at the biennial meeting of the Society for Research in Child Development, Kansas City, April.
- Emmerich, H. J. (1978). The influences of parents and peers on choices made by adolescents. *Journal of Youth and Adolescence*, 7, 175–180.
- Emmons, T. D., & Webb, W. W. (1974). Subjective correlates of emotional responsivity and stimulation seeking in psychopaths, normals, and acting-out neurotics. *Journal of Consulting and Clinical Psychology*, 42, 620–625.
- Erikson, E. (1963). *Childhood and society*. New York: Norton.
- Erikson, M., Gibbs, J. P., & Jensen, G. F. (1977). The deterrence doctrine and the perceived certainty of legal punishments. *American Sociological Review*, 42, 305–317.
- Farley, F. H. (1973). *A theory of delinquency*. Paper presented at the annual meeting of the American Psychological Association, Montreal, Quebec.

- Farley, F. H., & Farley, S. V. (1972). Stimulus-seeking motivation and delinquent behavior among institutionalized delinquent girls. *Journal of Consulting and Clinical Psychology, 39*, 94–97.
- Farrington, D. P. (1989). Self-reported and official offending from adolescence to adulthood. In M. W. Klein (Ed.), *Cross-national research in self-reported crime and delinquency*. Boston: Kluwer.
- Finn, P., & Bragg, B. W. (1986). Perception of risk of an accident by young and older drivers. *Accident Analysis and Prevention, 18*, 289–298.
- Fishburne, P. M., Abelson, H. I., & Cisin, I. (1980). *National survey on drug abuse: main finding: 1979*. Rockville, MD: National Institute of Drug Abuse.
- Flavell, J. (1985). *Cognitive development*. Englewood Cliffs, NJ: Prentice-Hall.
- Floyd, H. H., Jr., & South, D. R. (1972). Dilemma of youth: The choice of parents or peers as a frame of reference for behavior. *Journal of Marriage and the Family, 34*, 627–634.
- Furstenburg, F. (1976). *Unplanned parenthood*. New York: Free Press.
- Galambos, N. L., & Silbereisen, R. K. (1987). Substance use in West German youth: A longitudinal study of adolescents' use of alcohol and tobacco. *Journal of Adolescent Research, 2*, 161–174.
- Gans, J., Blyth, D., Elster, A., & Gaveras, L. L. (1990). *America's adolescents: How healthy are they?* (Vol. 1). Chicago: American Medical Association.
- Gerrard, M., McCann, L., & Fortini, M. (1983). Prevention of unwanted pregnancy. *American Journal of Community Psychology, 11*, 153–167.
- Glueck, S., & Glueck, E. (1950). *Unravelling juvenile delinquency*. New York: Commonwealth Fund.
- Goldsmith, S., Gabrielson, M. O., Gabrielson, I., Mathews, V., & Potts, L. (1972). Teenagers, sex, and contraception. *Family Planning Perspectives, 4*, 32–38.
- Goldstein, L. G., & Mosel, J. N. (1958). A factor study of drivers' attitudes with further study on driver aggression. *Highway Research Board Bulletin, 172*, 9–29.
- Gomme, I. M. (1985). Predictors of status and criminal offenses among male and female adolescents in an Ontario community. *Canadian Journal of Criminology, 27*, 147–159.
- Grasmick, H. G., & Milligan, H. M., Jr. (1976). Deterrence theory approach to socioeconomic/demographic correlates of crime. *Social Science Quarterly, 57*, 608–617.
- Halebsky, M. (1987). Adolescent alcohol and substance abuse: Parent and peer effects. *Adolescence, 22*, 961–967.
- Hansson, R. O., O'Connor, M. E., Jones, W. H., & Blocker, T. J. (1981). Maternal employment and adolescent sexual behavior. *Journal of Youth and Adolescence, 101*, 55–60.
- Harman, S. M. (1978). Clinical aspects of aging of the male reproductive system. In E. L. Schneider (Ed.), *The aging reproductive system* (Aging, Vol. 4). New York: Raven Press.
- Herdt, G. (1987). *The Sambia: Ritual and gender in New Guinea*. New York: Holt, Rinehart & Winston.
- Hirschi, T. (1969). *Causes of delinquency*. Berkeley: Univ. of California Press.
- Hirschman, R. S., Leventhal, H., & Glynn, K. (1984). The development of smoking behavior: Conceptualization and supportive cross-sectional survey data. *Journal of Applied Social Psychology, 14*, 184–206.
- Hundleby, J. D. (1987). Adolescent drug use in a behavioral matrix: A confirmation and comparison of the sexes. *Addictive Behaviors, 12*, 103–112.
- Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books.
- Irwin, C. E. (1990). The theoretical concept of at-risk adolescents. *Adolescent Medicine, 1*, 1–14.

- Jensen, G. F., Gibbs, J. P., & Erikson, M. (1978). Perceived risk of punishment and self-reported delinquency. *Social Forces*, 57, 57-78.
- Jessor, R. (1987a). Problem behavior theory, psychosocial development, and adolescent problem drinking. *British Journal of Addiction*, 82, 331-342.
- Jessor, R. (1987b). Risky driving and adolescent problem behavior: An extension of problem behavior theory. *Alcohol, Drugs, and Driving*, 3, 1-11.
- Jessor, R. (1990). Road safety and health behavior: Some lessons for research and intervention. *Health Education Research*, 5, 1-3.
- Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press.
- Jonah, B. A. (1984). *Accident risk and risk-taking among young drivers*. Paper presented at the Conference on Risk-Taking in Adolescent Drivers, University of British Columbia, Vancouver.
- Jonah, B. A. (1986). Accident risk and risk-taking behaviour among young drivers. *Accident Analysis and Prevention*, 18, 255-271.
- Jonah, B. A., & Wilson, R. J. (1984). *Drinking and driving among youth*. Paper presented at the Workshop on Epidemiological and Social Psychological Studies in Alcohol and Drug Use Among Youth, Toronto.
- Johnson, G. M., Shontz, F. C., & Locke, T. P. (1984). Relationships between adolescent drug use and parental drug behavior. *Adolescence*, 19, 295-299.
- Kahneman, D., & Tversky, A. (1972). Subjective probability: A judgement of representativeness. *Cognitive Psychology*, 3, 430-454.
- Kalmuss, D. (1986). Contraceptive use: A comparison of ever- and never-pregnant adolescents. *Journal of Adolescent Health Care*, 7, 332-337.
- Kandel, D. (1985). On processes of peer influences in adolescent drug use: A developmental perspective. *Advances in Alcohol and Substance Abuse*, 139-163.
- Kane, F. J., Jr., & Lachenbruch, P. (1973). Adolescent pregnancy: A study of aborters and non-aborters. *American Journal of Orthopsychiatry*, 43, 796-803.
- Keating, D. (1980). Thinking processes in adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology*. New York: Wiley.
- von Knorring, L., Orelund, L., & Winblad, B. (1983). Personality traits related to monoamine oxidase (MAO) activity in platelets. Submitted for publication.
- Kuhn, D., Phelps, E., & Walter, J. (1985). Correlational reasoning in an everyday context. *Journal of Applied Developmental Psychology*, 6, 85-97.
- Levine, E. M., & Kozak, C. (1979). Drug and alcohol use, delinquency, and vandalism among upper middle class pre- and post-adolescents. *Journal of Youth and Adolescence*, 8, 91-101.
- Levine, M., & Singer, S. (1988). Delinquency, substance abuse, and risk-taking in middle-class adolescents. *Behavioral Sciences and the Law*, 6, 385-400.
- Lukas, J. H., & Siegel, J. (1981). *Human augmenting-reducing and sensation-seeking*. Paper presented at meeting of the Society for Psychophysiological Research. Washington, DC, October.
- Major, L. F., & Murphy, D. L. (1978). Platelet and plasma amine oxidase activity in alcoholic individuals. *British Journal of Psychiatry*, 132, 548-554.
- Matthews, M., & Moran, A. (1986). Age differences in male drivers' perception of accident risk: The role of perceived driving ability. *Accident Analysis and Prevention*, 18, 299-313.
- McCord, W., & McCord, J. (1959). *Origins of crime*. New York: Columbia Univ. Press.
- McLaughlin, R. J., Baer, P. E., Burnside, M. A., & Pokorny, A. D. (1985). Psychosocial correlates of alcohol use at two age levels during adolescence. *Journal of Studies on Alcohol*, 46, 212-210.

- Meier, R. F., Burkett, S. R., & Hickman, C. A. (1984). Sanctions, peers, and deviance: Preliminary models of a social control process. *Sociological Quarterly*, *25*, 67–82.
- Moshman, D. (1979). Development of formal hypothesis-testing ability. *Developmental Psychology*, *15*, 104–112.
- Mott, F. L., & Haurin, R. J. (1987). *The interrelatedness of age at first intercourse, early pregnancy, alcohol, and drug use among American adolescents: Preliminary results from the National Longitudinal Survey of Youth Labor Market Experience*. Columbus, OH: Center for Human Resource Research, Ohio State University.
- Murphy, D. J. (1986). *Customers and thieves: An ethnography of shoplifting*. Dorset, England: Gower.
- Murphy, D. L., Belmaker, R. H., Buchsbaum, M., Wyatt, R. J., Martin, N. F., & Ciarranello, R. (1977). Biogenic amine-related enzymes and personality variations in normals. *Psychological Medicine*, *7*, 149–157.
- Murphy, D. L., Wright, C., Buchsbaum, M. S., Nichols, A., Costa, J. L., & Wyatt, R. J. (1976). Platelet and plasma amine oxidase activity in 680 normals: Sex and age differences and stability over time. *Biochemical Medicine*, *16*, 254–265.
- O'Connell, M., & Rogers, C. C. (1984). Out-of-wedlock births, premarital pregnancies, and their effect on family formation and dissolution. *Family Planning Perspectives*, *16*, 157–162.
- Oskamp, S., & Mindick, B. (1981). Personality and attitudinal barriers to contraception. In D. Byrne & W. A. Fisher (Eds.), *Adolescents, sex, and contraception* (pp. 65–107). New York: McGraw-Hill.
- Ozeran, B. J. (1973). *Sensation seeking as a predictor of leadership in leaderless, task-oriented groups*. Master's thesis, University of Hawaii.
- Patterson, G. (1982). *Coercive family process*. Eugene, OR: Castalia.
- Perez, J., & Torrubia, R. (1985). Sensation seeking and antisocial behavior in a student sample. *Personality and Individual Differences*, *6*, 401–403.
- Piaget, J. (1967). *Six psychological studies*. New York: Random House.
- Piaget, J., & Inhelder, B. (1975). *The origin of the idea of chance in children*. New York: Norton.
- Piliavin, I., Thornton, C., Gartner, R., & Matsueda, R. L. (1986). Crime, deterrence, and rational choice. *American Sociological Review*, *51*, 101–119.
- Pulkinnen, L. (1982). Self-control and continuity from childhood to adolescence. In P. B. Baltes & O. G. Brim (Eds.), *Lifespan development and behavior* (Vol. 4). New York: Academic Press.
- Robinson, D. S., Davis, J. M., Nies, A., Ravaris, C. L., & Sylvester, D. (1971). Relation of sex and aging to monoamine oxidase activity of human brain, plasma, and platelets. *Archives of General Psychiatry*, *24*, 536–539.
- Rose, R. M. (1978). Neuroendocrine correlates of sexual and aggressive behavior in humans. In M. A. Lipton, A. Dimascio, & K. F. Killam (Eds.), *Psychopharmacology: A generation of progress*. New York: Raven Press.
- Ross, B. M., & DeGroot, J. F. (1982). How adolescents combine probabilities. *Journal of Psychology*, *110*, 75–90.
- Rowe, A. R., & Tittle, C. R. (1977). Life cycle changes and criminal propensity. *Sociological Quarterly*, *18*, 223–236.
- Ruggiero, M., Greenberger, E., & Steinberg, L. (1982). Occupational deviance among first-time workers. *Youth and Society*, *13*, 423–48.
- Satinder, K. P., & Black, A. (1984). Cannabis use and sensation seeking orientation. *Journal of Psychology*, *116*, 101–105.
- Schwarz, R. M., Burkhart, B. R., & Green, B. (1978). Turning on or turning off: Sensation

- seeking or tension reduction as motivational determinants of alcohol use. *Journal of Consulting and Clinical Psychology*, 46, 1144–1145.
- Schooler, C., Zahn, T. P., Murphy, D. L., & Buchsbaum, M. (1978). Psychological correlates of monoamine oxidase activity in normals. *Journal of Nervous and Mental Diseases*, 166, 177–186.
- Sebald, H., & White, B. (1980). Teenagers' divided reference groups: Uneven alignment with parents and peers. *Adolescence*, 15, 979–984.
- Shannon, L. W. (1982). *Assessing the relationship of adult criminal activity to juvenile careers*. Washington, DC: U.S. Department of Justice. [Microfiche No. NCJ 77744, available from the National Juvenile Justice Clearinghouse of the National Criminal Justice Reference Service, Washington, DC]
- Shedler, J., & Block, J. (1990). Adolescent drug use and psychological health: A longitudinal inquiry. *American Psychologist*, 45, 612–630.
- Silverman, J., Buchsbaum, M. S., & Stierlin, H. (1973). Sex differences in perceptual differentiation and stimulus intensity control. *Journal of Personality and Social Psychology*, 25, 309–318.
- Spotts, J. V., & Shontz, F. C. (1984). Correlates of sensation seeking by heavy, chronic drug users. *Perceptual and Motor Skills*, 58, 427–435.
- Steinberg, L. D., Greenberger, E., Jacobi, M., & Garduque, L. (1981). Early work experience: A partial antidote for adolescent egocentrism. *Journal of Youth and Adolescence*, 10, 141–157.
- Steinberg, L., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. *Child Development*, 57, 841–851.
- Stern, M., Northmn, J. E., & Van Slyck, M. R. (1984). Father absence and adolescent 'problem behaviors': Alcohol consumption, drug use, and sexual activity. *Adolescence*, 19, 301–312.
- Stillman, R. C., Wyatt, R. J., Murphy, D. L., & Rauscher, F. D. (1978). Low platelet monoamine oxidase activity and chronic marijuana use. *Life Sciences*, 23, 1577–1582.
- Stumphauer, J. S. (1976). Modifying delinquent behavior: Beginnings and current practices. *Adolescence*, 11, 13–28.
- Sutker, P. B., Archer, R. P., & Allain, A. N. (1978). Drug abuse patterns, personality characteristics, and relationships with sex, race, and sensation seeking. *Journal of Consulting and Clinical Psychology*, 46, 1374–1378.
- Tietze, C. (1983). *Induced abortion: A world review*. New York: The Population Council, Inc.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5, 207–232.
- U.S. Bureau of the Census (1987). *Statistical abstracts of the United States* (108th ed.). Washington, DC.
- U.S. Department of Education (1988). *Youth indicators 1988: Trends in the well-being of American youth* (DE Publication No. 065-000-00347-3). Washington, DC: U.S. Government Printing Office.
- Wavering, M. (1984). Interrelationships among Piaget's formal operational schemata: Proportions, probability, and correlation. *Journal of Psychology*, 118, 57–64.
- Weiss, R. S. (1979). Growing up a little faster: The experience of growing up in a single-parent household. *Journal of Social Issues*, 35, 97–111.
- Whiting, B. B., & Whiting, J. W. M. (1975). *Children of six cultures: A psychocultural analysis*. Cambridge, MA: Harvard Univ. Press.
- Williams, A. F. (1985). Night-time driving and fatal crash involvement of teenagers. *Accident Analysis and Prevention*, 17, 1–5.

- Wilson, J. Q., & Herrnstein, R. J. (1985). *Crime and human nature*. New York: Simon & Schuster.
- Yamaguchi, K., & Kandel, D. (1987). Drug use and other determinants of premarital pregnancy and its outcome: A dynamic analysis of competing life events. *Journal of Marriage and Family*, *49*, 257–270.
- Zelnik, M., & Kantner, J. P. (1980). Sexual activity, contraceptive use, and pregnancy among metropolitan-area teenagers, 1971–1979. *Family Planning Perspectives*, *12*, 230.
- Zuckerman, M. (1979a). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale, NJ: Erlbaum.
- Zuckerman, M. (1979b). Sensation seeking and risk taking. In C. E. Izard (Ed.), *Emotions in personality and psychopathology*. New York: Plenum.
- Zuckerman, M. (1983). A biological theory of sensation seeking. In M. Zuckerman (Ed.), *Biological bases of sensation seeking, impulsivity, and anxiety*. Hillsdale, NJ: Erlbaum.
- Zuckerman, M. (1984). Sensation seeking: A comparative approach to a human trait. *Behavioral and Brain Sciences*, *7*, 413–471.
- Zuckerman, M., Bone, R. N., Neary, R., Mangelsdorff, D., & Brustman, B. (1972). What is the sensation seeker? Personality trait and experience correlates of the Sensation Seeking Scales. *Journal of Consulting and Clinical Psychology*, *39*, 308–321.
- Zuckerman, M., Eysenck, S. B. G., & Eysenck, H. J. (1978). Sensation seeking in England and America: Cross-cultural, age, and sex comparisons. *Journal of Consulting and Clinical Psychology*, *46*, 139–149.
- Zuckerman, M., & Neeb, M. (1980). Demographic influences in sensation seeking and expressions of sensation in religion, smoking, and driving habits. *Personality and Individual Differences*, *1*, 197–206.
- Zuckerman, M., Tushup, R., & Finner, S. (1976). Sexual attitudes and experience: Attitude and personality correlates and changes produced by a course in sexuality. *Journal of Consulting and Clinical Psychology*, *44*, 7–19.

RECEIVED October 26, 1989; REVISED October 16, 1990.

EXHIBIT 46

COMING OF AGE IN TWENTY-FIRST CENTURY AMERICA: PUBLIC ATTITUDES TOWARDS THE IMPORTANCE AND TIMING OF TRANSITIONS TO ADULTHOOD

TOM W. SMITH

This paper examines age norms on seven important transitions to adulthood. Americans rank finishing school as the most important hallmark of becoming an adult. This is followed closely by obtaining full-time employment, being able to support a family, and being financially independent. Among these seven standards of achieving adulthood the average transition age runs over a 5.3 year span, from being financially independent, living independently, and being employed full-time by the traditional age of majority (21) to being a parent by age 26.

A large degree of consensus prevails across social groups on the importance of these transitions. The only notable pattern of differences is that on supporting a family, having a child, and getting married older adults and the widowed and married rate these as more important than younger adults and the never married do.

Considerably more variation exists across social groups on the age or timing of these transitions. First, the young and never married favor earlier transitions on financial independence, living away from parents, and working full-time, and later transitions on supporting a family, getting married, and having children. Second, the better educated and those with higher incomes favor later transitions on all domains. Third, cultural differences related to race and religion appear. For example, blacks tend to favor the early transition model more than whites do.

Introduction

The transition to adulthood is universal in that it takes place in all human societies, but particularistic in that each society evolves its own system. The transition to adulthood is timeless in that it occurs thorough the history of human society and time-specific in that its nature and pace shifts and changes. The contemporary

American system of transition to adulthood is distinct not only from that in other countries, even other advanced industrial societies, but quite different from the American system only a generation ago (Breen & Buchmann, 2002; Cook & Furstenberg, 2002; Mercer, 2003; Settersten & Mayer, 1997).

Cross-nationally, the United States differs from other developed countries in numerous ways including having an earlier shift from secondary to college education and a higher proportion in college (Lippman, 2002), earlier ages of leaving home and living with a partner (Iacovou, 2002), and a greater spread in the age and timing of transitions (Cook & Furstenberg, 2002). Of course on other dimensions transitions in the United States are similar to those in other countries such as regarding employment and being self-supporting (Smeeding & Phillips, 2002).

Domestically, there have been major legal and demographic changes in how adulthood is defined and experienced. For example, legally the age of majority was decreased from 21 to 18 and the age at which people can be tried as adults was lowered in most states. Demographically, changes include the rise in median age at first marriage for women from 20 in 1960 to 25 in 2000, the large increase in post-secondary education, and huge increases in pre-marital childbearing (Baker & Stevenson, 1994; Smith, 1999, 2003).

While the legal and demographic shifts in the transition to adulthood are well-documented and frequently studied, the values and social preferences about the transition to adulthood are less well known. Research does show that prescriptive and proscriptive age norms do exist about what transitions should occur, at what age, and in what order (Neugarten et al., 1965; Settersten & Mayer, 1997). For example, Settersten's work in Chicago (Settersten, 1997, 1998; Settersten & Haegstad, 1996) showed that a majority considered age as relevant for the following youth-to-adulthood transitions—marrying, full-time employment, becoming a parent, leaving home, and finishing school. But because the age-norming, transition-to-adulthood research is based on studies that are variable in methods, local in coverage, and typically have small samples, what is known about national norms, sub-group differences, and changes over time is limited (Settersten & Mayer, 1997).

No truly comparative study of age norms has been carried out, but research indicates that prescriptive and proscriptive standards exist across cultures and that the specific norms vary across societies and generations. In Europe home leaving occurs at earlier ages in the north than in the south and this relates to differences in religion and cultural norms (Holdsworth, 2000; Holdsworth & Elliott, 2001; Iacovou, 2002). Based on a student sample, Peterson (1996) found that Australian age norms "differed in every case" from levels in the United States. Generational differences were found in homeleaving age differences in Canada (Veevers, Gee, & Wister, 1996) and in Japan younger people generally favored earlier transitions than older people did (Hori, 1994).

To better understand where the American public currently stands on the importance of and age norms for various transitions to adulthood the Network on the Transitions to Adulthood of the MacArthur Foundation designed a module to measure this. This is part of wide ranging research by the MacArthur Network examin-

ing current patterns of transitions to adulthood, how these transitions are changing, what factors aid and hinder successful attainment of adulthood, the social norms that guide this process, how the transitions and norms differ across sub-groups, and what public policies would best assist in people transitioning to adulthood. Understanding the social norms that govern the transition to adulthood will allow a better understanding of this crucial process and assist in the formulation of both personal decisions and public policies that will facilitate the transition to adulthood.

Data

The data on transitions to adulthood were collected on the 2002 General Social Survey (GSS). The GSS is an in-person, full-probability sample of adults living in households in the United States (Davis, Smith, & Marsden, 2003). The transition to adulthood items were administered to a half sample with 1398 cases.

The key questions to measure the transitions are as follows:

1. People differ in their ideas about what it takes for a young person to become an adult these days. How important is it for them to be....
 - a. Financially independent from their parents/guardians
 - b. No longer living in their parents' household
 - c. Completed their formal schooling
 - d. To be employed full-time
 - e. Be capable of supporting a family financially
 - f. Have a child
 - g. Get married

Extremely Important/Quite Important/Somewhat Important/Not too Important/Not at All Important

2. If Extremely/Quite/Somewhat Important, ask:
By what age should this normally occur?

Analysis

Importance of Transitions

As Table 1A shows, Americans are most likely to mention finishing schooling as a transition that a young person needs to complete to become an adult. Seventy-two percent consider this extremely important and 97% consider it at least somewhat important (the criteria for then being asked by what age the transition should "normally occur"). This is followed by obtaining full-time employment which is mentioned as extremely important by 61% and at least somewhat important by 95.5%. Next comes being able to support a family financially which 60% consider

Table 1
Importance and Timing of Transitions to Adulthood

A. Importance

	Ex. Imp.	Quite Imp.	Some- what Imp.	Not too Imp.	Not at all Imp.
Complete Education	72.3	17.9	7.0	2.1	0.8
Employed Full-time	61.0	22.8	11.7	3.8	0.7
Supporting a Family	60.3	22.0	11.2	4.6	1.8
Financially Independent	47.4	33.5	16.0	2.1	1.0
Not Living with Parents	29.3	27.9	25.0	13.3	4.4
Married	19.1	14.1	21.6	24.0	21.1
Have a Child	15.8	13.2	23.3	25.3	22.4

N=1353-1379

Wording: People differ in their ideas about what it takes for a young person to become an adult these days. How important is it for them to be...

- a. Financially independent from their parents/guardians
- b. No longer living in their parents' household
- c. Completed their formal schooling
- d. To be employed full-time
- e. Be capable of supporting a family financially
- f. Have a child
- g. Get married

Extremely Important/Quite Important/Somewhat Important/Not too Important/
 Not at All Important

B. Timing

	Mean Age	% 25 or Older
Financially Independent	20.9	13.9 (1317)
Not Living with Parents	21.1	15.2 (1114)
Employed Full-time	21.2	16.3 (1297)
Complete Education	22.3	22.3 (1306)
Supporting a Family	24.5	57.6 (1220)
Married	25.7	68.2 (714)
Have a Child	26.2	77.7 (675)

Wording: If Extremely/Quite/Somewhat Important, ask:
 By what age should this normally occur?

extremely important and 94% as at least somewhat important. Last among the top choices is being financially independent of parents which is considered extremely important by 47% and at least somewhat important by 97%. Other transitions are mentioned less frequently. Not living with parents is extremely important to 29% and at least somewhat important to 82%. It is followed by being married which is extremely important to 19% and at least somewhat important to 55%. The event least often mentioned as needed to become an adult is having a child which is considered as extremely important by 16% and at least somewhat important by 52%.

Of these seven roles, 37.9% considered all to be important markers of a youth becoming an adult (i.e. somewhat, quite, or extremely important), 19.9% named six of these changes, 28.4% five of them, 8.7% four, and only 5.1% considered three or fewer as important (mean mentions = 5.8).

Age Norms of Transitions

On average people believe that becoming self-supporting is the first transition that a young person should make (mean age = 20.9)(Table 1B). This is followed by no longer living with parents (21.1), having a full-time job (21.2), completing schooling (22.3), being able to support a family financially (24.5), getting married (25.7), and having a child (26.2). Thus, the average age at which people feel these various transitions to adulthood should occur ranges over a period of 5.3 years. This difference in the timing of transitions is further demonstrated by looking at how many people think the transitions should happen at age 25 or older. As Table 1B indicates, only 14–16% think that financial independence, living independently, and having a full-time job should wait until a person is 25 or older. Twenty-two percent think that finishing your education should be delayed until at least 25. A majority favor an age of 25 and over for being able to support a family (58%), getting married (68%), and having a child (78%).¹

Sub-Group Differences on Importance of Transitions

Overall, there is a good deal of consensus across social groups on the importance of these seven transitions. Examining the differences on the seven transitions by the nine demographics shows statistically significant variations in only 14 of 63 comparisons (Table 2). Looking at these by transitions there are no statistically significant differences in the importance of completing schooling and only one, small demographic difference over the importance of financial independence and full-time employment. Two notable differences occur on the importance of living independently and being able to support a family. College graduates are more likely to think that living independently is important (extremely + quite)(67%) than those with a high school degree or less education (54–55%). It is also seen as more important by Jews (71%) and those with no religion (62%) than by Protestants

Table 2
Importance Ratings of Transition by Socio-Demographics

Demographics	(Probability levels)						
	Transitions						
	Finan. Indep.	Living on Own	Finish Sch.	Work Full	Support family	Have Child	Mar- ried
Gender	.022	.461	.136	.058	.408	.555	.884
Age	.610	.839	.530	.158	.000	.007	.000
Degree	.286	.001	.318	.027	.125	.491	.529
Race	.948	.296	.684	.892	.130	.753	.318
Hispanic	.686	.088	.157	.620	.360	.464	.020
Marital Status	.937	.431	.567	.061	.006	.000	.000
Income	.595	.649	.238	.343	.795	.061	.003
Religion	.809	.006	.934	.482	.106	.000	.001

(59%) or Catholics (53%). Being able to support a family is seen as more important by older adults (90% 65+, 86% 50–64, 82% 39–49, 74% under 30) and by the married (85%) and widowed (87%) than by the never married (76%). There is least agreement on the importance having a child and getting married. Older adults are more likely than younger adults to see both these activities as important for becoming an adult. Twenty-nine percent of those under 30 rated marriage as important, but 50% of those 65 and over did so. Similarly, the widowed and married see childbearing and marriage as more important than those who have never married. On childbearing Jews and Catholics are the most likely to consider it important (respectively 45% and 34%) while only 26–27% of Protestants and those with no religion think it is important. On marriage Catholics and Protestants rate it as most important (respectively 36% and 35%), compared to only 25% of Jews and those with no religion. Marriage is also considered more important by Hispanics (44%) than non-Hispanics (32%). Those with low incomes tend to be bimodal either saying that getting married is extremely important or not at all important, while those with high incomes are in the middle categories, not to important to quite important.

Age and the life-cycle related variable of marital status show the only well-established pattern of differences with older adults and the married and widowed holding more to the traditional point of view that being able to support a family, getting married, and having children are important hallmarks of becoming an adult. This probably largely reflects a change in values across cohorts, but with only a single point of observation the effects of aging, life cycle, and cohort cannot be readily separated.

Table 3
Mean Age of Transitions by Socio-Demographics

Demographics	Finan. Indep.	Living on Own	Finish Sch.	Work Full	Support family	Have Child	Mar- ried
Gender							
Men	20.9	21.0	22.4	21.2	24.3	26.1	25.8
Women	20.9	21.2	22.2	21.3	24.8	26.3	25.6
Prob.	.695	.109	.436	.486	.024	.559	.734
Model	—	—	—	—	L	—	—
Age							
18–29	20.0	20.3	22.3	20.6	24.7	25.8	26.3
30–49	21.0	21.2	22.1	21.2	24.6	26.6	25.9
50–64	21.5	21.6	22.7	21.8	24.7	26.4	25.7
65+	20.9	21.4	22.0	21.5	24.0	25.6	24.3
Prob.	.000	.000	.398	.000	.119	.037	.001
Model	SLC	SLC	—	SLC	—	NCNL	L
Degree							
LTHS	19.9	20.5	20.9	20.1	23.2	25.3	24.4
HS	20.7	20.9	21.9	20.9	24.3	25.7	25.0
Jr. Col.	21.0	21.4	23.4	22.0	25.3	26.9	26.0
Bachelor	21.9	21.8	23.3	22.3	25.6	27.5	26.6
Graduate	22.2	22.0	23.9	22.9	26.1	28.8	27.7
Prob.	.000	.000	.000	.000	.000	.000	.000
Model	L	L	L	L	L	L	L
Race							
White	21.1	21.2	22.5	21.4	24.7	26.5	25.7
Black	20.3	20.9	21.3	20.5	23.9	24.8	25.5
Other	20.2	20.9	21.7	21.2	24.3	26.3	25.8
Prob.	.001	.207	.003	.003	.029	.000	.891
Model	NC	—	NC	NC	NC	NC	—
Hispanic							
Not	20.9	21.1	22.3	21.3	24.5	26.2	25.6
Hispanic	20.3	21.0	22.1	21.0	24.7	26.0	26.5
Prob.	.031	.806	.603	.309	.729	.649	.081
Model	L	—	—	—	—	—	—
Marital Status							
Married	21.2	21.4	22.5	21.6	24.7	26.4	25.6
Widowed	20.0	20.6	21.9	21.0	23.8	24.9	23.8
Divorced	21.0	21.0	22.4	21.0	24.3	26.5	26.0

continued

Table 3 (continued)

Demographics	Finan. Indep.	Living on Own	Finish Sch.	Work Full	Support family	Have Child	Mar- ried
Separated	19.7	20.2	21.7	20.0	23.3	25.0	24.0
Never Married	20.3	20.7	21.9	20.8	24.7	26.1	26.6
Prob.	.000	.001	.504	.000	.060	.102	.002
Model	NC	NC	—	NC	—	—	NC
Income							
Lt 10K	19.9	20.2	21.3	20.9	24.0	24.4	25.2
10–15K	20.1	20.2	22.1	20.6	23.9	24.5	25.7
15–20K	20.1	20.3	22.8	20.4	23.6	25.2	23.9
20–25K	20.6	20.6	22.1	20.5	23.8	25.7	24.6
25–30K	19.6	20.4	21.9	20.4	23.8	25.5	25.9
30–35K	20.3	20.9	21.7	20.8	23.9	24.8	24.8
35–40K	20.9	21.2	21.7	20.9	24.1	25.9	25.8
40–50K	20.9	21.0	21.9	21.0	24.4	26.4	26.0
50–60K	21.1	21.4	23.0	21.0	24.7	26.9	25.6
60–75K	21.0	21.1	23.0	21.7	24.9	26.9	25.7
75–90K	21.1	21.6	22.6	21.8	25.4	27.5	26.7
90–110K	21.7	21.7	22.6	21.6	25.1	27.5	26.9
110K+	22.4	22.1	22.8	22.5	26.1	27.9	27.2
Refused	21.5	21.8	22.3	22.0	25.0	26.1	25.5
Prob.	.000	.000	.287	.000	.000	.000	.029
Model	L	L	—	L	L	L	L
Religion							
Prot.	20.8	21.1	22.2	21.1	24.1	25.8	25.2
Cath.	20.8	21.3	22.5	21.5	25.0	26.7	25.8
Jew.	21.9	22.1	22.7	24.1	26.6	29.4	27.5
None	21.1	20.7	22.1	20.7	24.8	26.1	27.5
Other	21.4	21.4	22.1	21.7	25.8	27.3	26.7
Prob.	.257	.042	.908	.000	.000	.001	.000
Model	—	NC	—	NC	NC	NC	NC

Models:

NC=not constant (nominal variable)

L=linear

SLC=significant linear component, best linear fit is statistically significant, but also statistically significant variation around this linear model

NCNL=not constant, not linear, best linear fit is not statistically significant, but significantly different from constant model

Sub-Group Differences in Age Norms

There are considerably more differences across sub-groups about the timing of these seven transitions. Statistically significant differences appear for over half of the breakdowns (34 of 63).

Only one difference occurs for gender and Hispanic ethnicity and neither is notable.

On marital status the currently married favor the highest ages for all dimensions except getting married, for which the never married thinks one should wait the longest. There is also an interesting reversal on the general preference for a younger age of marrying than having children. The married, widowed, separated, and divorced all put the average age of marrying above the age of having a child (by 0.5–1.1 years), but the never married put having a child 0.5 years before getting married.

Age shows two distinct patterns. On gaining financial independence, living independently, and working full-time, young adults favor an earlier transition and older adults a delay. Those 50–64 favor a higher age than adults over 65. For the family-oriented variables of supporting a family, getting married, and having a child, the pattern reverses. Younger adults are for a later transition and older adults and especially those over 65 are for a younger age.

On race Blacks consistently favor earlier transitions than Whites and (with one exception) Others.² Blacks also differ from Whites and Others in favoring an earlier age for having a child than for getting married.

Jews favor later transitions than the other religious groups do. They are generally followed by Catholics with Protestants or those with no religion backing the youngest transitions. Those with no religion differ from the others in putting the transition to parenthood before matrimony.

On income the wealthiest are for the highest transition age for all changes. The earlier ages of change occur among those with low to moderate incomes, but only for four events is the lowest age among those with the least income.

Education shows the most consistent differences of all. For all transitions those with graduate degrees favor the latest transition and those without a high school degree the earliest. The transition gaps are 1.5 years for living independently, 2.3 for financial independence, 2.8 for working full-time, 2.9 for supporting a family, 3.0 for finishing school, 3.3 for getting married, and 3.5 years for having a child. This means that different educational groups have large and consistent differences about the timing of transition to adulthood. For example, 46% of those without a high school degree believe that one should finish schooling before age 20. This early end to education is backed by 32% of those with a high school degree, 19% with an associate degree, 11% of those with four-year degrees, and 7% of those with graduate degrees.³

Thus, on the timing of transitions there are several major patterns. First, there are differences by cohort/life cycle and marital status in which the young and never married favor younger transitions on financial independence, living away from

parents, and working full-time, and older transitions on supporting a family, getting married, and having children. (There are no differences on finishing school for either age or marital status.) Second, SES differences occur on education and income. Substantially later transitions are consistently endorsed by the better educated and those with higher incomes. Third, there are some race and religious differences that do not seem entirely due to SES. Blacks, for example, endorse earlier ages for finishing school than Whites do controlling for level of education.⁴

Summary and Conclusion

Americans rank finishing school as the most important hallmark of becoming an adult. This is followed closely by obtaining full-time employment, being able to support a family, and being financially independent. Of lesser importance are not living with parents, getting married, and having a child. The transition that people believe should come first is being financially independent (by age 20.9 on average), followed by not living with one parents (21.2), being employed full-time (21.2), finishing schooling (22.3), being able to support a family (24.5), getting married (25.7), and having a child (26.2). Thus, among these seven key standards of achieving adulthood the average transition period runs over a 5.3-year span, from being financially independent, living independently, and being employed full-time by the traditional age of majority (21) to being a parent by age 26.

There is a large degree of consensus across social groups on the relative importance of the seven transitions. The only notable pattern of differences is that on supporting a family, having a child, and getting married older adults and the widowed and married rate these as more important than younger adults and the never married do. This probably reflects in large part a shift in values across generations away from traditional family values, but may also represent life-cycle effects.

There is considerably more variations across social groups on the age or timing of the seven transitions. First, the young and never married favor earlier transitions on financial independence, living away from parents, and working full-time, and later transitions on supporting a family, getting married, and having children. (There are no differences on finishing school for either age or marital status.) This probably reflects a combination of inter-generational shifts in values and differences related to life cycle. Second, the better educated and those with higher incomes favor later transitions on all domains. It appears that the college-educated middle and upper classes and the not college-educated working and lower classes have notably different models on how people in general (and presumably their own children in particular) should transition to adulthood. The college-educated class favors finishing education at 23–24, getting married at about 27 and having children at 28–29.⁵ Those without any college education think these transitions should occur 3–3.5 years earlier. To the extent that extended education and delayed family formation leads to greater achievement and more material and psychological well-being, these difference in models of transition to adulthood could have notable impacts on social inequality and the perpetuation of same across generations. Third,

apparently independent of the SES effects there are also cultural differences related to race and religion. Blacks, for example, tend to back the early transition model more than Whites do net of SES. As with the case of the SES differences themselves, this would tend to lead to racial differences being continued into succeeding generations.

While the American people have norms about the sequence and timing of these seven transitions to adulthood, these norms are not rigid. There is a fair bit on inter-subject variation, a few notable sub-group variations (e.g. across cohorts and racial groups), and the norms have been flexible enough to change over time with alterations in family structure and demography.

Understanding the patterns and age norms is also relevant to the formulation of public policies and the programs of advocacy groups. First, it is important to realize that while the legal age of majority fell over the last 40 years (from 21 to 18), the social age of majority rose in terms of both behaviors and values. Public officials need to keep this disconnect in mind when setting educational, labor, and tax policies. Second, as noted above, Blacks and Whites differ notably on some age norms. Since age norms on such things as when education should end and when family formation should begin will notably affect people's life opportunities, public policies to reduce racial inequality and the efforts of civil-rights organization to overcome minority disadvantages need to take these differences into account. Third, norms in one area affect both norms and behaviors in other areas. The rising level of college education has led to a higher expected age for finishing education. This in turn has led to both later age of first marriage and a greater acceptance that marriage should be delayed (i.e. a rise in the age norm for marriage). Public officials and social advocates need to realize that norms and behaviors interact in complex ways and that norms in one area can profoundly influence norms and behaviors in other areas.

To what extent adult transition norms and patterns are particularistic to the United States or common among developed countries in general is unknown. Given the important role that culture and religion plays in establishing many transitional age norms (Cook & Furstenberg, 2002; Holdsworth, 2000; Holdsworth & Elliott, 2001; Iacovou, 2002) and the influence that institutions and public policies have on shaping transitional behaviors (Lippman, 2002; Smeeding & Phillips, 2002), it is probable that the norms in other countries vary systematically with their cultures and structures and due to this differ from what prevails in the contemporary United States. Only a rigorous cross-national study can establish what situation actually prevails.

Biographical Notes

Corresponding author: Tom W. Smith, Ph.D., National Opinion Research Center, 1155 E. 60th Street, Chicago, IL 60637-2799. E-Mail: Smith-tom@norc.net

Tom W. Smith, Ph.D. is director of the General Social Survey at the National Opinion Research Center, the University of Chicago. He specializes in the survey methodology and the study of social change.

Acknowledgements

The research reported here was supported by the National Opinion Research Center, University of Chicago (GSS Topical Report No. 35).

Notes

1. The age of transitions and their ordering are similar to those found in Settersten and Haegstad, 1996.
2. See similar results in Settersten and Haegstad, 1996.
3. See Settersten and Haegstad, 1996 for a similar pattern.
4. The cultural differences related to religion, ethnicity, and race need to be examined more closely, but sample size limits what can be established as their net effects.
5. Creating what is sometimes called a period of extended adolescence (Baker, 1994; Byers, 1993).

References

- Baker, D.P. & Stevenson, D.L. (1994). Transition to higher education in the United States: Institutional boundaries and pathways to adulthood. *Sociological Studies of Children*, 6, 141–157.
- Breen, R. & Buchmann, M. (2002). Institutional variation and the position of young people: A comparative perspective. *The Annals, AAPSS*, 580, 288–305.
- Byers, K.F. (1993). *Rights of transition: A study of extended adolescence, the role of traditional masculine growth rituals, and the initiation of manhood in the contemporary masculine life*. Unpublished Ph.d. dissertation, Union Institute.
- Cook, T.D. & Furstenberg, F., Jr. (2002). Explaining aspects of the transition to adulthood in Italy, Sweden, Germany, and the United States: A cross-disciplinary, case synthesis approach. *The Annals, AAPSS*, 580, 257–287.
- Holdsworth, C. (2000). Leaving home in Britain and Spain. *European Sociological Review*, 16, 201–222.
- Holdsworth, C. & Elliott, J. (2001). The timing of family formation in Britain and Spain. *Sociological Research Online*, 6 at www.socresonline.org.uk.
- Hori, S. (1994). Begging of old-age in Japan and age norms in adulthood. *Educational Gerontology*, 20, 439–451.
- Iacovou, M. (2002). Regional differences in the transition to adulthood. *The Annals, AAPSS*, 580, 40–69.
- Lippman, L. (2002). Cross-national variation in educational preparation for adulthood: From early Adolescence to young adulthood. *The Annals, AAPSS*, 580, 70–102.
- Mercer, C.H. (2003). *The age difference between spouses: Cross-national and within country variations*. Unpublished Ph.D. dissertation, University of Southampton.
- Neugarten, B.L., Moore, J.W., & Lowe, J.C. (1965). Age norms, age constraints, and adult socialization, *American Journal of Sociology*, 70, 710–717.
- Peterson, C.C. (1996). The ticking of the social clock: Adults' belief about the timing of transitional events. *International Journal of Aging and Human Development*, 42, 189–203.
- Settersten, R.A., Jr. (1997). The salience of age in the life course. *Human Development*, 49, 257–281.

- Settersten, R.A., Jr. (1998). A time to leave home and a time never to return? Age constraints on the living arrangements of young adults. *Social Forces*, 76, 1373–1400.
- Settersten, R.A., Jr. & Haegstad, G.O. (1996). What's the latest? Cultural age deadlines for family transitions. *Gerontologist*, 36, 178–188.
- Settersten, R.A., Jr. & Mayer, K.U. (1997). The measurement of age, age structure, and the life course. *Annual Review of Sociology*, 23, 233–261.
- Smeeding, T.M. & Phillips, K. R. (2002). Cross-national differences in employment and economic sufficiency. *The Annals, AAPSS*, 580, 103–133
- Smith, T.W. (2003). American sexual behavior: Trends, socio-demographic differences, and risk behavior. GSS Topical Report No. 25. Chicago: NORC, revised edition.
- Smith, T.W. (1999). The Emerging 21st Century American Family. GSS Social Change Report No. 62. Chicago: NORC.
- Veevers, J.E.; Gee, E.M.; and Wister, A.V. (1996). Homeleaving age norms: Conflict or consensus? *International Journal of Aging and Human Development*, 43, 277–295.

Revised manuscript accepted for publication in March, 2004. Action editor: P.S. Fry

EXHIBIT 47

Introducing the Issue

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

That the schedule for coming of age has been rather sharply revised both in the United States and more broadly throughout the industrialized world is by now widely recognized. Over the past decade, especially, the mass media have trumpeted the findings of a growing body of research showing that young people are taking longer to leave home, attain economic independence, and form families of their own than did their peers half a century ago. The forces behind this new timetable have been evident for several decades, but social science researchers, much less policy makers, were slow to recognize just how profound the change has been. A trickle of studies during the 1980s about the prolongation of young adulthood grew to a steady stream during the 1990s and then to a torrent during the first decade of the new millennium.¹ Now that researchers have shown how and why the timetable for becoming an adult has altered, policy makers must rethink whether the social institutions that once successfully educated, trained, and supported young adults are up to the task today.

Changes in the coming-of-age schedule are, in fact, nothing new. A century or more ago, the transition to adulthood was also a protracted affair. In an agriculture-based economy, it

took many young adults some time to gain the wherewithal to leave home and form a family. Formal education was typically brief because most jobs were still related to farming, the trades, or the growing manufacturing sector. By their teens, most youth were gainfully employed, but they frequently remained at home for a time, contributing income to their families and building resources to enter marriage and form a family.

By contrast, after World War II, with opportunities for good jobs abundant, young Americans transitioned to adult roles quickly. In 1950, fewer than half of all Americans completed high school, much less attended college. Well-paying, often unionized jobs with benefits were widely available to males. The marriage rush and baby boom era at mid-century was stimulated not only by a longing to settle down after the war years but also by generous new government programs to help integrate veterans back into society.

Today young adults take far longer to reach economic and social maturity than their contemporaries did five or six decades ago. In large part, this shift is attributable to the expansion of higher education beginning in the late 1960s. Employers have become

Gordon Berlin is president of MDRC. Frank F. Furstenberg Jr. is the Zellerbach Family Professor of Sociology at the University of Pennsylvania. Mary C. Waters is the M. E. Zukerman Professor of Sociology at Harvard University.

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

increasingly reluctant to hire young people without educational credentials. Failing to complete high school all but relegates individuals to a life of permanent penury; even completing high school is hardly enough to ensure reasonable prospects. Like it or not, at least some postsecondary education is increasingly necessary. In short, education has become an ever more potent source of social stratification, dividing the haves and the have-nots, a theme in this volume to which we will return.

Many observers, especially in the mass media, worry that this new timetable for adulthood has created a growing sense of entitlement and a lingering pattern of dependency.

The boom in higher education is not the only reason why young adults are taking more time to gain independence from their families and establish themselves in adult roles. The schedule for growing up, no doubt, has been affected by the lengthening of the life span over the past century. Most young adults today can expect to live into their late seventies, a decade longer than their counterparts even fifty years ago. It makes sense to continue investing into the third and even fourth decades of life when one can expect to live another fifty years or more.

Cultural changes, such as the post-1960s shift in sexual attitudes and practices, have also slowed what was once a rush into adult roles. Fifty years ago, premarital sex was still highly

stigmatized. Although the stigma did not deter many young couples from breaching the norms, marriage served as a safety net in the event of a premarital pregnancy. Today, most young people expect to have sex before marriage and have the means to prevent unwanted childbearing. Their contraceptive efforts are still imperfect, but the point is that they need not marry to have sex, and they will not necessarily become pregnant when they do.

The past several decades, then, have witnessed a big change in how and when youth take on adult roles—to put it another way, another notable shift in the “normal” pattern of moving from adolescence to adulthood. Although today’s delayed schedule is reminiscent of the pattern a century ago, however, the two are fundamentally different. Today, young people (unless they are the children of recent immigrants) rarely contribute earnings to the household; by and large, they are either fully or partially beholden to their parents for support while they complete their schooling and find a foothold in the labor force. Typically, they defer marriage in favor of cohabitation even when they do leave the natal household.

Although today’s young adults and their parents value independence highly, both tolerate and even endorse a slower schedule for attaining economic and social maturity. In effect, what is becoming normal, if not normative, is that the age of eighteen, or even twenty-one, has lost its significance as a marker of adult status. The transition to adulthood is drawn out over a span of nearly a decade and consists of a series of smaller steps rather than a single swift and coordinated one. Moreover, the social construction of adulthood seems to rely much less on the traditional demographic markers—home

leaving, full-time work, and family formation—and more on personal psychological self-assessments of “maturity.” At any rate, the traditional markers do not any longer stand for attaining adulthood.

Many observers, especially in the mass media, worry that this new timetable for adulthood has created a growing sense of entitlement and a lingering pattern of dependency. Much of the evidence, however, points to a different conclusion: attaining adult roles (as measured by independence from the natal family, union formation, and parenthood) is simply more difficult than it was, especially three or four decades ago. In fact, the vast majority of young adults in their late teens and early twenties are not at leisure—they are working, going to school, or doing both at the same time. Many unemployed and undereducated young people are desperate to work but cannot secure stable employment or make enough money to live on their own. Although they probably do receive support from their families during this period of semi-autonomy, most do not exhibit the signs of entitlement that are frequently ascribed to them.

The nation’s young adults are highly unlikely to return any time soon to the schedule for growing up that was normative among their parents and grandparents. The conditions driving the shift in the schedule are likely to be long-lasting. Policy makers must therefore begin to rethink and renovate the social institutions that were suited to the past, a time when the age of eighteen or twenty-one signified something different than it does today.

Understanding the New Schedule

Concern about the mismatch between the new realities of coming of age and the social institutions that once successfully supported young people moving toward adulthood gave

rise, in 1999, to the MacArthur Network on Adult Transitions and Public Policy. The Network, a team of twelve researchers from diverse social science disciplines, began its work by assessing the demographic, economic, sociological, and psychological evidence on adult transitions to learn what had changed and why. In a series of recent publications, the Network has documented that the changes in the timing, sequencing, and even attainment of adult roles have indeed been substantial and that they are affecting young adults in varying socioeconomic circumstances quite differently.² Drawing on both quantitative and qualitative data in the initial phase of its work, the Network reported that young adults between the ages of eighteen and thirty-four are employing some familiar and some different strategies than those that their parents and grandparents used to make a successful transition to adult work and family roles. In particular, young adults and their families are much more skeptical about the wisdom of early transitions to work and marriage, even taking into account geographical, religious, and socioeconomic differences. The Network also discovered that gender differences in the timing of adult transitions had virtually disappeared.³ By contrast, differences by social class have, if anything, become more pronounced.

These changes coincided with and were reinforced by a wave of immigration during the 1980s that attracted many young adult immigrants as well as immigrant families to the United States. These immigrants have imported traditional family practices while simultaneously demonstrating a high level of adaptation to American ways. First-generation immigrants often arrive as young adults—the peak age period for immigration. Socialized in their sending society, they enter the United States seeking work and are often cut

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

off from their parents and extended family. They achieve independence very young and are more likely to be in the labor force than native-born Americans of the same age and educational background. Second-generation immigrants—native-born children of immigrants—are more likely to live at home as young adults than are comparable natives, and they achieve higher levels of education than natives of similar socioeconomic backgrounds. As a result they have more extended transitions to adulthood than both their parents and comparable native-born Americans.

Network researchers then turned to the challenging task of examining some of the institutions that house and serve young adults—the family, higher education, the workplace, the community, and, for a group of especially vulnerable youth, the juvenile justice, foster care, and related systems. The aim of the second phase of the research program was to assess the ability of each of these institutions to support young adults in their quest for economic independence, intimacy, and civic responsibility—goals widely shared among both young adults and their parents. This volume of *The Future of Children* provides a summary of research findings to date and suggests policy steps that could make these institutions more effective.

How Well Do Traditional Supports Work?

One important if not unexpected finding of the Network was that existing institutions work much better for affluent young adults than they do for most others. Family resources and the opportunities they afford have become more central to educational attainment. And, with educational attainment an increasingly potent predictor of economic success and stable family life, growing levels of inequality have created an ever larger

chasm between the affluent third (roughly corresponding to college graduates) and the rest of the population. The economic burden on families, particularly those in the bottom two-thirds of the income distribution, has been growing far more rapidly than their capacity to undertake a longer and more expensive period of investment in their children's futures. Increasingly, parents are being asked to take on the costs of education, health care, and, often, support of children in their early twenties (and often later).

Although parents of all social strata seem to understand and accept the new schedule for growing up, middle- and lower-income parents are ill-equipped to handle the costs entailed, and the result is a sharply tilted playing field for young adult development. The new demands of supporting young adults for longer periods create impossible burdens for lower-income households and pose serious problems for all parents who must balance the need to make increased financial (and emotional) investments in their adult children against the need to ensure their own retirements. This privatized approach to investment in the nation's young is quite different from the accepted public approach to education for children below the age of eighteen.

Health care represents a glaring example of how the nation's public arrangements simply do not work for young adults who follow the new schedule for coming of age. Today's health care system more or less protects low-income children up to age eighteen, or in some instances twenty-one, but it does nothing for older youth who lack work-based or school-based health insurance. All but the most affluent parents are frustrated in their efforts to fill the health insurance gap. The pending health care bill, if passed by

Congress and signed by the president, will go a long way toward correcting the problem.

The new public-private approach to supporting higher education is equally problematic. Parents of modest means are hard-pressed to help their children obtain a college education. Although, as described in several articles in this volume, the nation makes both grants and loans available to low-income students, the process for applying for that money—and for finding out how large the grant or loan would be—is complex, intimidating, and cumbersome. As a result, many low-income students simply do not apply. Others end up borrowing and eventually owe considerable amounts of money or try to put themselves through school by working. These two options may not represent a problem for low- and moderate-income families whose children are well-prepared for college. But many youth from these families grow up in areas with poorly functioning school systems and are ill-prepared to make the transition to college. Without adequate economic and social support, they may flounder in the transition to college, creating a nightmare scenario where they fail to get a degree that enables them to repay their educational debts. Although the educational burdens on upper-income families are considerable, these parents are better equipped to help meet the costs of higher education, and their children are better prepared to succeed in college. Here too recent efforts to amend the student financial aid system and to increase Pell Grants and other sources of support could help to address these challenges for low- and moderate-income families.

Once students arrive at college, they tend to receive strikingly different levels of support depending on their economic background. Most four-year residential institutions, which

are largely populated by relatively affluent youth, are extremely well-suited to assist young adults in transition. They provide orientations for incoming students and their families, an array of services and counseling should students encounter problems, mentoring delivered by older students, recreational and extracurricular programs, health and mental health services, and, of course, residences. Students who get off track receive academic and emotional guidance. Many of these colleges and universities even offer career counseling and job placement for graduates. Furthermore, these institutions are conveniently linked to postgraduate education programs that are, generally speaking, similarly well-designed for youth in their mid- and late-twenties.

By contrast, the two-year community colleges that less affluent students are likely to attend are typically bare-bones institutions stretched thin by a myriad of demands and insufficient resources. Although potentially useful portals of entry for students hoping to move on to a four-year college, a skilled job, or a semi-profession that requires an associate's degree or a licensing exam, many two-year colleges lack the most basic amenities offered by a four-year residential college or even a four-year commuter school. Campus life is frequently limited, and the services afforded are meager or nonexistent. Students, often unprepared and overcommitted by outside obligations, pose serious challenges to the sometimes underpaid, overburdened faculty and administrators. Rather than serving as beacons of opportunity, too many of these two-year colleges are revolving doors through which students wander aimlessly in search of future direction. Indeed, research supported by the U.S. Department of Education shows that close to half of students who enter a community college do not earn a degree and

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

are not enrolled in any other postsecondary institution six years later.

In collaboration with MDRC, Network researchers undertook an assessment of how community colleges could realize their mission of providing academic training to allow students to get a degree or secure a job that might be otherwise unattainable without special training. Analysts examined several programs aimed at improving student outcomes, including changes in instructional practices, enhancements to student services, and increases in financial support. Although not all the programs were successful, some led to significant improvements in students' academic performance and persistence. The findings, as presented in the article in this volume by Thomas Brock, suggest that policy makers and educators need not accept high dropout rates as a given. Rather, by making changes in institutional practices—including new forms of flexible financial aid that incentivize and reward students who get good grades and complete courses, as well as innovative “learning community” programs that integrate courses and create study peer groups—they can boost the odds that more young people will earn college degrees and succeed in the labor market.

During the middle decades of the twentieth century and extending through the Vietnam War, military service represented an attractive possibility for youth who were not college bound. It provided, as Ryan Keltz, Meredith Kleykamp, and David R. Segal report in their article in this volume, an effective bridge from high school to work for a large number of young men who lacked vocational direction. Although the military continues today to provide a supportive environment for men and women who want to serve their country, leave home, and get training, it is increasingly

meant to provide a military career rather than a transition to the civilian labor market. Smaller and more select than the draft-era military, today's military is disinclined to afford training to youth who may exhibit educational deficits. Other youth-oriented institutions could learn much from the way the military trains and supports young adults, but the military itself is no longer a significant remedial institution for poorly functioning young adults.

Countless studies have assessed and evaluated the effect of service corps of various types. One rigorous study concluded that they can and often do play a useful role.

From the Depression-era's Civilian Conservation Corps, to the Great Society's Peace Corps and VISTA, to the 1980s state and urban conservation corps, and to the 1990s Corporation for National and Community Service and its dramatic expansion in the Edward M. Kennedy Serve America Act of 2009, policy makers have experimented episodically with institutions that serve the community while providing training and experience for young people who are unemployable or who simply want to gain skills, serve the community, or move on to independent living. Countless studies have assessed and evaluated the effect of service corps of various types. One rigorous study concluded that they can and often do play a useful role in providing time and space for young people to gain experience, acquire useful work skills and direction, and build a sense

of commitment to the larger community. If such results can be extended and built on by the Serve America Act, community service programs could begin to reach the scale needed to provide a new “institution” to help meet the needs of youth making the extended transition to adulthood.

Often coming as a year-long experience between high school and college or work, or as a year off during or after college, youth service programs could be a valuable bridging program with double social utility. Through these programs, young people do important work in their local communities—in hospitals, schools, and other public and nonprofit settings—and gain many experiences needed to make a successful transition to adulthood. In the long-standing debate about the pros and cons of mandatory national service for all, the passage of the Serve America Act may signal a commitment to build a voluntary, as opposed to a mandatory, system of opportunities for a diverse group of young people. This signal notwithstanding, unless concrete steps are taken to build the capacity of service models that work, to collect evidence of their ongoing effectiveness, and to build a record of their accomplishments—much as the WPA’s accomplishments were documented and remain for all to see in the nation’s parks and other structures—history suggests that expansion could be followed by contraction. After all, it was only a few short years ago that the Corporation for National and Community Service survived a near-death experience in Congress. But this time, getting it right may matter more than it has in the past, given the dearth of institutions to help meet the demands of a lengthened transition to adulthood.

Some proportion of young adults—those exiting foster care; youth in special education or with physical, emotional, or cognitive

limitations; the homeless; and the many exiting jail or prison—are at much higher risk in the transition to adulthood. Because these populations often overlap, however, it is hard to estimate their number precisely. Most experts believe that the share of youth who are at risk of encountering serious problems is significant. The vast majority come from poor and near-poor families that are disproportionately African American and Latino.

Much of the Network’s attention has been focused on the very expensive systems that serve these vulnerable populations as children—foster care, juvenile justice, special education, and social security disability. No easy or cost-free solutions are available to help these youth improve their prospects as young adults. Early detection of youths with problems, better schooling, and better alternatives to foster care and incarceration could reduce the share that enters early adulthood without the requisite skills to take advantage of educational opportunities and eventually find good jobs. But even with the best schooling and most effective preventive and ameliorative services, another challenge would be how to integrate the diverse systems that serve vulnerable youth. In addition, these youth often lack the family supports that other young people have as they age into young adulthood. The failure of existing institutions to adapt to current realities and the dearth of new institutions to serve young people without family supports are huge problems, as many of these young adults at risk will face lifelong problems that must be paid for one way or another.

The Changing Nature of Young Adulthood

The premise of this issue of *The Future of Children* is that the nation’s public policy and its social institutions fail to reflect the realities

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

of the new transition to adulthood—and thus do not adequately serve the needs of young adults. Although each article in the volume opens with a full summary, in this section we briefly highlight some of the findings we think are the most important.

Overview

Richard Settersten of Oregon State University and Barbara Ray of Hired Pen, inc., open the issue by surveying the changes that have taken place over the past few decades in the timing and sequencing of young adulthood. They describe the later age at marriage, the rise in the number of young people living at home with their parents into their twenties, and the longer period of time young people are staying in school. They stress that these changes create strains not only on the families of young adults but also on the institutions—colleges and universities, the military, youth service organizations, and the work setting—that have traditionally supported them. Noting that these institutions are not designed for this new pattern of life choices, Settersten and Ray raise the question of whether the risks and costs newly associated with the early adult years should be borne privately by families or publicly by government. They also point out that despite the problems it creates, the lengthening transition to adulthood creates opportunities for some young people, especially those from more affluent backgrounds, to explore careers and lifestyles before settling into traditional adult roles.

Immigration

One of the most notable changes in American young adulthood is a demographic one. Young adults today are remarkably ethnically and racially diverse, owing in no small part to the enormous volume of immigration during the past four decades that has swelled the

ranks of first- and second-generation immigrants and children of immigrants. Rubén Rumbaut and Golnaz Komaie of the University of California–Irvine document these demographic changes and explore the ways in which generation and national origin shape the experience of young adulthood. The first generation of immigrants, having arrived in this country as young adults themselves, are the least likely of all young adults in the United States aged eighteen to thirty-four to live in their parents' households. They are also the least likely to be attending school, but the most likely to be working full time, to be married, and to have children. By contrast, the second generation is the most likely to live in the natal household and to be attending school between eighteen and thirty-four; they are by far the least likely to be married and to have children. In addition to these vast differences between the generations, immigrant groups also experience gaps in social, economic, and legal status that are even greater than the gaps between native whites and blacks. Sizable segments of immigrant youth, especially the undocumented and the less-educated poor, face structural barriers in their transitions to adulthood, and the authors discuss possible policy options to deal with those barriers.

Family Changes

Frank Furstenberg of the University of Pennsylvania surveys the important family changes that characterize the transition to adulthood. He notes that both patterns of family formation and the shape of the family have changed often in American history and that the period often used as a benchmark for measuring family change—that immediately after World War II—was in reality an anomaly in the long sweep of family history, notable for its very early pattern of attaining such markers of adulthood as employment, marriage, and

childbearing. It should therefore come as no surprise that U.S. family formation patterns today differ dramatically from those of fifty years ago. Young adults are on average marrying later, and a substantial fraction, not at all. Cohabitation has become increasingly acceptable as an alternative to marriage, and the average age of childbearing has risen. Furstenberg documents two major trends in these family formation patterns. First, gender equality has increased, with men and women growing more alike in the age at which they leave home, marry, and have children. And, second, class inequality has grown substantially, with lower-income young people less likely to follow an orderly and predictable sequence of education, full-time employment, home-leaving, marriage, and parenthood. Higher-income young adults are more likely to follow the traditional sequence, but they take longer to complete it and often must go through an extended period of financial dependence on parents while they complete their education. The share of young adults residing with parents has risen since the 1960s, when adult transitions started at an earlier age. Furstenberg argues that the popular media often portray these changes as objectionable for parents and young adult children, but the few studies to examine this question find that parents and young adults accommodate well to the new schedule.

As a result of delays in establishing themselves financially, young people tend to depend longer on their families of origin. Although all industrialized countries have experienced this same pattern, the U.S. welfare state is relatively undeveloped, meaning that the burden of supporting young adults falls more heavily on American families. Furstenberg calls for further research on how families are managing these new demands and warns that the need for active parenting

extending into their children's twenties and even thirties may discourage people from becoming parents in the first place, leading to a trend toward lower fertility, especially among more affluent families.

Second Chances for High School Dropouts

The American labor market has little to offer workers who do not complete high school, and at least some college is increasingly required to attain a well-paying job. Yet somewhere between 9 and 16 percent of young people aged sixteen to twenty-four have not completed high school. Over the past several decades a variety of "second-chance" programs have been developed to help dropouts finish high school or obtain a General Educational Development (GED) credential and get a foothold in the labor market. Dan Bloom of MDRC reviews the types of programs available, as well as their efficacy, and then considers their implications for the transition to adulthood. Although he notes that it is difficult to prove that the collapse of the job market for high school dropouts over the past several decades caused the steep decline in the share of dropouts who marry—from 68 percent of men aged twenty-two to thirty-two in 1970 to only 26 percent in 2007—the two trends certainly reflect each other. Bloom surveys eleven major programs intended for young dropouts, dividing them into three categories—work programs, training and education programs, and mandatory, welfare-based programs for teen mothers. All have been evaluated using rigorous random-assignment techniques. Though the evaluation findings are mixed, they show at least short-term modest effects for many of the programs. Bloom also cites descriptive studies showing that young people who obtain a GED tend to do relatively poorly in the labor market, in part because they are much less

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

likely to pursue postsecondary education than those who get a high school degree. Based on these findings, Bloom proposes three focuses for future research and policy: strengthening programs for youth who voluntarily seek to continue their education or find jobs, including building tighter links between GED preparation programs and postsecondary occupational certificate programs; identifying strategies to engage disconnected youth who are unlikely to volunteer for programs such as the Job Corps; and analyzing local systems to support disconnected youth.

Improving Higher Education Outcomes

Even though the value of a college education has increased markedly over the past forty years, with college graduates earning 1.8 times as much as high school graduates, college graduation rates have not improved in decades, largely because students' rates of persistence to a degree have not improved. The five-year college graduation rate is 60 percent at four-year colleges, but only 32 percent at community colleges. The low community college graduation rate is a growing concern, because more than a third of all college students attend two-year colleges. Meanwhile, access to college has improved substantially, with the share of women on campus catching up to and surpassing that of men and the share of nonwhite college students doubling in the past two decades.

Thomas Brock of MDRC outlines these trends in college attendance and persistence and reviews the research on interventions aimed at improving college outcomes for young adults. The changing nature of young adulthood, with more youth combining work, school, and parenthood, results in a diverse college student population—one that is older, more part time, and more likely to attend episodically than has been conventional until

recently. Indeed, Brock reports that only 27 percent of current undergraduates are “traditional students” who attend full time immediately following high school and who rely on parents for financial support. Of all undergraduates in 1999–2000, 28 percent were highly nontraditional—in their twenties or older, combining work with school, and raising children. And nontraditional students are much less likely than traditional students to persist to a degree. Brock surveys a number of interventions that have been evaluated by rigorous random-assignment design. Among the more promising interventions are remedial education courses that foster more student engagement and belonging on campus, enhanced student services such as counseling and support, and performance-based scholarships that tie financial incentives to successful course completion. Brock concludes that many of the interventions show modest positive effects and that performance-based scholarships show pronounced positive effects. Although many people believe that making federal financial aid more effective will also increase persistence, surprisingly little systematic research has addressed that question. One clear finding is that simplifying the application form for federal financial aid (FAFSA) has a substantial payoff in increasing college enrollment.

The Labor Market

One of the key markers of the transition to adulthood, and arguably one necessary for success, is finding stable and well-paying employment. Dramatic changes in the labor market in recent decades, however, have complicated young people's prospects of finding such employment. In their survey of the labor market and the transition to adulthood, Sheldon Danziger and David Ratner of the University of Michigan contend that young people now must struggle to attain

financial independence—a development with implications in other areas. Although it cannot be proved, for example, that the delay in achieving financial independence has caused delays in leaving home and in marrying, these trends are correlated.

Even though the value of a college education has increased markedly over the past forty years, college graduation rates have not improved in decades, largely because students' rates of persistence to a degree have not improved.

Danziger and Ratner stress that gender plays an important part in the story of the labor market. The prospects of young men, especially less-educated young men, have declined precipitously, while more young women are working and their earnings have increased relative both to inflation and to the earnings of young men. The median annual earnings (in constant 2007 dollars) of men between the ages of twenty-five and thirty-four who worked at some time during the year fell 21 percent between 1973 and 2007, whereas the median earnings of women rose 62 percent. Job turnover—what economists call “churning”—has also increased dramatically. The fraction of individuals in jobs lasting less than one year has risen faster for younger than for older workers. The share of workers in longer-term jobs declined precipitously for men, while

holding steady for women. Employment for men with the least education also fell during the past few decades, with the sharpest declines for African American men with less than a high school education. Because of the increasing labor market returns to education and the importance of postsecondary education for employment, Danziger and Ratner recommend programs that increase educational attainment, including early childhood education and second-chance programs such as those described by Dan Bloom. They also support raising the minimum wage and expanding the earned income tax credit (EITC), both of which could raise the incomes of workers at the lower end of the distribution.

Civic Participation

In their article on civic participation, Constance Flanagan of Penn State University and Peter Levine of Tufts University reinforce a theme running throughout the volume—the ways in which class, race, and immigrant status shape very different patterns in young adulthood. They find that more affluent young people are more likely to be civically engaged than the less affluent, both in terms of political activity such as voting and in terms of volunteering. This civic divide is a consequence both of cumulative disadvantage in the pre-adult years and of a dearth of institutional opportunities for young adults who are not in college. The authors argue that young adulthood is a critical period for forming political beliefs and behaviors, and they trace the ways in which an elongated transition to adulthood might provide opportunities for increased civic engagement among young people. They also trace generational differences in political attitudes and behaviors and suggest that young people in more recent cohorts may be shifting to more active engagement.

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

The Military

Although only a small fraction of U.S. young adults serve in the nation's all-volunteer military, young adults are very much the focus of the military, because the majority of military personnel fall into this age group. In their article on young adulthood and the military, Ryan Kelty of Washington College, Meredith Kleykamp of the University of Kansas, and David R. Segal of the University of Maryland explain that in periods of mass conscription, such as during World War II, the military is for most people a hiatus between adolescence and adulthood. By contrast, today's all-volunteer military is more likely to be a period of active transition into young adulthood and, often, into a career in the military.

The military's new, more career-oriented system has led it to implement a number of policies to cope with the family needs of young adults. Indeed Kelty, Kleykamp, and Segal document the ample material support the military provides to young adults—reasonable wages, generous in-kind transfers, free medical care, housing, educational benefits, and training designed to promote responsible membership in intimate relationships and the wider community. As a result, the pattern of family formation in the military is earlier and more stable than it is among civilians of the same age. The majority of enlisted personnel are parents, and the racial differences in family formation that exist among civilians do not characterize the military. No black-white gap in marriage exists among military personnel. The transition to adulthood, including economic independence from parents, is thus much more stable and orderly for military personnel.

Kelty, Kleykamp, and Segal note that much about what the military does cannot easily be replicated in the wider society. As an

institution, the military has unique control over young adult behavior through its code of conduct. It also restricts who can enlist, barring openly homosexual personnel, restricting the occupations available to women within the military, drawing recruits who have high school diplomas, and refusing to enlist high school dropouts or people with criminal records. The authors also note that the military in a time of war holds dangers for young adults, most especially in the long-run effects of injuries, both psychological and physical, from the war and the long-run effects of the physical and symbolic violence women experience in a male-dominated institution.

Justice System and Social Services

All the articles in this volume stress the varying needs of young adults and the ways in which young people with fewer financial resources, less education, and less support from their families of origin have a harder time than their more affluent peers in making a successful transition to independent adulthood. The point holds particularly true in the case of vulnerable youth—defined by D. Wayne Osgood and E. Michael Foster of Penn State University and Mark E. Courtney of the University of Washington as those involved in the social service, health, and justice systems in childhood and adolescence. The authors survey the special challenges faced by youth involved in the mental health system, the foster care system, the juvenile justice system, the criminal justice system, special education, and the health care system, as well as runaway and homeless youth. Although noting that these populations overlap and that many young people need services from multiple systems, Osgood, Foster, and Courtney show that the categorical ways in which state and federal funding for these systems are designed often keep

these issues compartmentalized and prevent service providers from seeing or helping the whole person. The authors explain that at age eighteen or twenty-one, young people age out of more supportive and inclusive systems designed for children to either no services or services with less support designed for adults. Many of these systems still function as if youth become independent adults overnight, and they are at odds with the longer period of semi-autonomy that characterizes young adulthood today. The authors point to the poor outcomes among these vulnerable youth and stress the need to redesign targeted services for them. They also argue that universal programs for all young adults would greatly benefit vulnerable populations. Finally, they highlight recent promising policy developments such as the 2008 Fostering Connections Act, which extends government responsibility for youth in foster care from age eighteen to age twenty-one, and the Shared Youth Vision Initiative, designed to improve and coordinate systems that serve vulnerable youth as they transition to adulthood.

Key Policy Issues

The Network's research has revealed three urgent policy issues. The first is the twin problem of access and persistence in higher education, especially at the nation's community colleges. In response to findings from research, some of it supported by this Network, federal policy makers are moving rapidly and forcefully to strengthen these critical institutions that bridge the gap between a generation ill-prepared for college-level work and a labor market that is demanding ever more complex skills.

The second pressing need is to design and implement effective new programs to identify and prepare at-risk youth for the transition.

Such programs, for example, would help young people to complete their secondary education so that they are better prepared to take the next step, whether directly into the labor force, into military service or alternative forms of service, or into higher education. Although the Network's focus was on the period of adult transitions (age eighteen to thirty-four), one signal research effort was an evaluation of ChalleNGe, a unique program developed by the National Guard to provide an alternative for high school dropouts between the ages of sixteen and eighteen. The program intervenes early to help these young people complete high school or obtain a GED during a five-month military-academy style residential program that emphasizes schooling, service, leadership, and healthy living among other skills needed in adulthood. After youth complete the residential portion of the program, trained mentors work with them in their own communities over the next twelve months to effectuate a successful transition to postsecondary education, work, or military service. As the articles in this volume by Dan Bloom and by Sheldon Danziger and David Ratner demonstrate, the consequences of school dropout are devastating to the long-term transition to adulthood. Early evaluation results from a randomized controlled trial of the ChalleNGe program present encouraging evidence that the program could offer valuable lessons for tackling this difficult set of problems.

The third policy priority is diagnosing and attending to the problems of especially vulnerable youth and the systems that serve them, like foster care and juvenile justice, and rethinking how the nation might build a better integrated system of care. The list of systemic issues is long. One key problem is the failure to coordinate among systems that often define their jurisdiction narrowly,

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

especially when young people are known to more than one system and when needs overlap. Another is conflicting missions and funding sources. Yet another is the age at which services end—a crucial issue at a time of lengthening transitions to adulthood. Although families with means are extending help to their children well into their twenties and beyond, the special education, foster care, juvenile justice after-care, and related systems end service eligibility abruptly, often at age eighteen and only rarely much past age twenty-one. Promising strategies would reward collaboration and coordination, extend the reach of these systems well into adulthood, strengthen existing services and develop new ones to meet the special developmental needs of vulnerable youth at this stage of life, and better integrate services with those from more mainstream systems. Examples include building links to programs like ChalleNGe for foster care youth who drop out of school or facilitating access to community colleges and four-year colleges when skills permit. Here too, policy makers are beginning to recognize the need for change—witness the passage in 2008 of federal legislation extending services in the foster care system from age eighteen to twenty-one. Other efforts to coordinate these systems at the federal level are also under way. But more remains to be done. One way to stimulate change would be to free a few willing states from federally imposed categorical restrictions and ask them to experiment with integrated systems of care geared to making mainstream links and providing supports that extend into adulthood.

In sum, when the Research Network on Transitions to Adulthood and Public Policy began its work more than a decade ago, the lengthening of the transition and the concept of early adulthood as a distinct stage in

human development were only dimly perceived. As a result, the real and tangled implications of young people taking a decade or more after leaving high school to attain the markers commonly associated with adulthood—full-time work, an independent household, a stable relationship with a significant other in marriage or cohabitation, child-rearing, civic engagement, and, increasingly in the twenty-first century, at least some postsecondary education or training—were only poorly understood.

Research uncovered several important consequences of the extended transition. The first was the growing burden placed on the middle- and lower-income families who were providing their children with schooling, housing, health insurance, and income well beyond the age range of eighteen to twenty-one, the traditional age of majority. Instead of saving for retirement, or meeting their own needs, parents found themselves continuing to invest in their children's future. The second consequence was the unexpected strain being imposed on key social institutions. Many young adults found themselves without health insurance and with few viable options to obtain it. Colleges often labeled students who came back to school later in life as “nontraditional,” when in fact taking time off to work, see the world, or volunteer was increasingly the norm and not the exception for young adults. And the academic, financial, social, and emotional needs of this new breed of students differed from those of fresh-out-of-high-school students. Third, few new institutional options were available to promote development at this stage of life. Youth corps and other volunteer programs existed, but the total number of slots available was generally small. Possibly most consequential of all, children in the care of the state—foster care, special education, the juvenile justice

system—had been particularly hard hit by the new transition. These social systems continued to end their support abruptly at age eighteen, even while low- and middle-income families were increasingly stepping in to help their more advantaged young adult children weather a longer transition. In effect, the most disadvantaged—those least able to adapt and most in need of transitional help well into adulthood—had been left “on their own without a net.”

A decade later, as the articles in this volume testify, recognition and change are in the air. While families still bear the brunt of the burden and institutions have not completely made the transition, policy and practice are now both astir. Out of necessity, to attract and hold a volunteer army, the military has made a number of changes to encourage and support the transition to adulthood—paying for higher education, offering more attractive pay, and providing better housing, supports, and work hours for married couples. For vulnerable youth, the Fostering Connections to Success and Increasing Adoptions Act of 2008 extends the definition of a “child” up to age twenty-one and offers federal matching funds to states that opt to allow young people to remain in foster care past age eighteen. It also encourages states to provide that support in more constructive ways that facilitate mastery of the skills needed to become productive adults and lead independent lives. Similarly, the Edward M. Kennedy Serve America Act of 2009, as noted, expands and extends the work of the Corporation for National and Community Service. It more than triples (from 75,000 today to 250,000 by

2017) the number of positions available each year for young people to engage in service learning opportunities in education, health, clean energy, economic opportunity, and other national priorities, thus providing a new rite of passage to adulthood in the way that military service did during the draft era. In the health care area, sweeping new legislation would offer health insurance options for all Americans, including young adults who have not yet connected with employer-based health insurance and who are not covered by college-based plans. Change is stirring in higher education as well. The Obama administration has proposed a bold, potentially transformative set of reforms and expansions in student grant and loan programs including significant increases in Pell Grant amounts, a \$12 billion investment in community college facilities, accountability measures, instructional innovation, and programs—investments that would help these strategically placed institutions meet the needs of a twenty-first century student body.

Taken as a whole, these developments signal an unusually bold set of initiatives and, most important, resources that would significantly help to relieve parental burden and drive key institutions to adapt to the changing needs of young adults in transition. But as is the case for all policy changes, the devil will be in the details of on-the-ground practice. The articles in this volume provide a blueprint for harnessing resources to need and policy to practice that could help to put derailed young people back on the pathway to adulthood in the twenty-first century.

Gordon Berlin, Frank F. Furstenberg Jr., and Mary C. Waters

Endnotes

1. William S. Aquilino, "Two Views of One Relationship: Comparing Parents' and Young Adult Children's Reports of the Quality of Intergenerational Relations," *Journal of Marriage and the Family* 61 (1999): 858–70; Frances K. Goldscheider and Calvin Goldscheider, "The Effects of Childhood Family Structure on Leaving and Returning Home," *Journal of Marriage and the Family* 60 (1998):745–56; Frances K. Goldscheider and Linda J. Waite, *New Families? No Families? The Transformation of the American Home* (University of California Press, 1991); Michael J. Rosenfeld, *The Age of Independence: Interracial Unions, Same-Sex Unions, and the Changing American Family* (Harvard University Press, 2007); Michael Shanahan, "Pathways to Adulthood in Changing Societies: Variability and Mechanisms in Life Course Perspective," *Annual Review of Sociology* 26 (2000): 667–92.
2. MacArthur Foundation Research Network on Transitions to Adulthood, www.transad.pop.upenn.edu.
3. Richard A. Settersten, Frank F. Furstenberg Jr., and Rubén G. Rumbaut, eds., *On the Frontier of Adulthood: Theory, Research, and Public Policy* (University of Chicago Press, 2005).

EXHIBIT 48

[Home](#)[News](#)[Sport](#)[Reel](#)[Worklife](#)[Travel](#)[Future](#)[M](#)

Magazine

Is 25 the new cut-off point for adulthood?

By Lucy Wallis

BBC News

23 September 2013



New guidance for psychologists will acknowledge that adolescence now effectively runs up until the age of 25 for the purposes of treating young people. So is this the new cut-off point for adulthood?

"The idea that suddenly at 18 you're an adult just doesn't quite ring true," says child psychologist Laverne Antrobus, who works at London's Tavistock Clinic.

"My experience of young people is that they still need quite a considerable amount of support and help beyond that age."

Child psychologists are being given a new directive which is that the age range they work with is increasing from 0-18 to 0-25.

"We are becoming much more aware and appreciating development beyond [the age of 18] and I think it's a really good initiative," says Antrobus, who believes we often rush through

childhood, wanting our youngsters to achieve key milestones very quickly.

The new guidance is to help ensure that when young people reach the age of 18 they do not fall through the gaps in the health and education system. The change follows developments in our understanding of emotional maturity, hormonal development and particularly brain activity.

"Neuroscience has made these massive advances where we now don't think that things just stop at a certain age, that actually there's evidence of brain development well into early twenties and that actually the time at which things stop is much later than we first thought," says Antrobus.

There are three stages of adolescence - early adolescence from 12-14 years, middle adolescence from 15-17 years and late adolescence from 18 years and over.

Neuroscience has shown that a young person's cognitive development continues into this later stage and that their emotional maturity, self-image and judgement will be affected until the prefrontal cortex of the brain has fully developed.

Alongside brain development, hormonal activity is also continuing well into the early twenties says Antrobus.

"A number of children and young people I encounter between the age of 16 and 18, the flurry of hormonal activity in them is so great that to imagine that's going to settle down by the time they get to 18 really is a misconception," says Antrobus.

She says that some adolescents may want to stay longer with their families because they need more support during these formative years and that it is important for parents to realise that all young people do not develop at the same pace.

But is there any danger we could be breeding a nation of young people reluctant to leave adolescence behind?

TV sitcoms are littered with such comic stereotypes of juvenile adults, such as Smithy from Gavin and Stacey or Private Pike in Dad's Army.

Then there are those characters who want to break away from their overbearing or protective parents or guardians and reach adulthood, but struggle to cut the family ties.

Frank Furedi, professor of sociology at the University of Kent, says we have infantilised young people and this has led to a growing number of young men and women in their late 20s still living at home.

"Often it's claimed it's for economic reasons, but actually it's not really for that," says Furedi. "There is a loss of the aspiration for independence and striking out on your own. When I went to university it would have been a social death to have been seen with your parents, whereas now it's the norm.



"So you have this kind of cultural shift which basically means that adolescence extends into your late twenties and that can hamper you in all kinds of ways, and I think what psychology does is it inadvertently reinforces that kind of passivity and powerlessness and immaturity and normalises that."

Furedi says that this infantilised culture has intensified a sense of "passive dependence" which can lead to difficulties in conducting mature adult relationships. There's evidence of this

culture even in our viewing preferences.

"There's an increasing number of adults who are watching children's movies in the cinema," says Furedi. "If you look at children's TV channels in America, 25% of the viewers are adults rather than children."

He does not agree that the modern world is far more difficult for young people to navigate.

"I think that what it is, is not that the world has become crueller, it's just that we hold our children back from a very early age. When they're 11, 12, 13 we don't let them out on their own. When they're 14, 15, we hover all over them and insulate them from real-life experience. We treat university students the way we used to treat school pupils, so I think it's that type of cumulative effect of infantilisation which is responsible for this."

But should parents really be encouraging adolescents to make their own way in the world more? The TV series *Girls* - with central character Hannah Horvath struggling with adulthood - has captured the zeitgeist. Hannah's parents have cut her off financially and she has to live away and navigate her 20s making her own mistakes.



One of the traditional rites of passage for adulthood was always leaving home, but TV property expert Sarah Beeny says that adolescents do not have to move out of the parental house in order to learn how to be independent and there are huge advantages to multi-generational living.

"The solution to not having useless 25 [and] 30-year-olds living at home is not sending them out of the home, it's making them do their own washing, pay their own way, pay towards the rent, pay towards the bills, to take responsibility for cleaning up their bedroom and not waiting on them hand and foot," says Beeny.

She says that parents should play a part in teaching adolescents key skills and that young people in return can keep their parents current.

"I know it sounds like a utopian dream but it's probably where we should be aiming. To me that's the holy grail... not everybody living in their own individual pods by themselves thinking, brilliant I'm paying a mortgage."

The idea of parental responsibility to adolescents should also extend to another external symbol of maturity says motoring expert Quentin Willson - the car. He says it has become a "talisman" for young people to feel more mature.

Willson says statistics show that at the age of 18 the vast majority of accidents caused by young drivers are down to bad judgement and decision making, and that behind the wheel "adult maturity isn't fully formed until you get past 25 for most cases of people".

But rather than raise the minimum age for driving, Willson believes parents and teachers should impart safe driving skills before the effects of adolescence really kick in.

"If you teach these children when their mindsets are pure and before they've been corrupted by things like Grand Theft Auto 5 and Top Gear and all these corrosive social pressures, then you get the road safety message in much earlier," says Willson.

"The government should look at this very carefully and put driving on the GCSE syllabus. So you teach kids to drive in terms of theory at school and all the right messages at 13, 14, 15, because when you get to 17 the testosterone is raging, all those corrosive influences are embedded."

With such racing hormonal activity and adolescence taking much longer than we previously thought, how will we know when we actually do reach adulthood?

For Antrobus it is when independence "feels like something that you both want and can acquire".

But for the eternal adolescents among us, perhaps Beeny's definition is apt.

"For me adulthood is realising that there are no grown-ups and everyone else is winging it," says Beeny.

What was the moment when you realised you had become an adult? How old were you? Comment on [Facebook](#) or [Twitter](#) with the hashtag #adulthood.

Share this story About sharing

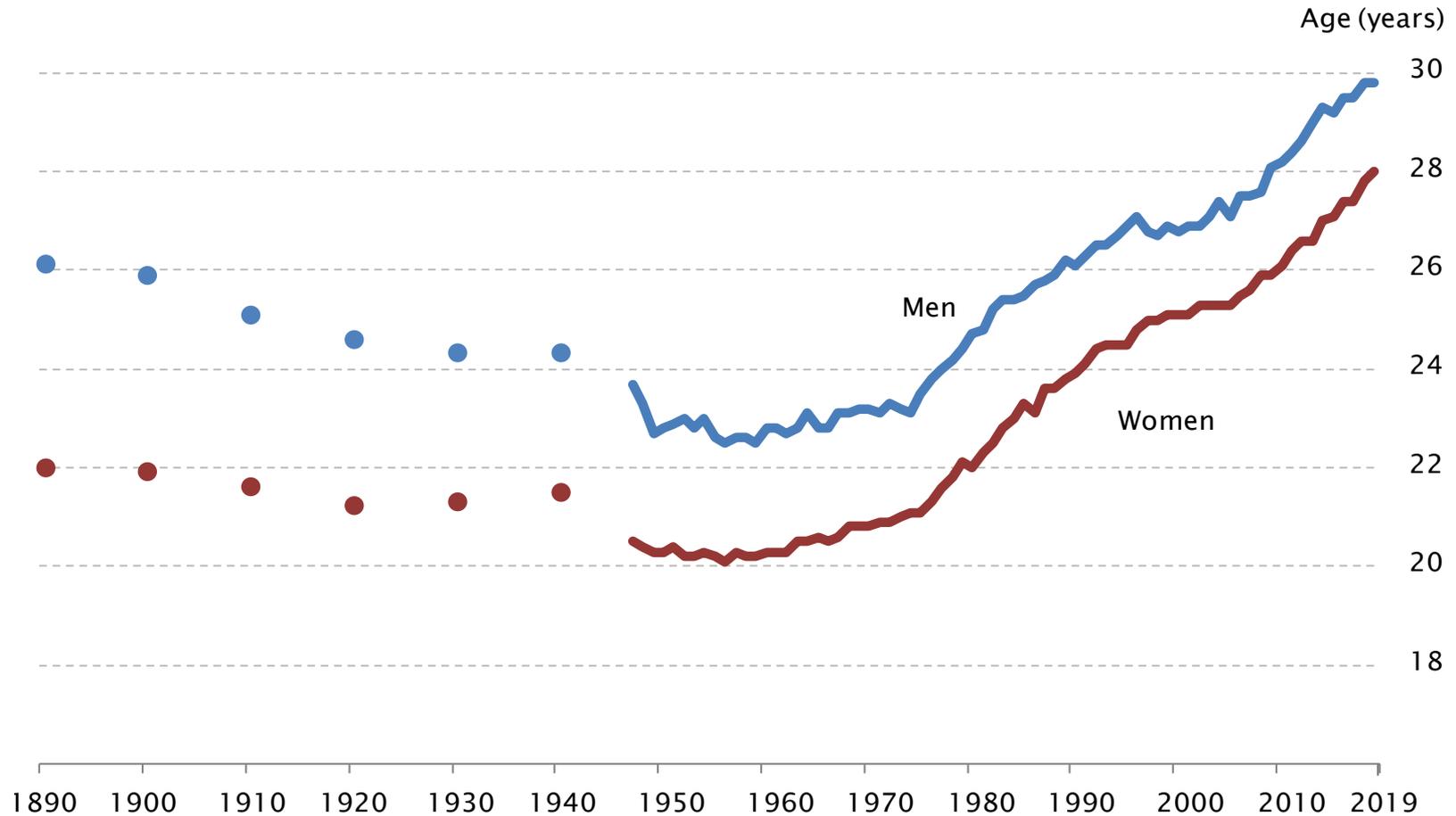
In today's Magazine

Two close friends who have every reason to hate each other

24 December 2019

EXHIBIT 4;

Figure MS-2 Median age at first marriage: 1890 to present



Source: U.S. Census Bureau, Decennial Censuses, 1890 to 1940, and Current Population Survey, Annual Social and Economic Supplements, 1947 to 2019.

Note: Starting in 2019, estimates for marriages now include same-sex married couples.

EXHIBIT 50

National Vital Statistics Reports



Volume 51, Number 1

December 11, 2002

Mean Age of Mother, 1970–2000

by T. J. Mathews, M.S., and Brady E. Hamilton, Ph.D.,
Division of Vital Statistics

Abstract

Objectives—This report presents trends in the mean age of mothers giving birth for the United States for the last three decades. Data are presented by live-birth order, race, Hispanic origin, and State of residence of the mother.

Methods—Descriptive tabulations and graphs of the trends in the mean age of mother are discussed.

Results—The mean age of mother has increased steadily in the United States over the last three decades. Mothers having their first and second live births had the largest increase in mean age. Among racial and Hispanic origin subgroups, Japanese women had the highest mean age in 2000. Puerto Rican women had the lowest mean age. Massachusetts had the highest mean age in 2000 and Mississippi had the lowest.

Keywords: mean age • birth order • race and Hispanic origin • State-specific mean age

Introduction

Data on the age of mothers have been collected and published from the birth registration system of the United States for many decades. One measure that generates considerable interest among researchers and particularly the public is the typical age at which women have children. Often the interest is specifically in the “average” age of women having their first child.

The mean age figures, published here in detail for the first time, are shown for the years 1970–2000. Data by State are shown for 1970, 1980, 1990, and 2000. Data by detailed race and Hispanic origin begin with 1989, when the Hispanic reporting area was nearly complete, and go through 2000. Mean age of mother for selected countries are shown for 1970 and 2000. Information about change in the mean age of mother over these various time periods is displayed as absolute change in years.

The mean age of mother is the arithmetic average of the mother’s age at time of the birth. For this report the mean age is computed directly from the frequency of births by age of mother in the United States (approximately 4 million annually). Consequently, the measure

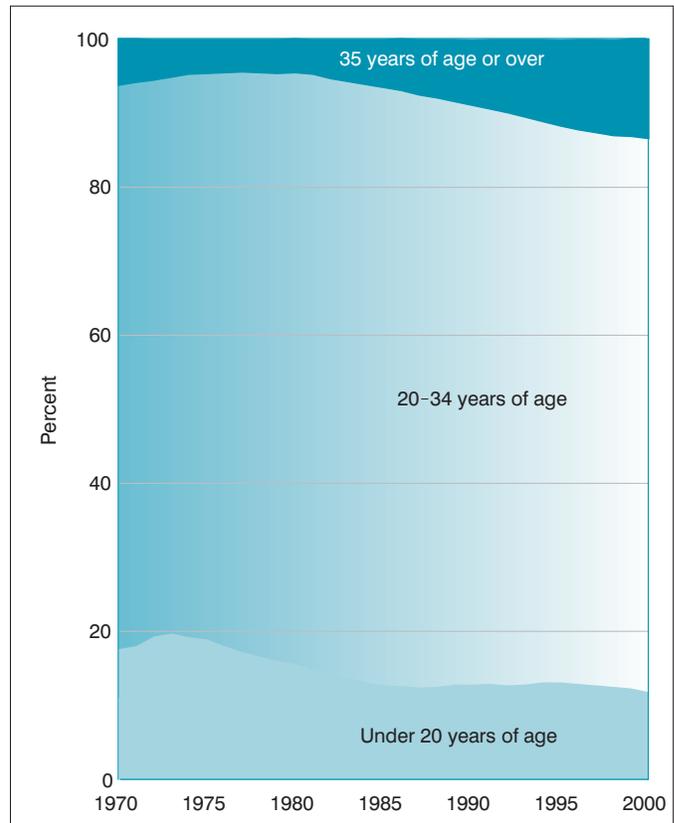


Figure 1. Percent of all live births by age of mother, 1970–2000

Acknowledgments

This report was prepared under the general direction of Stephanie J. Ventura, Chief of the Reproductive Statistics Branch (RSB). William D. Mosher of RSB provided peer review. This report was edited by Thelma W. Sanders, typeset by Jacqueline M. Davis, and graphics were produced by Jarmila G. Ogburn of the Publications Branch, Division of Data Services.



is affected by age patterns in childbearing and by the age distribution of the population of women within the childbearing years. The age distribution of women giving birth has changed from 1970 to 2000 with relatively fewer mothers under 20 years of age and more mothers 35 years and over (figure 1).

Median age of mother is a related measure to the mean and is published elsewhere (1). The median age of the mother is the middle point if mothers ages were arranged from the lowest to highest. Published medians are computed using the birth rates of women in 5-year age groups, from 10–14 years to 45–49 years of age (1,2). The median is the more useful measure when it is appropriate to minimize the influence of outliers, i.e., births to the youngest and oldest women. Another measure, age-specific birth rates, can also be used to describe the age pattern of childbearing of women over time. However, mean age at birth is more easily compared over time and across population groups than age-specific birth rates. It is also easier to interpret than either age-specific birth rates or median age at birth. For a more detailed explanation of the difference between the mean and median age of mother and the calculation of these measures see the Technical Notes.

Results and Discussion

Mean age of mother, 1970–2000

The mean age of mother in the United States was 24.6 in 1970 and rose to 27.2 in 2000, an increase of 2.6 years. The mean age at first birth was 21.4 in 1970 and rose to 24.9 in 2000, an increase of 3.5 years.

In contrast, the median age of mother was 25.4 in 1970 and 27.1 in 2000. The median age at first birth was 22.1 in 1970 and 24.6 in 2000. In 1990 the mean was higher than the median, remained higher through 1998, but was only slightly higher in 1999 and 2000 (table 1, figure 2, and table I in the Technical Notes).

Figure 2 shows that in most years, the mean and median ages were not identical. In the 1970s the mean age was lower than the median, while in the 1990s the mean was slightly higher (see the Technical Notes for a more detailed explanation of these differences).

Mothers are older

The mean age of mothers increased 2.6 years in the past three decades. This increase occurred despite the fact that over one-half of all births still occur to women in their twenties. The lowest mean age was for the years 1973 and 1974 (24.4 years of age).

The increase in the mean age for women having their first live birth from 1970 to 2000 was 3.5 years. The largest increase in mean age was for women having their second live birth (3.6 years). Mean age at third, fourth, and fifth and higher order increased 2.6, 1.6, and 0.4 years, respectively (table 1).

Mean age by race and Hispanic origin

Table 2 shows the mean age of mother by race and Hispanic origin by live birth order for the years 1989–2000. The mean age for all groups for all live birth orders increased during this time period (figure 3). In 1989 Chinese women had the highest mean age of 30.4 years, but in 2000 Japanese women had the highest mean age at 31.8 years. Puerto Rican women had the lowest mean age in 1989

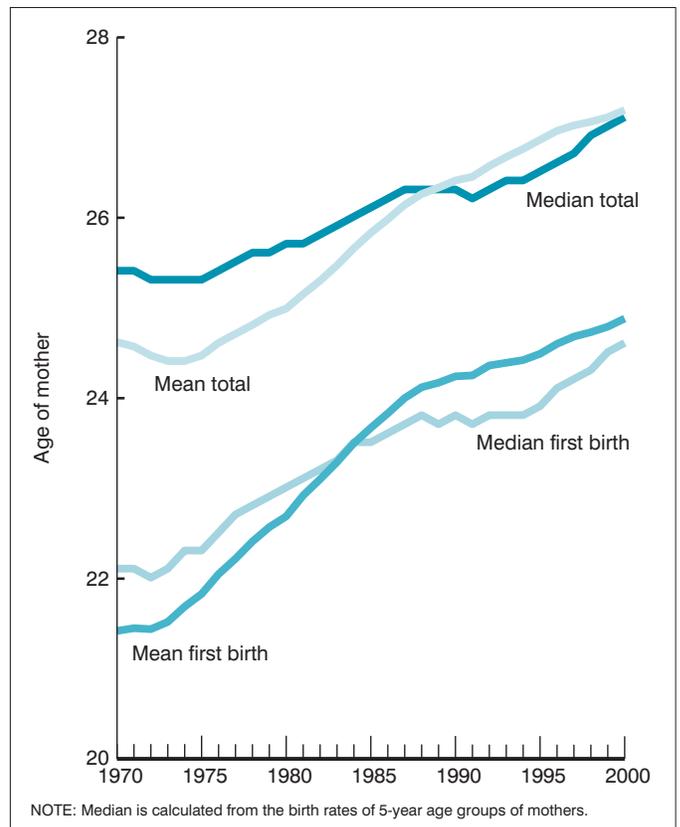


Figure 2. Mean and median age of mother by live birth order, 1970–2000

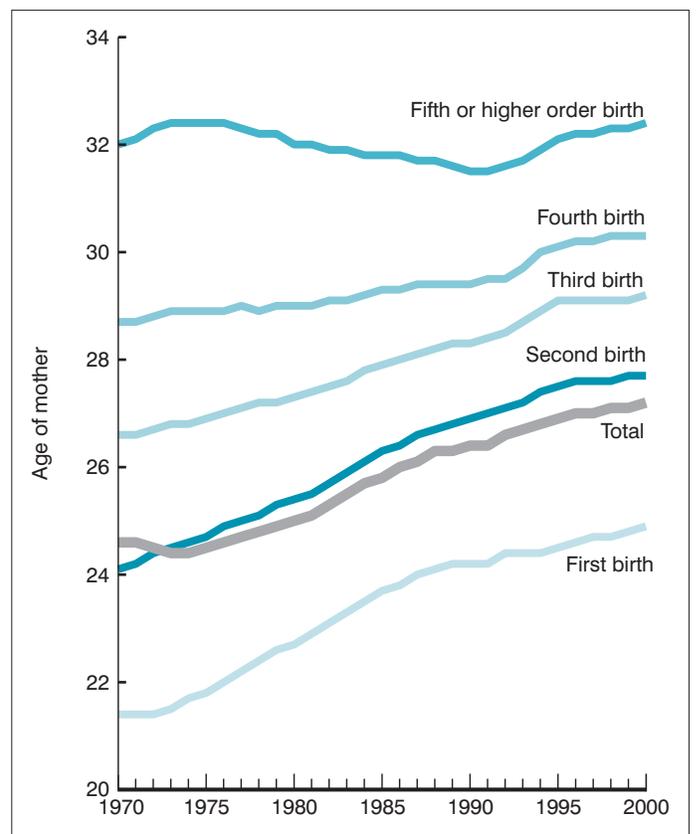


Figure 3. Mean age of mother by live birth order, 1970–2000

and 2000 (24.3 and 25.0 years, respectively). American Indian women had the lowest mean age at first live birth in both 1989 and 2000 (21.3 and 21.6 years, respectively). Japanese and Chinese women had the highest mean ages in all live birth orders from 1989 to 2000 (data for 2000 in figure 4).

Mean age at first live birth by State

Mean age of mother at first live birth varies considerably by State (table 3 and figure 5). In 1970 the lowest mean age was for Arkansas at 20.2 years. The mean ages for Connecticut, Massachusetts, and New York was 22.5 in 1970, 2.3 years higher than Arkansas. In 2000 Mississippi had the lowest mean age, 22.5 years, while Massachusetts had the highest at 27.8, a difference of 5.3 years.

Several factors affect variations in mean age by State. States with higher proportions of births to younger women have a lower mean age. Teenage women are the most likely to be having first births and thus State teenage birth rates play a role in variations in the mean age at first live birth by State. Compositional factors can also affect variations in means by State. In general, black, Hispanic, and American Indian women have lower mean ages than non-Hispanic white and Asian or Pacific Islander women (table 2). States with higher proportions of black, Hispanic, and American Indian women can be expected to have lower mean ages.

All States and the District of Columbia had significant increases in the mean age at first birth from 1970 to 2000 (figure 5). Eight States and the District of Columbia reported an increase of more than 4 years. Massachusetts reported the greatest increase in mean age at first birth, 5.3 years, from 22.5 to 27.8, while Utah reported the smallest increase, 1.9 years.

In the more recent period, from 1990 to 2000, only Alaska declined significantly in mean age at first birth, declining less than 1 year from 24.4 years to 24.1. Forty-five States and the District of Columbia had significant increases in mean age in this decade. Six States, Massachusetts, Michigan, Virginia, North Carolina, New Jersey, and New Hampshire and the District of Columbia had absolute increases of 1 year or more of age.

Mean age at first birth for developed countries

The mean age at first birth varies considerably across developed nations (table 4). According to the latest available data for selected countries, the mean age in 2000 ranged from 24 in the Slovak Republic to 29 in Switzerland (3–5). Increases in mean age at first birth from 1970 to 2000 for the selected countries shown here range from 2 to 4 years. The United States ranks in the top one-half of this distribution, with an increase of 3.5 years. A recent report showed that most developed countries have experienced an increase in the mean age at first birth over the last 30 years (6).

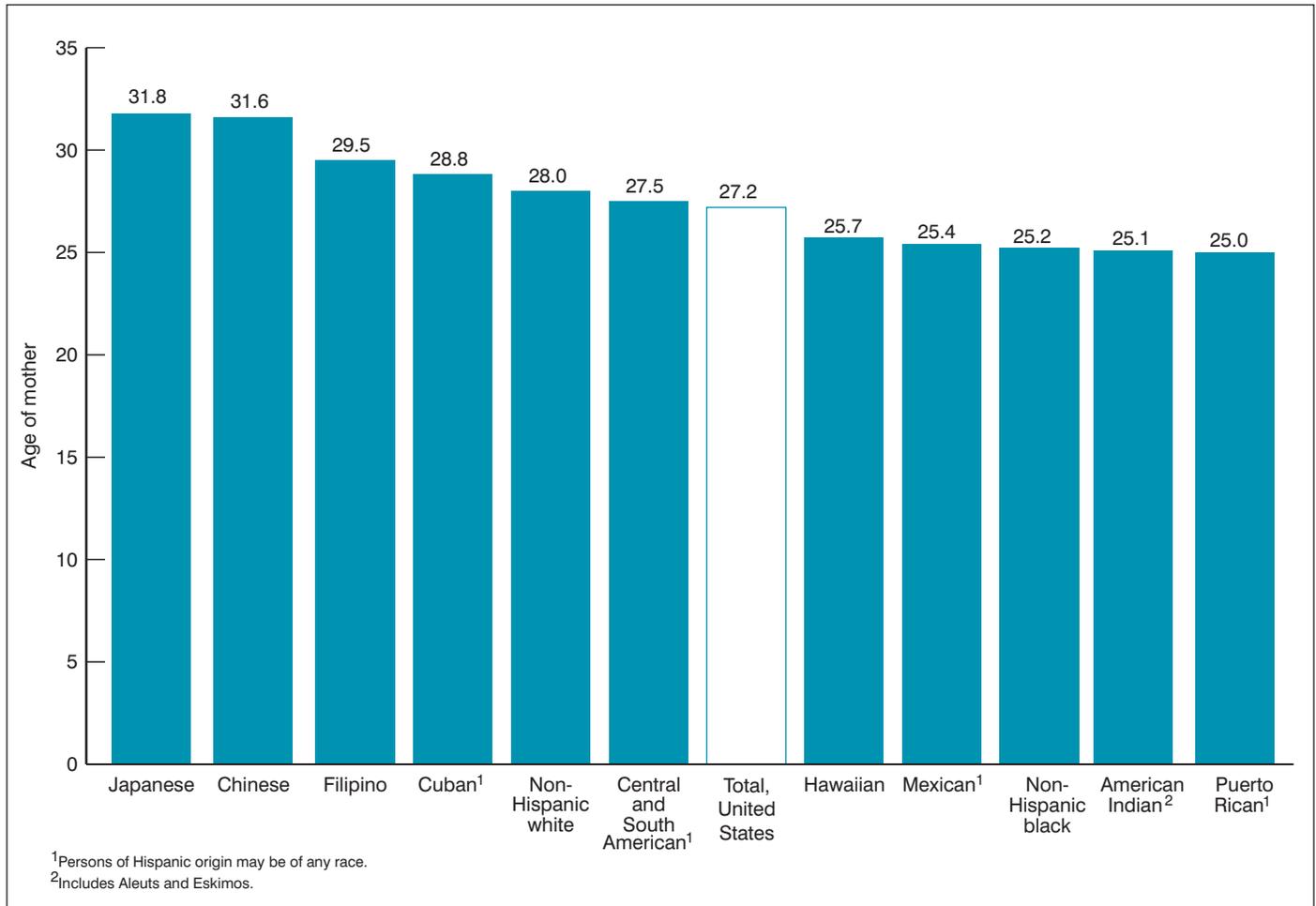


Figure 4. Mean age of mother by race and Hispanic origin of mother, 2000

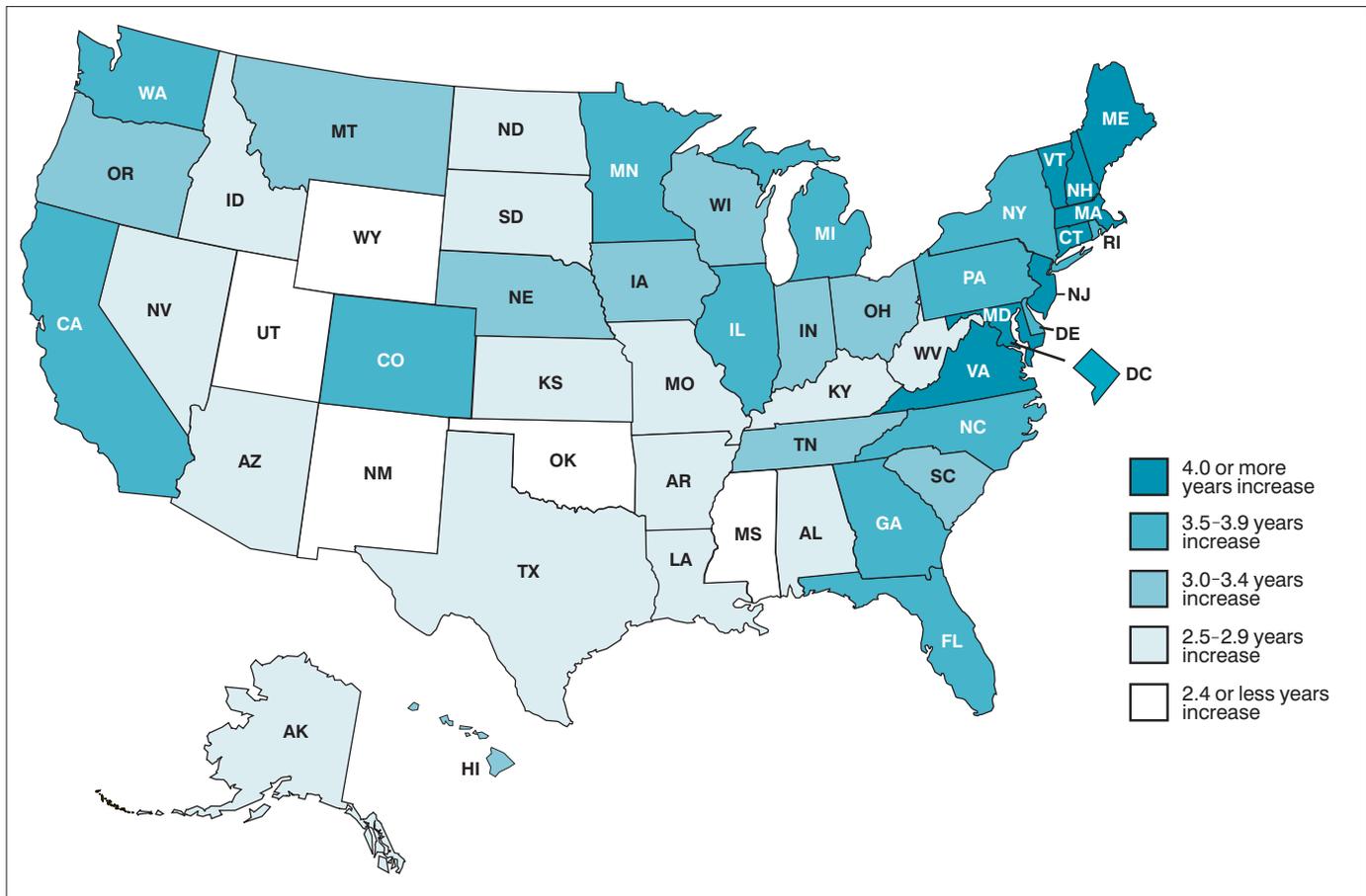


Figure 5. Absolute change in mean age of mother at first live birth, 1970–2000

Factors affecting mean age at birth

Since 1970 the data in this report show that the mean age of mother for all births and the mean age at first birth increased 2.6 and 3.5 years, respectively. The fact that the rise has been widespread, occurring for each birth order, race and Hispanic origin group, and all States, supports the idea that there has been a real change in the reproductive behavior of women in the United States.

Several factors may account for the upward trend in mean age at birth apart from an upward shift in the age structure of the population of women. Education and career have been reported as important factors in women's decisions to delay marriage and motherhood (7). From 1970 to 2000, the percent of women having completed 4 or more years of college nearly tripled while the female labor force participation rate increased 39 percent (8). Contraceptive use at first intercourse, particularly condom use, rose dramatically between the 1970s and 1990s (9). These concurrent trends can contribute to the delay of a first birth and subsequently to older ages at second and higher order births. The effect of economic cycle, social support, marriage squeeze, and marital disruption, are additional factors to be considered in understanding the postponement of childbearing.

References

1. National Center for Health Statistics. Vital statistics of the United States, 1999, vol 1 natality. Hyattsville, Maryland. 2002. Available at: <http://www.cdc.gov/nchs/dataawh/statab/unpubd/natality/natab99.htm>.
2. Martin JA, Hamilton BE, Ventura SJ, Menacker F, Park MM. Births: Final data for 2000. National vital statistics reports; vol 50 no. 5. Hyattsville, Maryland: National Center for Health Statistics. 2002.
3. Council of Europe. Recent Demographic Developments in Europe 2001. Strasbourg: Council of Europe Publishing. 2001.
4. Statistics Bureau. Statistical handbook of Japan 2001. Ministry of Public Management, Home Affairs, Ports, and Telecommunications. 2001.
5. Japan Information Network. Women's Life Cycle (1983–2000). Released August 29, 2001. Available at: <http://www.jin-japan.org/stat/stats/18WME11.html>.
6. UNICEF. 'A league table of teenage births in rich nations,' *Innocenti Report Card No. 3*, July 2001. UNICEF Innocenti Research Centre, Florence.
7. Goldin C. Career and family: College women look to the past. Working Paper No. 5188. Cambridge, Massachusetts: National Bureau of Economic Research. 1995.
8. U.S. Census Bureau. Statistical abstract of the United States: 2001. 121st ed. Washington DC: U.S. Census Bureau. 2001.
9. Abma J, Chandra A, Mosher W, Peterson L, Piccinino L. Fertility, family planning, and women's health: New data from the 1995 National Survey of Family Growth. National Center for Health Statistics. Vital Health Stat 23(19). 1997.

List of Detailed Tables

1. Mean age of mother and absolute change by live birth order: United States, 1970–2000	6
2. Mean age of mother and absolute change by race and Hispanic origin of mother and live birth order: United States, 1989–2000	7
3. Mean age of mother at first live birth by State, 1970, 1980, 1990, and 2000, and absolute change, 1970–2000: United States, each State, and territory	10
4. Mean age of mother at first live birth and absolute change for selected countries, 1970 and 2000	11

Table 1. Mean age of mother and absolute change by live birth order: United States, 1970–2000

Year	Total ¹	1st	2d	3d	4th	5th and higher order
2000	27.2	24.9	27.7	29.2	30.3	32.4
1999	27.1	24.8	27.7	29.1	30.3	32.3
1998	27.1	24.7	27.6	29.1	30.3	32.3
1997	27.0	24.7	27.6	29.1	30.2	32.2
1996	27.0	24.6	27.6	29.1	30.2	32.2
1995	26.9	24.5	27.5	29.1	30.1	32.1
1994	26.8	24.4	27.4	28.9	30.0	31.9
1993	26.7	24.4	27.2	28.7	29.7	31.7
1992	26.6	24.4	27.1	28.5	29.5	31.6
1991	26.4	24.2	27.0	28.4	29.5	31.5
1990	26.4	24.2	26.9	28.3	29.4	31.5
1989	26.3	24.2	26.8	28.3	29.4	31.6
1988	26.3	24.1	26.7	28.2	29.4	31.7
1987	26.1	24.0	26.6	28.1	29.4	31.7
1986	26.0	23.8	26.4	28.0	29.3	31.8
1985	25.8	23.7	26.3	27.9	29.3	31.8
1984	25.7	23.5	26.1	27.8	29.2	31.8
1983	25.5	23.3	25.9	27.6	29.1	31.9
1982	25.3	23.1	25.7	27.5	29.1	31.9
1981	25.1	22.9	25.5	27.4	29.0	32.0
1980	25.0	22.7	25.4	27.3	29.0	32.0
1979	24.9	22.6	25.3	27.2	29.0	32.2
1978	24.8	22.4	25.1	27.2	28.9	32.2
1977	24.7	22.2	25.0	27.1	29.0	32.3
1976	24.6	22.0	24.9	27.0	28.9	32.4
1975	24.5	21.8	24.7	26.9	28.9	32.4
1974	24.4	21.7	24.6	26.8	28.9	32.4
1973	24.4	21.5	24.5	26.8	28.9	32.4
1972	24.5	21.4	24.4	26.7	28.8	32.3
1971	24.6	21.4	24.2	26.6	28.7	32.1
1970	24.6	21.4	24.1	26.6	28.7	32.0
Absolute change 1970–2000	2.6	3.5	3.6	2.6	1.6	0.4

¹Includes birth order not stated.

Table 2. Mean age of mother and absolute change by race and Hispanic origin of mother and live birth order: United States, 1989–2000

Years and origin/race of mother	Total ¹	1st	2d	3d	4th	5th and higher order
Non-Hispanic white						
2000	28.0	25.9	28.6	30.0	31.3	33.4
1999	27.9	25.8	28.5	30.0	31.2	33.4
1998	27.9	25.7	28.5	30.0	31.2	33.4
1997	27.8	25.6	28.4	30.0	31.2	33.3
1996	27.7	25.5	28.4	30.0	31.2	33.3
1995	27.6	25.4	28.3	29.9	31.1	33.2
1994	27.5	25.4	28.2	29.8	31.0	33.0
1993	27.4	25.3	28.0	29.6	30.8	32.8
1992	27.3	25.2	27.9	29.3	30.5	32.7
1991	27.1	25.1	27.7	29.2	30.5	32.5
1990	27.1	25.0	27.6	29.1	30.3	32.5
1989	27.0	25.0	27.5	29.0	30.3	32.5
Absolute change 1989–2000	1.0	0.9	1.1	1.0	1.0	0.9
Non-Hispanic black						
2000	25.2	22.3	25.5	27.2	28.2	30.5
1999	25.1	22.2	25.5	27.1	28.2	30.5
1998	25.0	22.2	25.4	27.0	28.2	30.4
1997	25.0	22.1	25.4	27.0	28.2	30.4
1996	24.9	22.0	25.3	27.0	28.1	30.3
1995	24.8	21.9	25.3	27.0	28.0	30.2
1994	24.7	21.8	25.1	26.7	27.8	30.0
1993	24.6	21.8	24.9	26.5	27.6	29.7
1992	24.5	21.8	24.7	26.2	27.4	29.6
1991	24.4	21.7	24.6	26.2	27.4	29.6
1990	24.4	21.7	24.6	26.3	27.4	29.7
1989	24.3	21.6	24.6	26.3	27.5	29.8
Absolute change 1989–2000	0.9	0.7	0.9	0.9	0.7	0.7
American Indian						
2000	25.1	21.6	24.7	27.0	29.0	31.7
1999	25.0	21.5	24.7	26.9	28.7	31.6
1998	24.9	21.4	24.6	26.9	28.9	31.4
1997	25.0	21.4	24.6	27.0	28.9	31.5
1996	25.0	21.4	24.7	27.0	28.8	31.2
1995	24.9	21.3	24.7	27.0	28.7	31.3
1994	24.9	21.3	24.6	26.8	28.4	31.1
1993	24.9	21.4	24.4	26.6	28.4	30.9
1992	24.9	21.3	24.3	26.4	28.1	30.8
1991	24.8	21.2	24.2	26.4	28.0	30.8
1990	24.9	21.3	24.2	26.3	28.0	30.9
1989	24.8	21.3	24.1	26.2	28.0	30.9
Absolute change 1989–2000	0.3	0.3	0.6	0.8	1.0	0.8
Chinese						
2000	31.6	30.1	32.7	34.0	34.2	35.3
1999	31.6	30.2	32.7	34.0	34.1	35.5
1998	31.6	30.2	32.6	33.9	34.7	35.2
1997	31.3	29.9	32.4	33.8	34.6	35.9
1996	31.2	29.8	32.3	33.5	34.4	35.8
1995	31.1	29.8	32.1	33.5	34.2	35.3
1994	31.0	29.6	32.0	33.3	34.3	36.2
1993	30.8	29.5	31.8	33.1	33.8	35.6
1992	30.7	29.4	31.7	33.0	34.0	35.2
1991	30.5	29.2	31.4	33.0	33.4	35.4
1990	30.5	29.1	31.2	32.3	33.2	34.8
1989	30.4	29.1	31.3	32.8	33.7	34.7
Absolute change 1989–2000	1.2	1.0	1.4	1.2	0.5	0.6

See footnote at end of table.

Table 2. Mean age of mother and absolute change by race and Hispanic origin of mother and live birth order: United States, 1989–2000—Con.

Year and origin/race of mother	Total ¹	1st	2d	3d	4th	5th and higher order
Japanese						
2000	31.8	30.6	32.7	33.7	34.6	35.6
1999	31.6	30.3	32.5	33.9	34.6	36.0
1998	31.6	30.3	32.4	33.5	34.5	35.0
1997	31.5	30.2	32.3	33.5	34.1	35.8
1996	31.2	29.8	32.1	33.5	34.2	35.5
1995	31.1	29.6	32.1	33.4	33.6	35.1
1994	31.0	29.6	31.9	32.9	33.9	34.4
1993	30.9	29.5	31.7	33.1	33.7	34.9
1992	30.9	29.6	31.7	32.9	33.6	34.9
1991	30.6	29.1	31.4	32.8	33.1	35.2
1990	30.4	29.1	31.2	32.3	33.2	34.0
1989	30.3	28.9	31.3	32.2	32.3	34.5
Absolute change 1989–2000	1.5	1.7	1.4	1.5	2.3	1.1
Hawaiian						
2000	25.7	22.6	25.8	28.2	29.4	31.6
1999	25.6	22.7	25.6	28.1	29.3	31.6
1998	25.6	22.6	25.9	28.0	29.4	31.6
1997	25.5	22.6	25.8	27.8	29.1	31.2
1996	25.5	22.5	25.9	27.8	29.2	30.7
1995	25.5	22.4	25.9	27.8	29.1	31.2
1994	25.2	22.1	25.6	27.7	28.6	30.7
1993	25.3	22.3	25.5	27.1	28.7	30.9
1992	25.1	22.3	24.9	27.0	28.7	30.6
1991	25.1	22.1	25.0	27.3	28.7	30.9
1990	25.0	22.2	25.1	27.0	28.4	30.7
1989	25.0	22.2	25.1	26.9	28.3	30.6
Absolute change 1989–2000	0.7	0.4	0.7	1.3	1.1	1.0
Filipino						
2000	29.5	27.3	30.3	32.1	33.3	34.9
1999	29.4	27.1	30.2	32.0	33.1	35.1
1998	29.4	27.2	30.2	31.9	33.1	34.2
1997	29.3	27.1	30.1	31.9	33.1	34.3
1996	29.2	26.9	30.1	32.0	32.9	34.5
1995	29.2	26.9	30.1	31.9	33.0	34.5
1994	29.1	27.0	29.9	31.7	32.8	34.5
1993	29.0	26.9	29.7	31.6	32.9	34.0
1992	29.0	26.9	29.6	31.6	32.8	34.5
1991	28.9	26.7	29.6	31.4	32.6	34.6
1990	28.8	26.8	29.4	31.2	32.1	34.3
1989	28.8	26.8	29.4	31.2	32.6	34.2
Absolute change 1989–2000	0.7	0.5	0.9	0.9	0.7	0.7
Mexican						
2000	25.4	22.2	25.3	27.8	29.7	32.2
1999	25.4	22.1	25.2	27.7	29.6	32.2
1998	25.3	22.1	25.1	27.6	29.5	32.2
1997	25.2	22.0	25.1	27.6	29.6	32.1
1996	25.2	22.0	25.0	27.5	29.5	32.2
1995	25.1	21.9	24.9	27.5	29.5	32.1
1994	25.1	21.9	24.9	27.4	29.4	32.0
1993	25.1	21.9	24.8	27.3	29.2	31.9
1992	25.1	21.9	24.7	27.2	29.1	31.9
1991	25.0	21.8	24.7	27.2	29.0	31.8
1990	25.1	21.9	24.7	27.1	29.0	31.8
1989	25.1	21.9	24.6	27.1	29.0	31.8
Absolute change 1989–2000	0.3	0.3	0.7	0.7	0.7	0.4

See footnote at end of table.

Table 2. Mean age of mother and absolute change by race and Hispanic origin of mother and live birth order: United States, 1989–2000—Con.

Year and origin/race of mother	Total ¹	1st	2d	3d	4th	5th and higher order
Puerto Rican						
2000	25.0	22.4	25.5	27.2	28.4	30.5
1999	24.9	22.2	25.4	27.2	28.2	30.5
1998	24.8	22.1	25.4	27.1	28.3	30.4
1997	24.8	22.1	25.3	27.1	28.3	30.3
1996	24.7	22.0	25.3	27.1	28.1	30.1
1995	24.6	21.9	25.2	26.9	28.1	30.0
1994	24.6	21.9	25.1	26.9	28.0	29.7
1993	24.6	22.0	25.0	26.6	27.8	29.9
1992	24.5	22.0	24.8	26.5	27.7	29.7
1991	24.4	22.0	24.6	26.4	27.8	29.7
1990	24.4	21.9	24.6	26.5	27.7	29.9
1989	24.3	21.8	24.5	26.4	27.8	30.0
Absolute change 1989–2000	0.7	0.6	1.0	0.8	0.6	0.5
Cuban						
2000	28.8	26.5	29.8	31.6	32.7	33.8
1999	28.7	26.4	29.7	31.3	32.7	33.8
1998	28.6	26.3	29.5	31.4	32.7	33.5
1997	28.4	26.1	29.4	31.2	32.0	33.4
1996	28.3	26.2	29.2	31.0	32.3	33.2
1995	28.2	25.9	29.2	31.1	31.7	33.4
1994	28.1	25.9	29.0	30.8	31.7	32.3
1993	28.1	26.1	28.9	30.5	31.5	32.5
1992	27.9	25.9	28.8	30.3	31.0	32.3
1991	27.8	25.7	28.4	30.1	31.0	32.3
1990	27.6	25.6	28.3	30.0	31.1	31.3
1989	27.3	25.3	28.1	29.8	30.6	31.4
Absolute change 1989–2000	1.5	1.2	1.7	1.8	2.1	2.4
Central and South American						
2000	27.5	24.8	28.0	30.0	31.3	33.3
1999	27.5	24.6	27.9	29.9	31.3	33.4
1998	27.4	24.6	27.8	29.9	31.2	33.4
1997	27.4	24.6	27.8	29.9	31.2	33.2
1996	27.3	24.6	27.7	29.7	31.3	33.1
1995	27.2	24.5	27.6	29.6	31.1	33.1
1994	27.2	24.6	27.5	29.5	30.8	32.8
1993	27.1	24.6	27.3	29.3	30.6	32.9
1992	27.1	24.6	27.2	29.2	30.6	32.6
1991	27.0	24.5	27.1	29.2	30.4	32.6
1990	27.0	24.5	27.1	29.1	30.5	32.6
1989	27.0	24.5	27.1	29.1	30.6	32.5
Absolute change 1989–2000	0.5	0.3	0.9	0.9	0.7	0.8

¹Includes live birth order not stated.

10 National Vital Statistics Reports, Vol. 51, No. 1, December 11, 2002

Table 3. Mean age of mother at first live birth by State, 1970, 1980, 1990, and 2000, and absolute change, 1970–2000: United States, each State, and territory

State	1970	1980	1990	2000	Absolute change, 1970–2000
United States	21.4	22.7	24.2	24.9	3.5
Alabama	20.5	21.6	22.8	23.3	2.8
Alaska	21.6	23.2	24.4	24.1	2.5
Arizona	21.2	22.3	23.5	23.8	2.6
Arkansas	20.2	21.3	22.2	22.7	2.5
California	21.8	23.2	24.5	25.3	3.5
Colorado	21.6	23.3	24.9	25.3	3.7
Connecticut	22.5	24.1	26.3	27.2	4.7
Delaware	21.4	22.7	24.5	25.0	3.6
District of Columbia	21.0	22.9	24.0	25.7	4.7
Florida	21.0	22.5	24.2	24.9	3.9
Georgia	20.7	22.2	23.5	24.4	3.7
Hawaii	22.4	23.8	25.0	25.5	3.1
Idaho	20.8	22.1	23.2	23.5	2.7
Illinois	21.5	22.7	24.3	25.1	3.6
Indiana	20.9	22.1	23.3	23.9	3.0
Iowa	21.3	22.6	24.0	24.4	3.1
Kansas	21.1	22.4	23.8	24.0	2.9
Kentucky	20.7	21.5	22.9	23.6	2.9
Louisiana	20.5	21.5	22.6	23.0	2.5
Maine	21.2	22.6	24.4	25.3	4.1
Maryland	21.6	23.1	25.3	26.1	4.5
Massachusetts	22.5	24.1	26.2	27.8	5.3
Michigan	21.2	22.7	23.9	25.0	3.8
Minnesota	22.0	23.4	25.2	25.9	3.9
Mississippi	20.3	21.0	21.9	22.5	2.2
Missouri	21.1	22.3	23.6	24.0	2.9
Montana	21.2	22.7	23.8	24.2	3.0
Nebraska	21.4	22.7	24.1	24.5	3.1
Nevada	21.3	22.6	23.8	24.2	2.9
New Hampshire	21.6	23.6	25.7	26.7	5.1
New Jersey	22.4	23.9	26.1	27.1	4.7
New Mexico	21.0	22.0	23.0	23.0	2.0
New York	22.5	23.8	25.6	26.4	3.9
North Carolina	20.8	22.1	23.5	24.5	3.7
North Dakota	21.5	22.6	24.2	24.3	2.8
Ohio	21.3	22.5	23.8	24.5	3.2
Oklahoma	20.7	21.7	22.8	23.1	2.4
Oregon	21.4	23.0	24.2	24.7	3.3
Pennsylvania	21.7	23.1	24.8	25.6	3.9
Rhode Island	22.1	23.4	25.1	25.9	3.8
South Carolina	20.6	21.8	23.1	23.7	3.1
South Dakota	21.1	22.3	23.6	23.7	2.6
Tennessee	20.7	22.0	23.1	23.8	3.1
Texas	20.9	22.1	23.3	23.7	2.8
Utah	21.4	21.9	22.9	23.3	1.9
Vermont	21.7	23.4	25.4	26.3	4.6
Virginia	21.4	23.0	24.7	25.7	4.3
Washington	21.5	23.2	24.7	25.3	3.8
West Virginia	20.8	21.7	22.8	23.5	2.7
Wisconsin	21.8	22.9	24.6	25.1	3.3
Wyoming	21.0	22.1	23.3	23.2	2.2
Puerto Rico	25.3	24.9	24.9	25.0	–0.3
Virgin Islands	25.3	25.6	25.9	26.3	1.0
Guam ^{1,2}	---	25.7	25.8	26.4	0.7
American Samoa ³	---	---	---	27.6	NA
Northern Marianas ⁴	---	---	---	27.9	NA

--- Data not available.

NA Not applicable.

¹Data are not available for Guam, 1970.²Absolute change for Guam, 1980–2000.³Data are not available for American Samoa, 1970, 1980, and 1990.⁴Data are not available for Northern Marianas, 1970, 1980, and 1990.NOTE: Difference of means was significant at $p < 0.05$ for United States, each State, and territory, 1970–2000.

Table 4. Mean age of mother at first live birth and absolute change for selected countries, 1970 and 2000

Countries	1970	2000	Absolute change, 1970–2000
Czech Republic	22.5	24.9	2.4
Finland	24.4	27.4	3.0
Hungary	22.8	25.1	2.3
Iceland	21.3	25.5	4.2
Japan	25.6	28.0	2.4
Netherlands	24.8	28.6	3.8
Slovak Republic	22.6	24.2	1.6
Sweden	25.9	27.9	2.0
Switzerland	25.3	28.7	3.4
United States	21.4	24.9	3.5

SOURCES: Council of Europe. Recent Demographic Developments in Europe 2001. Council of Europe Publishing, Strasbourg, 2001. Statistics Bureau. Statistical Handbook of Japan 2001. Ministry of Public Management, Home Affairs, Ports, and Telecommunications, 2001. Japan Information Network. Women's Life Cycle (1983–2000). Released August 29, 2001. Available at: <http://www.jinjapan.org/sta/stats/18WME11.html>.

Technical Notes

Differences between mean and median age of mother

As mentioned in the introduction, the mean age of mother is the arithmetic average of mother's age at birth. The median age of the mother, on the other hand, is the middle point of the distribution of age at birth. Ranked in order of age of mother, 50 percent of the births would occur above and below the median age.

For this report, the mean is computed directly from the sum of all mother's ages divided by the number of mothers. Unlike the median age, which is a function of the rank order of the ages, the mean is affected by the numeric values of the ages. As a result, the mean is more sensitive to the distribution of births by age of mother than the median. For example, compare the age of mother at childbirth for the following distributions:

Distribution A—18, 19, 22, 23, 25, 26, and 28 years (mean = 23, median = 23).

Distribution B—15, 17, 20, 23, 25, 26, and 28 years (mean = 22, median = 23).

The median and mean age is the same in distribution A, but differ in distribution B. In both distributions, the median, the middle frequency in the distribution, is 23 years. However, the mean age in distribution A is 23 years while the mean in distribution B is 22 years. This occurs because age at childbirth in distribution B is more dispersed for those mothers below the median age (15–23 years) than above it (23–28 years). In distribution A, age at childbirth is equally dispersed about the median age (18–23 years and 23–28 years). Distribution B is therefore skewed towards births to younger women with the result that the mean age is less than the median age.

Figure 2 shows that the mean age of mother was less than the median age from 1970 to 1987. This indicates more frequent births to younger women than to older women. In 1990 the mean was higher than the median, remained through 1998, but was only slightly different in 1999 and 2000. The trends for mean and median age at first live birth are similar to those for all births. However, the transition happened several years earlier and the mean remained higher in 1999 and 2000. These trends in combination indicate more frequent births to older than younger women now compared with the mid-1980s and earlier years.

Significance testing

The number of births, while essentially a complete count and not subject to sampling error, may be affected by nonsampling errors in the registration process. The number of events that occurred can be thought of as one in a series of possible outcomes. When considered in this way, the number of births for analytical purposes is subject to random variation.

The difference between the two means, irrespective of sign (+/-), is defined as statistically significant (when *N* is relatively large) if the value exceeds the test statistic in the derived formula for *Z* below. This statistic equals 1.96 times the standard error of the difference between means.

Table I. Median age of mother and absolute change for total births and first live birth: United States, 1970–2000

Year	Total ¹	1st
2000	27.1	24.6
1999	27.0	24.5
1998	26.9	24.3
1997	26.7	24.2
1996	26.6	24.1
1995	26.5	23.9
1994	26.4	23.8
1993	26.4	23.8
1992	26.3	23.8
1991	26.2	23.7
1990	26.3	23.8
1989	26.3	23.7
1988	26.3	23.8
1987	26.3	23.7
1986	26.2	23.6
1985	26.1	23.5
1984	26.0	23.5
1983	25.9	23.3
1982	25.8	23.2
1981	25.7	23.1
1980	25.7	23.0
1979	25.6	22.9
1978	25.6	22.8
1977	25.5	22.7
1976	25.4	22.5
1975	25.3	22.3
1974	25.3	22.3
1973	25.3	22.1
1972	25.3	22.0
1971	25.4	22.1
1970	25.4	22.1
Absolute change 1970–2000	1.7	2.5

¹Includes birth order not stated.

$$1.96 \sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}$$

where:

- s*₁ = first standard deviation
- s*₂ = second standard deviation
- N*₁ = first number of births
- N*₂ = second number of births

If the difference is less than or equal to this test statistic, then the difference would occur by chance 5 times out of 100 or more. Accordingly, we would conclude that the difference is not statistically significant at the 95-percent confidence level. If the difference is greater than this statistic, then the difference would occur by chance less than 5 times out of 100. The difference, we would therefore conclude, is statistically significant at the 95-percent confidence level.

Example:

Is the 2000 mean age at first birth of women in Ohio (24.5 years) significantly higher than the comparable 1990 statistic (23.8 years)?

The difference between the rates is $24.5 - 23.8 = 0.7$. The statistic is then calculated as follows:

$$1.96 \sqrt{\left(\frac{(5.38)^2}{67,621}\right) + \left(\frac{(5.83)^2}{60,643}\right)}$$

$$1.96 \sqrt{\left(\frac{(28.94)^2}{67,621}\right) + \left(\frac{(33.99)^2}{60,643}\right)}$$

$$1.96 \sqrt{(0.000428039) + (0.000560475)}$$

$$1.96 \sqrt{0.000988514}$$

$$0.06$$

The difference between the two means (0.7) is greater than this statistic (0.06). Therefore, the difference is statistically significant at the 95-percent confidence level.

Contents

Abstract 1
Introduction 1
Results and Discussion 2
References 4
List of detailed tables 5
Technical Notes 12

Suggested citation

Mathews TJ, Hamilton BE. Mean age of mother, 1970–2000. National vital statistics reports; vol 51 no 1. Hyattsville, Maryland: National Center for Health Statistics. 2002.

National Center for Health Statistics

Director, Edward J. Sondik, Ph.D.
Deputy Director, Jack R. Anderson

Division of Vital Statistics

Director, Mary Anne Freedman

To receive this publication regularly, contact the National Center for Health Statistics by calling 301-458-4636. E-mail: nchsquery@cdc.gov
Internet: www.cdc.gov/nchs

Copyright information

All material appearing in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

DEPARTMENT OF
HEALTH & HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics
6525 Belcrest Road
Hyattsville, Maryland 20782-2003

DHHS Publication No. (PHS) 2003–1120
03-0046 (12/02)

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

MEDIA MAIL POSTAGE & FEES PAID CDC/NCHS PERMIT NO. G-284

EXHIBIT 51

Mean Age of Mothers is on the Rise: United States, 2000–2014

T.J. Mathews, M.S.; and Brady E. Hamilton, Ph.D.

Key findings

Data from the National Vital Statistics System

- The mean age of mothers has increased from 2000 to 2014 for all birth orders, with age at first birth having the largest increase, up from 24.9 years in 2000 to 26.3 years in 2014.
- Increases in the average age for all birth orders were most pronounced from 2009 to 2014.
- In 2014, Asian or Pacific Islander mothers had the oldest average age at first birth (29.5 years), while American Indian or Alaska Native mothers had the youngest (23.1 years).
- Mean age at first birth increased in all states and the District of Columbia (D.C.) from 2000 to 2014, but D.C. (3.4 years) and Oregon had the largest increases (2.1 years).

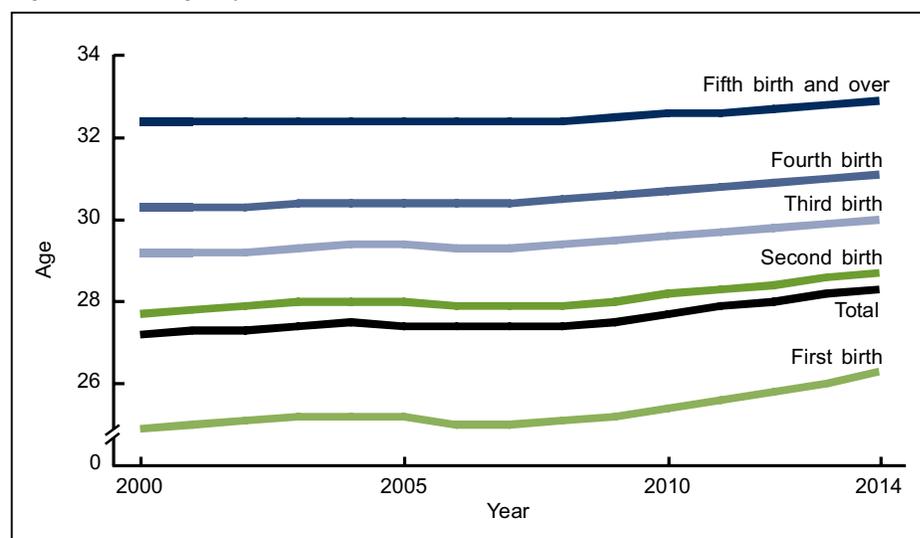
A mother's age at birth, and particularly the mean or "average" age when a mother has her first child, is of interest to researchers and the public. Mean age can affect the total number of births a mother has over a lifetime, which in turn impacts the composition and growth of the U.S. population. Age of mother is associated with a range of birth outcomes, such as multiple births and birth defects. An earlier report presented trends in mean age from 1970 to 2000 (1). This report updates the earlier report and presents trends in the mean age at first and higher birth orders by race and Hispanic origin of mother and by state from 2000 to 2014 (1).

Keywords: maternal age • race and Hispanic origin • birth order • National Vital Statistics System (NVSS)

What are the recent trends in average age of mothers in the United States?

- The mean age of first-time mothers increased 1.4 years, from 24.9 in 2000 to 26.3 in 2014. While the mean age at first birth was fairly stable

Figure 1. Mean age, by birth order: United States, 2000–2014



SOURCE: CDC/NCHS, National Vital Statistics System.



NCHS Data Brief ■ No. 232 ■ January 2016

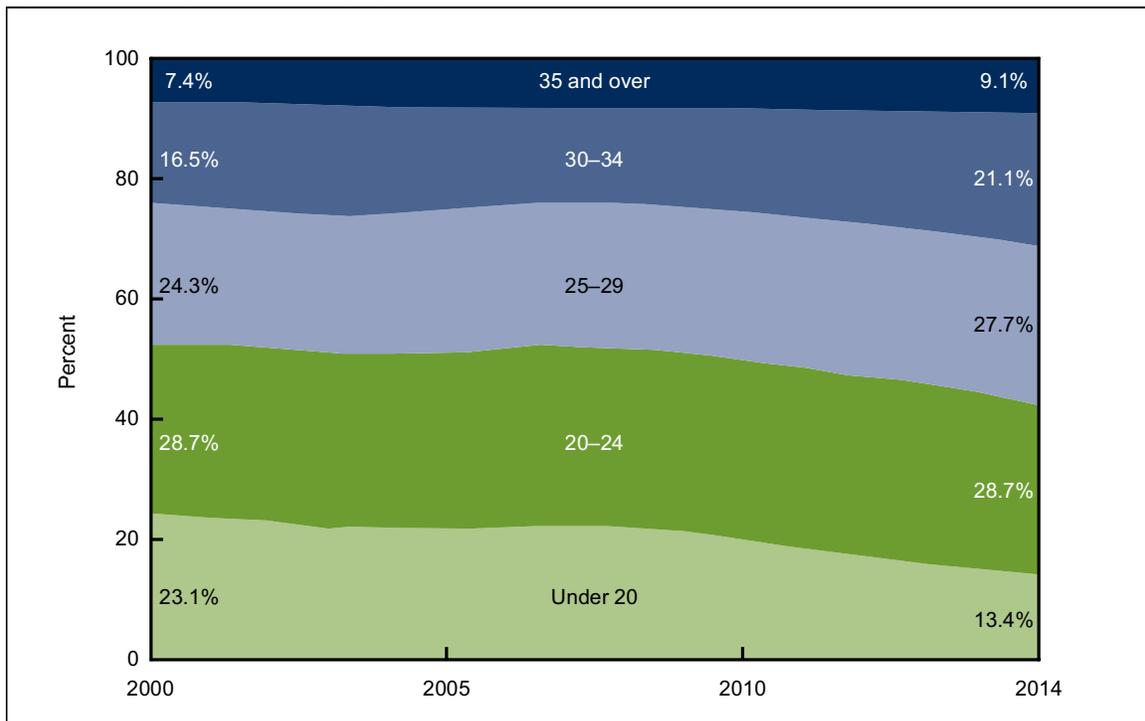
for the first half of this time period, greater increases were observed from 2009 (25.2 years) to 2014 (26.3 years) (Figure 1).

- Trends in mean age of mother for higher-order births were similar to those for first births—that is, generally stable from 2000 to 2006, followed by greater increases from 2009 to 2014.
- Increases from 2000 to 2014 in average age for higher birth orders were less than those for first births, rising 1.4 years for first births, 1.0 years for second births, 0.8 years for third- and fourth-order births, and 0.5 years for fifth- and higher-order births.
- As a result of the different rate of increases by birth order, the gap in the mean age between sequential birth orders has decreased. For example, the difference in the mean age at first birth compared with the mean age at second birth was 2.8 years in 2000 and 2.4 years in 2014.

How has the distribution of age at first birth changed?

- The largest factor in the rise in mean age at first birth is the decline in the proportion of first births to mothers under age 20, down 42% from 2000 to 2014, or from approximately 1 in 4 births to 1 in 7 (Figure 2).
- From 2000 to 2014, the proportion of first births to women aged 30–34 rose 28% (from 16.5% to 21.1%), and first births to women aged 35 and over rose 23% (from 7.4% to 9.1%).

Figure 2. Percentage of first births, by age of mother: United States, 2000–2014



SOURCE: CDC/NCHS, National Vital Statistics System.

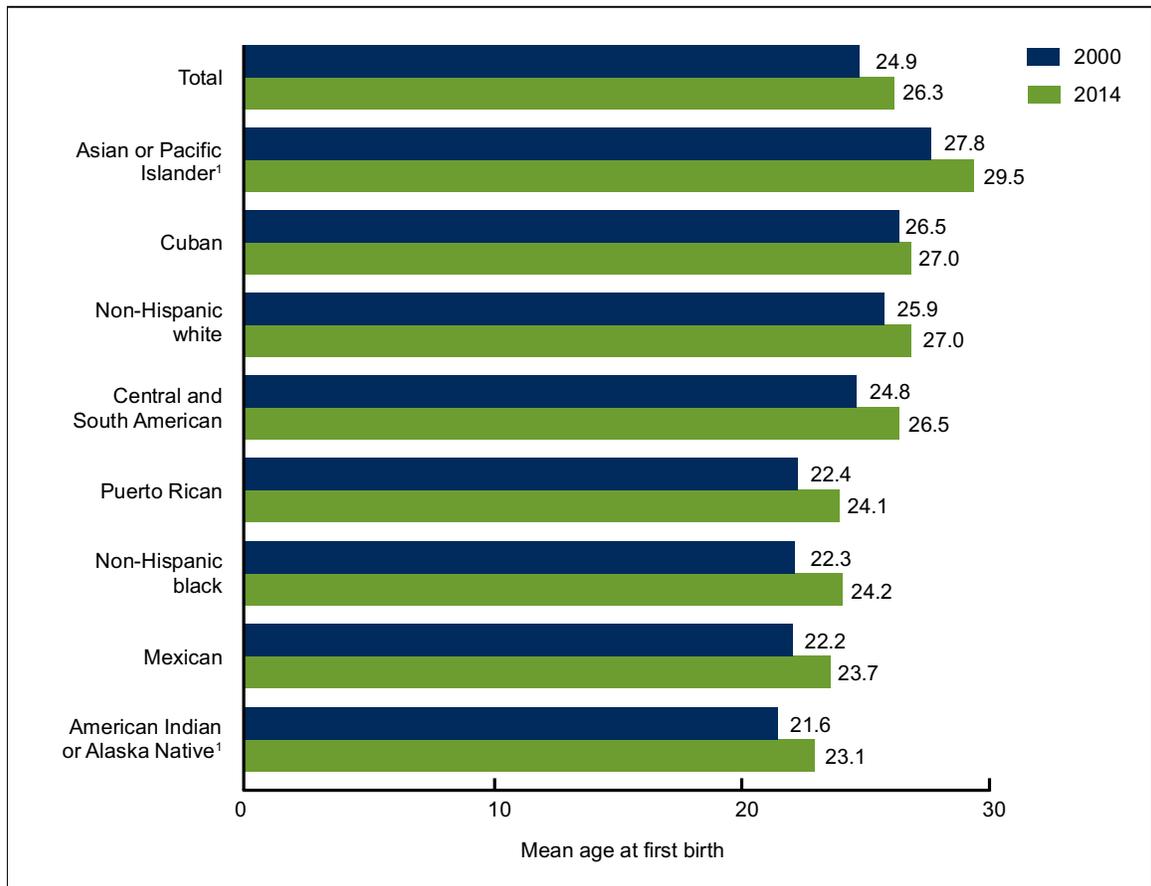
NCHS Data Brief ■ No. 232 ■ January 2016

- The proportion of first births to mothers aged 20–24 was the same in 2000 and 2014, while the proportion of first births to mothers aged 25–29 increased 14%, from 24.3% in 2000 to 27.7% in 2014.

Does the average age of first-time mothers differ by race and Hispanic origin?

- The mean age at first birth increased for all race and Hispanic origin groups from 2000 to 2014. Increases ranged from 0.5 years for Cuban mothers to 1.9 years for non-Hispanic black mothers (Figure 3).
- Asian or Pacific Islander (API) mothers had the oldest average age at first birth in 2000 (27.8 years) and 2014 (29.5 years), while American Indian or Alaska Native (AIAN) women had the youngest average age at first birth (21.6 years in 2000 and 23.1 years in 2014). The difference in mean age at first birth among these groups was 6.4 years in 2014, up from 6.2 years in 2000.

Figure 3. Mean age at first birth, by race and Hispanic origin of mother: United States, 2000 and 2014



¹Includes persons of Hispanic and non-Hispanic origin.
SOURCE: CDC/NCHS, National Vital Statistics System.

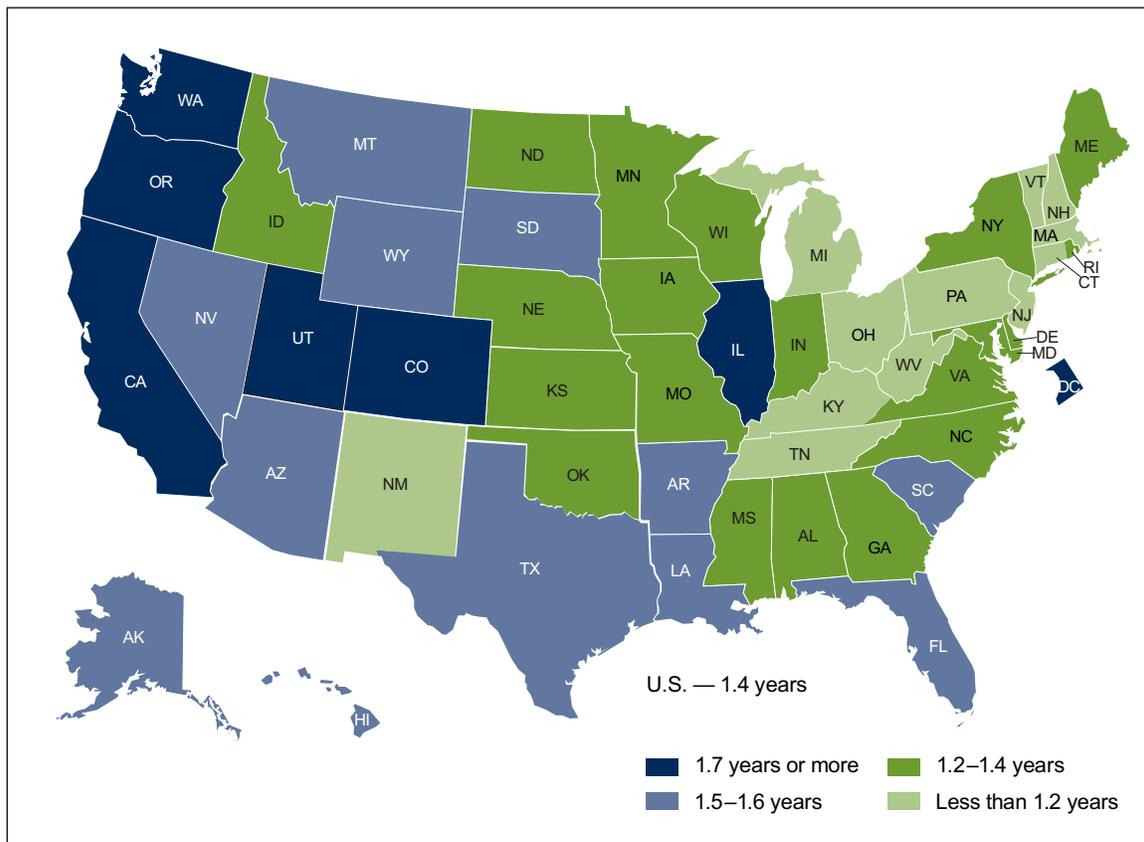
NCHS Data Brief ■ No. 232 ■ January 2016

- In 2014, the mean age at first birth for API (29.5 years), non-Hispanic white (27.0 years), Central and South American (26.5 years), and Cuban (27.0 years) mothers was higher than the average for all mothers (26.3 years). The mean age was lower than the average for Puerto Rican (24.1 years), non-Hispanic black (24.2 years), Mexican (23.7 years), and AIAN (23.1 years) mothers.

Does average age of mother at first birth differ by geographic area over time?

- The average age of first-time mothers increased for all states and the District of Columbia (D.C.) from 2000 to 2014. Increases ranged from 0.7 years for mothers in New Hampshire to more than three years for mothers in D.C. (Figure 4).
- States with larger increases (1.7 years or more) tended to be in the western United States (California, Oregon, Washington, Utah, and Colorado). Greater increases were also seen in Illinois, Arkansas, and D.C.
- Apart from New Mexico, states with the smallest increases (less than 1.2 years) were all east of the Mississippi River, from Tennessee to New Hampshire.

Figure 4. Increase in mean age at first birth, by state: United States, 2000–2014



SOURCE: CDC/NCHS, National Vital Statistics System.

NCHS Data Brief ■ No. 232 ■ January 2016**Summary**

The average age of first-time mothers increased by 1.4 years from 2000 to 2014, with most of the increase occurring from 2009 to 2014. Trends were similar for higher birth orders with fairly stable mean ages occurring from 2000 to 2006, and greater increases occurring from 2009 to 2014. Since 2000, the mean age at first birth increased for all race and Hispanic origin groups, but large differences remained among the groups. AIAN mothers had the youngest mean age at first birth in 2014 and API mothers had the oldest.

Since 2000, the average age at first birth has increased in all states, rising 1.9 years or more in D.C., California, Oregon, and Utah, while increasing by less than a year in Connecticut, Michigan, New Hampshire, and West Virginia.

Continued delays in childbearing in the United States are evident in the 1.4 year increase in the average age of first births from 2000 to 2014 (2–5). The decrease in the proportion of first births to women under age 20 had the largest impact on this change, while increases in first births among mothers aged 30 and over also contributed to the increase in mean age.

Over the past several decades, the United States continued to have a larger number of first births to older women along with fewer births to mothers under age 20 (1,5). This trend and the more recent uptick in delayed initial childbearing can affect the number of children a typical woman will have in her lifetime, family size, and for the overall population change in the United States.

Definitions

Mean and average age: The arithmetic average of a mother's age at birth.

First birth: The first child born alive to a mother.

Race and Hispanic origin: Race and Hispanic origin are reported separately on birth certificates. Persons of Hispanic origin may be of any race. Persons of non-Hispanic ancestry are further classified by race because there are substantial difference in fertility and maternal characteristics between Hispanic and non-Hispanic persons. Persons of AIAN and API ancestry are not classified separately by Hispanic origin because the majority of these persons are non-Hispanic. Multiple-race data reported since 2003 were bridged to single race categories for comparability among states and for trend analyses (2).

Data source and methods

This report contains data from the birth data set, which is part of the National Vital Statistics System (NVSS). NVSS contains all live births reported in the United States. The birth data set is the primary data set for analyzing birth trends and patterns in the United States. Birth data sets are available from NCHS at: <http://www.cdc.gov/nchs/about/major/dvs/Vitalstatsonline.htm> and <http://www.cdc.gov/nchs/VitalStats.htm>.

NCHS Data Brief ■ No. 232 ■ January 2016

About the authors

T.J. Mathews and Brady Hamilton are with the CDC's National Center for Health Statistics, Division of Vital Statistics, Reproductive Statistics Branch.

References

1. Mathews TJ, Hamilton BE. Mean age of mother, 1970–2000. National vital statistics reports; vol 51 no 1. Hyattsville, MD: National Center for Health Statistics. 2002.
2. Hamilton BE, Martin JA, Osterman MJK, et al. Births: Final data for 2014. National vital statistics reports; vol 64 no 12. Hyattsville, MD: National Center for Health Statistics. 2015.
3. Ventura SJ, Hamilton BE, Mathews TJ. National and state patterns of teen births in the United States, 1940–2013. National vital statistics reports; vol 63 no 4. Hyattsville, MD: National Center for Health Statistics. 2014.
4. Mathews TJ, Hamilton BE. First births to older women continue to rise. NCHS data brief, no 152. Hyattsville, MD: National Center for Health Statistics. 2014.
5. Gregory E. Ready: Why women are embracing the new later motherhood. Basic Books. 2007.

NCHS Data Brief ■ No. 232 ■ January 2016

**U.S. DEPARTMENT OF
HEALTH & HUMAN SERVICES**

Centers for Disease Control and Prevention
National Center for Health Statistics
3311 Toledo Road, Room 5419
Hyattsville, MD 20782-2064

FIRST CLASS MAIL
POSTAGE & FEES PAID
CDC/NCHS
PERMIT NO. G-284

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

For more NCHS Data Briefs, visit:
<http://www.cdc.gov/nchs/products/databriefs.htm>.



NCHS Data Brief ■ No. 232 ■ January 2016

Suggested citation

Mathews TJ, Hamilton BE. Mean age of mothers is on the rise: United States, 2000–2014. NCHS data brief, no 232. Hyattsville, MD: National Center for Health Statistics. 2016.

Copyright information

All materials appearing in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

National Center for Health Statistics

Charles J. Rothwell, M.S., M.B.A., *Director*
Nathaniel Schenker, Ph.D., *Deputy Director*
Jennifer H. Madans, Ph.D., *Associate Director for Science*

Division of Vital Statistics

Delton Atkinson, M.P.H., M.P.H., P.M.P., *Director*
Hanyu Ni, Ph.D., M.P.H., *Associate Director for Science*

For e-mail updates on NCHS publication releases, subscribe online at:
<http://www.cdc.gov/nchs/govdelivery.htm>.

For questions or general information about NCHS:
Tel: 1-800-CDC-INFO (1-800-232-4636)
TTY: 1-888-232-6348
Internet: <http://www.cdc.gov/nchs>
Online request form: <http://www.cdc.gov/cdc-info/>

ISSN 1941-4927 Print ed.
ISSN 1941-4935 Online ed.
DHHS Publication No. 2016-1209
CS262027

EXHIBIT 52

The Changing Economics and Demographics of Young Adulthood: 1975–2016

Population Characteristics

Current Population Reports

By Jonathan Vespa

Issued April 2017

P20-579

INTRODUCTION

What does it mean to be a young adult? In prior generations, young adults were expected to have finished school, found a job, and set up their own household during their 20s—most often with their spouse and with a child soon to follow. Today's young adults take longer to experience these milestones. What was once ubiquitous during their 20s is now not commonplace until their 30s. Some demographers believe the delays represent a new period of the life course between childhood and adulthood, a period of “emerging adulthood” when young people experience traditional events at different times and in a different order than their parents did.¹ What is clear is that today's young adults look different from prior generations in almost every regard: how much education they have, their work experiences, when they start a family, and even who they live with while growing up. It comes as no surprise that when parents recall stories of their youth, they are remembering how different their experiences were.

This report looks at changes in young adulthood over the last 40 years. It focuses on how the experiences of today's young adults differ, in timing and degree, from what young adults experienced in the 1970s—how

much longer they wait to start a family, how many have gone to college, and who are able to live independently of their parents. This report looks at a snapshot of the young adult population, defined here as 18 to 34 years old, and focuses on two periods: 1975 and today (using data covering 2012 to 2016 to reflect the contemporary period). Many of the milestones of young adulthood are reflected in the living arrangements of young people: when they move out of their parents' home and when they form families. Because these milestones are tied to young adults' economic security, the report also focuses on how education and work experience vary across young adult living arrangements.

HIGHLIGHTS

- Most of today's Americans believe that educational and economic accomplishments are extremely important milestones of adulthood. In contrast, marriage and parenthood rank low: over half of Americans believe that marrying and having children are not very important in order to become an adult.
- Young people are delaying marriage, but most still eventually tie the knot. In the 1970s, 8 in 10 people married by the time they turned 30. Today, not until the age of 45 have 8 in 10 people married.
- More young people today live in their parents' home than in any other arrangement: 1 in 3 young

¹ F. Furstenberg, Jr., “On a New Schedule: Transitions to Adulthood and Family Change,” *The Future of Children*, Vol. 20, 2010, pp. 67–87. See also, F. Furstenberg, Jr., et al., “Growing Up Is Harder To Do,” *Contexts*, Vol. 3, 2004, pp. 33–41, and J. Arnett, *Emerging Adulthood: The Winding Road From the Late Teens Through the Twenties*, Oxford University Press, New York, 2014.

people, or about 24 million 18- to 34-year-olds, lived in their parents' home in 2015.

- In 2005, the majority of young adults lived independently in their own household, which was the predominant living arrangement in 35 states. A decade later, by 2015, the number of states where the majority of young people lived independently fell to just six.
- More young men are falling to the bottom of the income ladder. In 1975, only 25 percent of men, aged 25 to 34, had incomes of less than \$30,000 per year. By 2016, that share rose to 41 percent of young men. (Incomes for both years are in 2015 dollars.)
- Between 1975 and 2016, the share of young women who were homemakers fell from 43 percent to 14 percent of all women aged 25 to 34.
- Of young people living in their parents' home, 1 in 4 are idle, that is they neither go to school nor work. This figure represents about 2.2 million 25- to 34-year-olds.

About the Data

This report uses two surveys from the U.S. Census Bureau to look at the demographic and economic characteristics of young adults: the American Community Survey (ACS) and the Current Population Survey (CPS). It uses a third data source, the General Social Survey (GSS), to look at beliefs, attitudes, and values that Americans have about adulthood.

The ACS provides statistics on the country's people, housing, and economy at various geographic levels, including the nation, states, and counties. It uses a series of monthly samples to produce annually updated estimates for small geographic areas. In 2015, the ACS sampled about 3.5 million households. This report uses 2005 and 2015 ACS data to look at state-level changes in young adult living arrangements. For more information about the survey, see www.census.gov/programs-surveys/acs/. For more information about sample design and methodology, see www.census.gov/programs-surveys/acs/technical-documentation/code-lists.html.

The CPS collects information about the economic and employment characteristics of the civilian, noninstitutionalized population. This report uses the survey's 1975 and 2016 Annual Social and Economic Supplement, which has data on marriage and family, employment patterns, work hours, earnings, and occupation. It also uses the 1976 and 2014 June supplement to the survey, which collects data on women's fertility. The CPS counts college students living in dormitories as if they were living in their parents' home. As a result, the number of young adults residing in their parents' home is higher than it would be otherwise, especially for 18- to 24-year-olds, who are more likely to be living in college housing. For more information about the CPS, see www.census.gov/programs-surveys/cps.html.

Since 1972, the GSS has collected data on Americans' opinions and attitudes about a variety of topics. Because of its long-running collection, researchers can use the survey to study changes in Americans' attitudes and beliefs. The survey is administered by the National Opinion Research Center at the University of Chicago, with support from the National Science Foundation.¹ The module on the milestones of adulthood comes from the 2012 GSS, the most recent year available, and was developed by the MacArthur Foundation Research Network on Transitions to Adulthood.

¹ T. Smith, P. Marsden, M. Hout, and J. Kim, *General Social Surveys 1972–2012*, sponsored by the National Science Foundation (NORC ed.), Chicago: National Opinion Research Center, Storrs, CT: The Roper Center for Public Opinion Research, University of Connecticut, 2013.

Defining Young Adults

Young Adults. This report looks at the population of 18- to 34-year-olds at two time periods, in 1975 and today, covering the years 2012 to 2016. For some parts of the analysis, this report looks at a subsection of this population, the group of 25- to 34-year-olds. Throughout this report, the terms young adult and young people are used interchangeably to refer to these age groups.

Generations and cohorts. The population of 18- to 34-year-olds is a cohort, which is a group of people that share a common demographic experience or characteristic (in this case, age). By comparing cohorts at two different time periods, researchers can study how the experiences of a group of people have collectively changed over time. The cohort of 18- to 34-year-olds in 2016 includes people born between 1982 and 1998, which roughly corresponds to the millennial generation. There is no official start and end date for when millennials were born. The cohort of 18- to 34-year-olds in 1975 includes people born between 1941 and 1957, encompassing members of the silent generation (born 1928 to 1945) as well as some baby boomers (born 1946 to 1964).

Adulthood. There are many ways to define adulthood, whether physically, emotionally, or psychologically. This report looks at adulthood as a period of the life course defined by a set of common experiences, events, and transitions. It focuses on demographic and economic events including schooling, marriage and parenthood, and work. This is by no means an exhaustive list, but represents one possible set of common experiences that people have as they age.

WHAT DOES IT MEAN TO BE AN ADULT TODAY?

Americans Rank Educational and Economic Accomplishments as the Most Important Milestones of Adulthood

To say that young adults delay marriage and put off having children describes behaviors that are reflected in demographic trends for the population as a whole. To put these experiences in context, though, it helps to look at what adults think about them. Do people believe that waiting later to marry or have children is a normal part of adulthood today?

The 2012 General Social Survey asked Americans aged 18 and older

about how important a variety of experiences are to becoming an adult. Over half of Americans say that getting married or having children are not important to becoming an adult, and only a third think they are somewhat important (Figure 1). These trends align with research showing that less than 10 percent of men and women think that people need to have children to be very happy in life.²

Instead, the highest ranked milestones are educational and economic. Finishing school ranks the highest, with more than 60 percent

² J. Daugherty and C. Copen, "Trends in Attitudes About Marriage, Childbearing, and Sexual Behavior: United States, 2002, 2006–2010, and 2011–2013," *National Health Statistics Reports*, No. 92, National Center for Health Statistics, Hyattsville, MD, 2016.

of people saying that doing so is extremely important to becoming an adult. The emphasis on education underlies the rising student debt that many young people carry. In 2013, 41 percent of young families had student debt, up from 17 percent in 1989.³ Not only do more young families have student debt, they are deeper in debt too. The amount owed on student loans nearly tripled, rising from a median of \$6,000 to \$17,300 across the same period (in 2013 dollars).⁴

Economic security ranks second in the transition to adulthood. About half of adults believe that having a full-time job and being able to financially support a family are extremely important to becoming an adult (Figure 1). Despite the prominence given to economic security, only a quarter of Americans think that moving out of the parents' home is a very important part of adulthood. Given the attention paid to the "boomerang generation" that has "failed to launch," it is surprising that Americans do not rate living independently as a more important step toward adulthood.⁵ Yet in a study by the Pew Research Center, most parents with coresidential adult children are just as satisfied with their living arrangements as parents whose adult children live elsewhere. Similarly, more than 2 in 3 young adults who live at home are very happy with their family life.⁶

³ Young families are those headed by someone under the age of 35. Survey of Consumer Finance, "Table 13: Family Holdings of Debt, by Selected Characteristics of Families and Type of Debt, 1989–2013 Surveys," Board of Governors of the Federal Reserve System, Washington, DC, 2013.

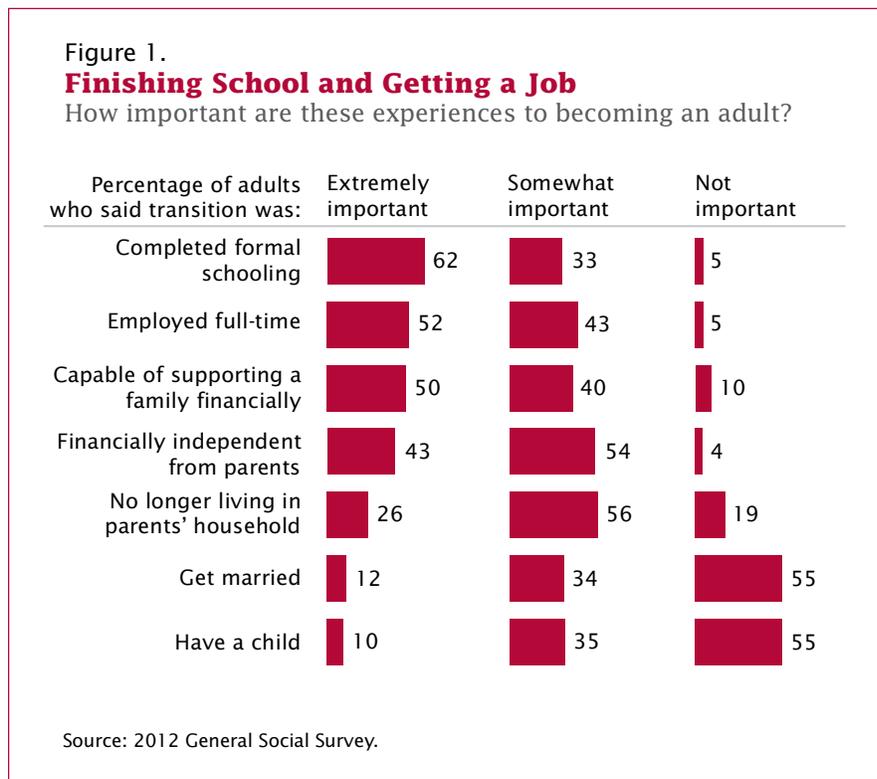
⁴ *ibid.*

⁵ K. Parker, "The Boomerang Generation," *Pew Social and Demographic Trends Report*, Pew Research Center, Washington, DC, 2012.

⁶ *ibid.*

Most Americans Believe Young People Should Be Economically Secure Before Settling Down

The majority of Americans believe education and economic security are extremely important for becoming an adult. What they think about the timing of these milestones is revealing. When asked when people should normally finish school and have a full-time job, the median age was just 22 (Table 1). Ironically, the median age when most Americans believe that people should be financially independent of their parents is just 21, a year earlier than the ideal age for finishing school and working full-time. The contradiction shows that it is not always clear when and in what order young people should experience these milestones. What is clear is that most Americans believe young people should accomplish economic milestones before starting a family. Americans reported that the ideal age for getting married and having



children is 25, the same age when most Americans believe a young person should be capable of supporting a family (Table 1).

Do as I Say, Not as I Do

Believing that young people should be done with school, gainfully employed, and capable of

Table 1.
Milestones of Adulthood

How important are these experiences to becoming an adult?

Milestones	Percentage of adults who said transition was:			Ideal age for completing milestone	Percent with completed milestone by the ideal age
	Extremely important	Somewhat important	Not important		
Completed formal schooling	61.5	33.3	5.2	22	¹ 51.8
Employed full-time	51.5	43.1	5.4	22	36.7
Capable of supporting a family financially	50.0	40.3	9.7	25	² 42.1
Financially independent from parents/guardians	42.8	53.7	3.5	21	³ 28.9
No longer living in parents' household	25.8	55.8	18.5	21	47.1
Get married	11.5	33.9	54.6	25	23.5
Have a child	10.4	34.6	55.1	25	⁴ 38.0

¹ Has a high school diploma or college degree, and has not been enrolled in school in the last 3 months.

² Personal income at least 150 percent of poverty level for a family of three.

³ Personal income at least 150 percent of poverty level for one person.

⁴ Women only.

Note: "Somewhat important" includes respondents who said quite or somewhat important, whereas "Not important" includes respondents who said not too important or not at all important. The ideal age is the median age when respondents think the transition should normally happen. It is asked only of those who said the transition was at least "Somewhat important." Data on the importance of milestones and ideal age for completing milestones come from the 2012 General Social Survey. Data on getting married, employed full-time, and being capable of supporting a family financially or financially independent from parents come from the 2016 Current Population Survey Annual Social and Economic Supplement. Data on having a child come from the 2014 Current Population Survey, June Supplement. And data on completed formal schooling and no longer living in parents' household come from the 2015 American Community Survey.

Source: 2012 General Social Survey; U.S. Census Bureau, 2016 Current Population Survey Annual Social and Economic Supplement; 2014 Current Population Survey, June Supplement; 2015 American Community Survey.

supporting a family by the age of 25 says little about who actually meets these milestones. Many young people fall short of reaching them by the time most Americans believe that they normally should. For example, most Americans believe young people should ideally finish school by the age of 22, but only 52 percent of young people have done so by this age, counting those who have a high school diploma or college degree, and are no longer enrolled (Table 1). Moreover, only 37 percent of 22-year-olds are employed full-time.

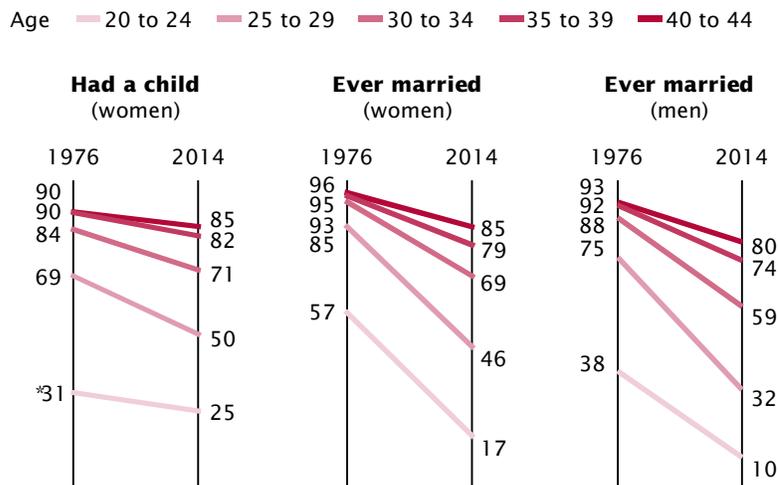
Far more young adults miss the bar set for financial independence: less than 1 in 3 were financially independent of their parents by the age of 21 (when measured by the proportion of 21-year-olds whose income was at least 150 percent of the poverty threshold) (Table 1). The true proportion that is financially independent is probably lower because young people may omit the financial help from their parents, such as a down payment for a mortgage or help paying the rent or other bills, when reporting their income. This kind of help should not be underestimated. About 1 in 3 of all 18- to 34-year-olds rely on their parents for financial assistance.⁷

Family Delayed, but Not Forgone

Although most Americans think that the ideal age people should marry is 25, only about a quarter of adults (around 24 percent) have actually done so by that age (Table 1). Many people do go on to

⁷ R. Schoeni and K. Ross, "Material Assistance From Families During the Transition to Adulthood," *On the Frontier of Adulthood: Theory, Research, and Public Policy*, pp. 396–416, R. Settersten, F. Furstenberg, Jr., and R. Rumbaut, eds., University of Chicago Press, Chicago, IL, 2005.

Figure 2.
Family Delayed, but Not Forgone
Adults who have ever had a child or married: percent change from 1976 to 2014



* 18 to 24 years old for the 1976 data on having had a child.

Source: U.S. Census Bureau, 1976 and 2014 Current Population Survey Annual Social and Economic Supplement for ever married; 1976 and 2014 Current Population Survey, June Supplement for fertility.

marry and have children, just not as young adults. In 1995, women had a 59 percent chance of marrying by the age of 25. As of 2010, they had a 44 percent chance, a decline of 15 percentage points in just 15 years. Nonetheless, their chances of marrying by the age of 40 barely budged across the same period, from an 86 percent chance to an 84 percent chance.⁸ Thus over the long-term, women's chances of marrying are nearly as high as they were 20 years ago, but their chances of marrying as young adults have fallen sharply.

In other words, many Americans put off starting a family until they are older. The trends show up in

⁸ These probabilities represent the average likelihood of an event happening by the specified age. C. Copen et al., "First Marriages in the United States: Data From the 2006–2010 National Survey of Family Growth," *National Health Statistics Reports No. 49*, National Center for Health Statistics: Hyattsville, MD, 2012.

historical data going back to 1976, which illustrate a retreat from marriage and childbearing at younger ages (Figure 2). Among women in their early 20s, the proportion who ever gave birth fell from 31 percent to 25 percent between 1976 and 2014.⁹ The decline in marriage was even steeper, falling from 57 percent to just 17 percent among women aged 20 to 24 years old over the same period (Figure 2). As a result, parenthood now precedes marriage for many women. Nearly 40 percent of all births in the United States are to unmarried women.¹⁰

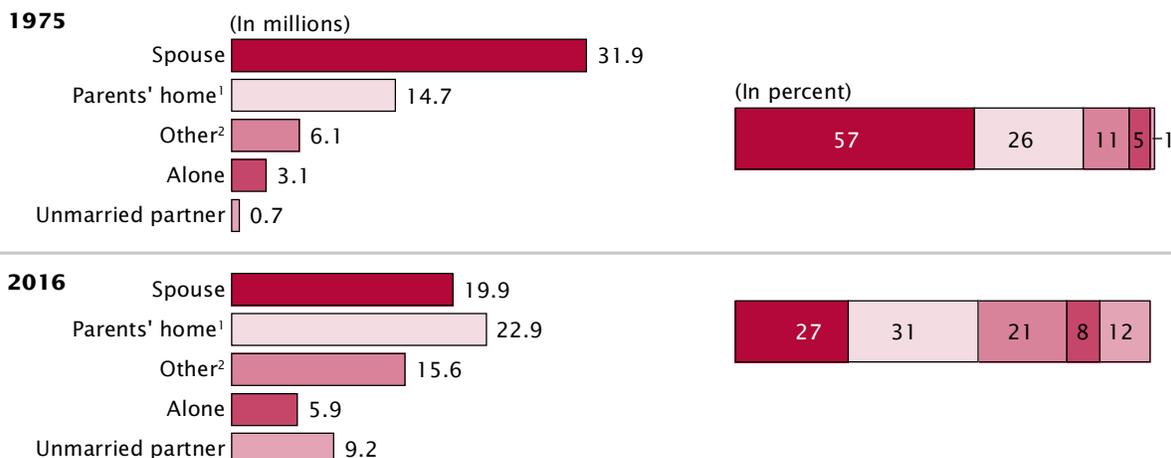
⁹ U.S. Census Bureau, Historical Table 1, "Percent Childless and Births per 1,000 Women in the Last 12 Months: Selected Years, 1976 to 2014," Current Population Survey, June Fertility Supplement, Washington, DC, 2014, <www.census.gov/hhes/fertility/files/cps/historical/H1.xlsx>.

¹⁰ B. Hamilton et al., "Births: Final Data for 2014," *National Vital Statistics Report*, 64(12), National Center for Health Statistics, Hyattsville, MD, 2015.

Figure 3.

More Young Adults Lived With Parents Than a Spouse in 2016

Living arrangements among adults aged 18 to 34: 1975 and 2016



¹ College students who are living in dormitories are counted as living in the parents' home.

² "Other" includes people who are living with relatives besides a spouse, such as siblings or grandparents, and nonrelatives such as roommates.

Source: U.S. Census Bureau, 1975 and 2016 Current Population Survey Annual Social and Economic Supplement.

For the most part, we can still find the same high levels of marriage and parenthood from the 1970s, we just have to look at older ages today. In 1976, over two-thirds of women, some 69 percent, were mothers by the time they were 25 to 29 years old (Figure 2). To find that same proportion today we have to look among women who are aged 30 to 34. The retreat is far more pronounced for marriage. In 1976, some 85 percent of women and 75 percent of men were married by the time they were 29 years old. To find at least that same proportion today, we have to look among people in their early 40s.

What these trends indicate is that young adults are not necessarily giving up on marriage. They are waiting longer. And, if Americans' attitudes are any indication, they expect young people to be done with school and economically secure before marrying (Table 1). In this case, our behaviors reflect

our attitudes. People with a college degree are the most likely to marry and stay married. Research from the National Center for Health Statistics shows that a woman with a college degree is less likely to be married by the age of 25 than one with only a high school diploma.¹¹ By the age of 35, the pattern has reversed: the college-educated woman has a greater chance of being married and staying married than women with any other educational background. A college-educated woman has a 78 percent chance of still being married by her twentieth anniversary. A woman with only a high school diploma has a 41 percent chance.¹²

Delaying Marriage, but Still Living Together

Although young people are delaying marriage, they are not putting off romantic relationships. Over the last 40 years, the number of young

people living with a boyfriend or girlfriend has increased more than 12 times, making it the fastest growing living arrangement among young adults (Figure 3). Not only are they living together without being married, they are doing so at the same age that earlier generations were settling down to marry. Since the 1980s, the age when people start their first coresidential relationship has stayed consistently around 22, whereas the age when they first marry has risen from 22 to 27 for women.^{13, 14} In other words, young adults are still starting relationships at the same age that their parents did, but they are trading marriage for cohabitation.

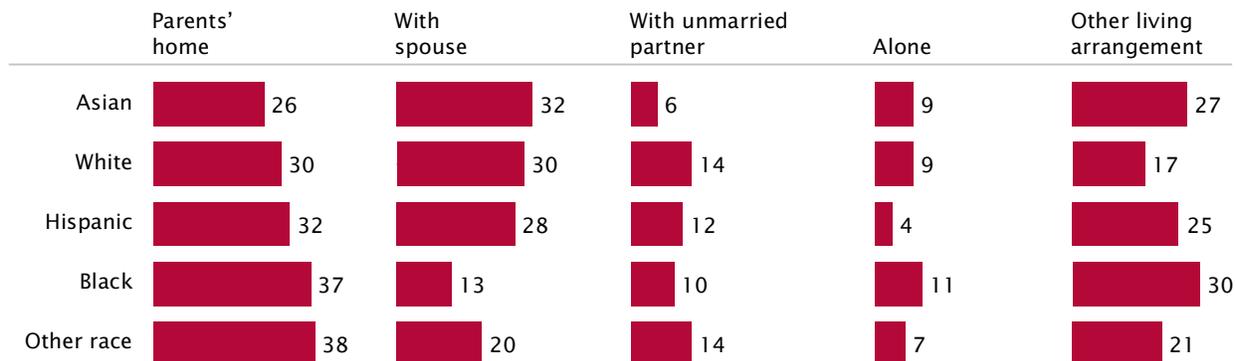
¹³ W.D. Manning, S.L. Brown, and K.L. Payne, "Two Decades of Stability and Change in Age at First Union Formation," *Journal of Marriage and Family*, Vol. 76, No. 2, 2014, pp. 247-260.

¹⁴ U.S. Census Bureau, Table MS-2 Estimated Median Age at First Marriage by Sex, 1890 to 2015, 2015, <www.census.gov/hhes/families/files/ms2.xls>.

¹¹ See footnote 8.

¹² See footnote 8.

Figure 4.
Who's at Home?
 Living arrangements of young adults aged 18 to 34: 2016
 (In percent)



Note: Asian, White, and Black include young adults who reported only that race and were not Hispanic. Other race includes young adults who were not Hispanic, and reported multiple race groups, or were American Indian or Alaska Native alone or Native Hawaiian or Other Pacific Islander alone.

Source: U.S. Census Bureau, 2016 Current Population Survey Annual Social and Economic Supplement.

Alongside the rise of living together without being married, there are more young adults today who are choosing to live alone, move in with roommates, stay in their parents' home, or live with other family members such as siblings (Figure 3). There are now more young people living with their parents than in any other arrangement. What is more, almost 9 in 10 young people who were living in their parents' home a year ago are still living there today, making it the most stable living arrangement for young adults (Tables 4 and 5). The growth in all of these living arrangements has come at the expense of marriage. Over the last 40 years the proportion of young people who were living with a spouse fell by half, from 57 percent to 27 percent (Figure 3). The result is that young people are living in more diverse arrangements than at any point in the last 40 years.

Racial and Ethnic Differences in Young Adult Living Arrangements

More young adults live in their parents' home than in any other living arrangement today (Figure 3). This trend is not the same for all young people. For Hispanics, Blacks, and other race groups, a greater share of young people live at home than in any other arrangement (Figure 4). For Whites, as many live in their parents' home as live with a spouse, while for Asians, living with a spouse is actually the most common arrangement for young people.

If we consider living with a spouse or unmarried partner as one group, then White young adults are the most likely to be living as couples, some 44 percent, while Blacks have the smallest share at 23 percent. Almost half of these Black couples are unmarried, which reflects their relatively low probability of marrying. Blacks have a less than 50 percent chance of marrying by the age of 30, compared with an almost 75 percent chance for Whites and Asians.¹

¹ C. Copen et al., "First Marriages in the United States: Data From the 2006–2010 National Survey of Family Growth," *National Health Statistics Reports*, No. 49, National Center for Health Statistics, Hyattsville, MD, 2012.

The Delay in Marriage and Parenthood Reflect the Growing Complexity of Young Adult Experiences

For decades, researchers have looked at a set of common experiences that signify the transition to adulthood: leaving home, working, marrying, and becoming a parent.¹⁵ To get a better sense of how the transition to adulthood has changed over time, we can look at the most common combination of these four experiences in 1975 (regardless of the order in which young adults completed them). Is this combination of experiences still the most common today?

The most common combination in 1975 was having all four milestones. Close to half (45 percent) of all 25- to 34-year-olds lived away from parents, were ever married, lived with a child, and were in the labor force (Figure 5). The second most common set, another 22 percent, had all of those milestones except they did not work (many of these people were married mothers who, in 1975, were not working outside the home). In other words, there was a good deal of uniformity in what people experienced by their early 30s: the two most common sets of milestones described the experiences of two-thirds of all 25- to 34-year-olds in 1975.

Today, the experiences are more diverse. The most common arrangement is still having all four milestones, but that combination applies to a much smaller proportion of 25- to 34-year-olds: only 24 percent, compared with 45 percent

¹⁵ M. Shanahan et al., "Subjective Age Identity and the Transition to Adulthood: When Do Adolescents Become Adults?" *On The Frontier of Adulthood: Theory, Research, and Public Policy*, pp. 225–255, R. Settersten Jr., F. Furstenberg, Jr., and R. Rumbaut, eds., University of Chicago Press, Chicago, IL, 2005.

in 1975 (Figure 5). The second most common set in 2016, describing about 1 in 4 young people, is living away from parents and being in the labor force, a marked contrast to the second most common set in 1975, which revolved around marriage and parenthood. Taken together, the two most common sets of milestones in 2016 describe just under half of all 25- to 34-year-olds, far less than what the two most common sets described in 1975. Since the rest of the young adults must fit into some combination of these four milestones (even if they have none of them), the conclusion is that the experiences of young people today are more diverse, the transitions to adulthood more varied.¹⁶

THE GROWING ECONOMIC AND DEMOGRAPHIC DIVERSITY OF YOUNG ADULTS

Who young adults live with goes hand in hand with their economic security. Young people tend to put off marriage and parenthood when they are worried about their financial well-being, such as during a recession or when they are unemployed.¹⁷ They weigh the cost of housing in the decision to move and if they perceive that living on their own will be too expensive,

¹⁶ Wayne Osgood et al., "Six Paths to Adulthood: Fast Starters, Parents Without Careers, Educated Partners, Educated Singles, Working Singles, and Slow Starters," *On The Frontier of Adulthood: Theory, Research, and Public Policy*, pp. 320–355, R. Settersten, Jr., F. Furstenberg, Jr., and R. Rumbaut, eds., University of Chicago Press, Chicago, IL, 2005.

¹⁷ V.K. Oppenheimer, "Cohabiting and Marriage During Young Men's Career-Development Process," *Demography*, Vol. 40, 2003, pp. 127–149. See also, T. Sobotka, V. Skirbekk, and D. Philipov, "Economic Recession and Fertility in the Developed World," *Population and Development Review*, Vol. 37, 2011, pp. 267–306, and D. Schneider, "The Great Recession, Fertility, and Uncertainty: Evidence from the United States," *Journal of Marriage and Family*, Vol. 77, 2015, pp. 1144–1156.

young people put off forming their own household.¹⁸ Unemployment also acts as a catalyst for moving back to the parents' home or doubling up in another household, whereas higher incomes make it easier for young adults to live independently.^{19, 20} As a result, decisions about who to live with and whether and when to marry reflect the economic circumstances of young people.

Are Today's Young Adults Better Off Than Prior Generations?

Americans' attitudes about adulthood suggest that some young people should delay traditional experiences, like marrying and starting a family, because they should achieve educational and economic milestones first. They want to finish school and feel financially secure enough that they can support a family. But are they? How do the economic conditions of young people today compare to those in 1975? Here the report focuses on 25- to 34-year-olds, an age group that has had the time to finish school, start working, and form their own households independent of their parents.

¹⁸ F. Billari and A. Liefbroer, "Should I Stay Or Should I Go? The Impact of Age Norms on Leaving Home," *Demography*, Vol. 44, 2007, pp. 181–198.

¹⁹ E. Wiemers, "The Effect of Unemployment on Household Composition and Doubling Up," *Demography*, Vol. 51, 2014, pp. 2155–2178. See also, L. Mykyta and S. Macartney, "Sharing a Household: Household Composition and Economic Well-Being: 2007–2010," *Current Population Report*, P60-242, U.S. Census Bureau, Washington, DC, 2012, and G. Kaplan, "Moving Back Home: Insurance Against Labor Market Risk," *Journal of Political Economy*, Vol. 120, 2012, pp. 446–512.

²⁰ M. Iacovou, "Leaving Home: Independence, Togetherness, and Income," *Advances in Life Course Research*, Vol. 15, 2010, pp. 147–160. See also, J. Ermisch, "Prices, Parents and Young People's Household Formation," *Journal of Urban Economics*, Vol. 45, 1999, pp. 47–71.

Figure 5.

Four Common Milestones of Adulthood—Getting Married, Having Children, Working, and Living Independently

What are the most common combinations that young adults have completed?

(Percentage of young adults aged 25 to 34)

In 1975		In 2016	
Ranking	Milestones	Ranking	Milestones
	Percentage of 25- to 34-year-olds		Percentage of 25- to 34-year-olds
1	All four milestones Lived away from parents, ever married, lived with a child, in the labor force	1	All four milestones Lived away from parents, ever married, lived with a child, in the labor force
	45		24
2	Lived away from parents, ever married, lived with a child	2	Lived away from parents, in the labor force
	22		23
3	Lived away from parents, ever married, in the labor force	3	Lived away from parents, ever married, in the labor force
	15		13
4	Lived away from parents, in the labor force	4	Lived away from parents, in the labor force, lived with a child
	6		8
5	In the labor force only	5	In the labor force only
	3		8
	All other combinations	6	Lived away from parents, ever married, lived with a child
	9		8
			All other combinations
			16

Note: Each ranked group lists only the milestones that the young adults in that group experienced.
 Source: U.S. Census Bureau, 1975 and 2016 Current Population Survey Annual Social and Economic Supplement.

More young people today have a college degree and work full-time, year-round . . .

Today’s young adults are better educated than their peers were in 1975. Among 25- to 34-year-olds, more than one-third have a college degree or higher, compared with less than one-quarter in 1975 (Table 2). However, young women have experienced more dramatic educational changes than men. There are now more young women than young men with a college degree, whereas in 1975 educational attainment among young men outpaced that of women.²¹ Having a more educated population of young adults marks a relative

improvement in their economic condition, given the strong link between higher education and higher earnings.²²

. . . but, young women are pulling ahead, while young men are falling behind.

On the whole, more young people are working today and have a full-time job that employs them year-round (Table 2). The driving force behind the increase, however, has been the rise of young women in the labor force. Whereas the share of men aged 25 to 34 who were employed is about the same today as it was in 1975, the share of young women who were

employed has risen from just under one-half to over two-thirds (Table 2). Even among young women who were out of the labor force, we see a remarkable change in the reason why they were not working. In 1975, virtually all of the young women who were out of the labor force reported the reason why as taking care of home and family (the share of women out of the labor force is only slightly larger than the share who were homemakers, Table 2). But by 2016, less than half of young women who were out of the labor force were homemakers.

Over the last four decades, young women have made considerable economic gains. The median income of women aged 25 to 34 who were working rose from \$23,000 to \$29,000 between 1975

²¹ C. Ryan and K. Bauman, “Educational Attainment in the United States: 2015,” *Current Population Reports*, P20-578, U.S. Census Bureau, Washington, DC, 2016.

²² Bureau of Labor Statistics, “More Education Still Means More Pay in 2014,” *The Economics Daily*, U.S. Department of Labor, Washington, DC, 2014.

Table 2.
Young Women’s Economic Gains Are Outpacing Men’s
Economic and educational characteristics of young adults aged 25 to 34
(In percent)

Characteristics	1975			2016		
	All	Men	Women	All	Men	Women
Total (in thousands)	30,101	14,785	15,316	43,751	21,838	21,912
Work						
Employed.	66.8	84.9	49.3	77.0	83.7	70.4
Worked full-time, year-round ¹	46.0	66.7	26.0	57.3	66.6	48.1
Unemployed.	6.3	7.7	4.9	4.5	5.1	4.0
Not in labor force	26.9	7.4	45.8	18.4	11.2	25.7
Homemaker ²	N	N	42.9	7.5	1.0	13.9
Education						
Bachelor’s degree or higher.	22.8	27.4	18.4	37.0	34.0	40.0
Associate’s degree or some college	20.0	21.8	18.2	28.8	27.6	30.1
High school diploma	39.6	34.5	44.6	25.6	29.2	22.1
No high school diploma	17.6	16.3	18.8	8.5	9.2	7.8
Economic Resources						
Homeowner ³	51.9	48.7	55.0	28.8	26.6	31.1
Personal income (median) ⁴	\$36,858	\$45,908	\$22,895	\$34,837	\$40,401	\$29,429
\$0–\$29,999	52.8	25.0	79.6	49.7	41.4	58.1
\$30,000–\$59,999	33.6	49.0	18.8	32.0	35.1	28.8
\$60,000–\$99,999	11.9	22.7	1.5	12.9	15.9	9.9
\$100,000 or more.	1.7	3.3	0.2	5.4	7.6	3.2

N Not available.
¹ Worked at least 50 weeks in the year prior to interview and worked at least 35 hours per week.
² Only asked of women in 1975. To be considered a homemaker, young adults must not be in the labor force and, when asked why, report that they are taking care of home and family.
³ To be considered a homeowner, young adults must be living in their own household as the householder or spouse of the householder, and they must own or be buying the housing unit (i.e., not renting).
⁴ Income shown in 2015 dollars, adjusted for inflation using the research series of the Consumer Price Index (CPI-U-RS), provided by the U.S. Bureau of Labor Statistics.
 Source: U.S. Census Bureau, 1975 and 2016 Current Population Survey Annual Social and Economic Supplement.

and today (in 2015 dollars, Table 2). At the same time, the share of young women who earned \$60,000 or more grew from about 2 percent to 13 percent—a minority, but still a sizeable change. Even with this change, however, the median income of young women is still \$11,000 lower than the income of young men.

While young women made gains, some young men fell behind. Since 1975, young men have swelled the ranks at the bottom of the income distribution. Some 41 percent of all men aged 25 to 34 have incomes less than \$30,000 today, up from 25 percent in 1975. Growth at the bottom, and to a smaller extent the top, came at the expense of the middle. Between 1975 and 2016, the share of young men with incomes in the middle (\$30,000 to \$59,999) fell from 49 percent to 35 percent, while the share at the very top (\$100,000 or more) grew from 3 percent to 8 percent (Table 2).

Living Arrangements During Young Adulthood: The Majority of Young Adults No Longer Live in Their Own Household

Historically, the transition to adulthood for many young people has involved leaving their parents' home and establishing their own household.²³ The timing of setting up an independent household has been tied to when young adults marry and start a family. Homeownership especially is tied to marriage and family, as it is typical in the United States for married couples to live independently of

²³ S. Ruggles, "Patriarchy, Power, and Pay: The Transformation of American Families, 1800–2015." *Demography*, Vol. 52, 2015, pp. 1797–1823. See also, T. Burch and B. Matthews, "Household Formation in Developed Societies," *Population and Development Review*, Vol. 13, 1987, pp. 495–511.

their parents.²⁴ But as young people continue delaying marriage, they still set up their own households whether they live alone or with an unmarried partner.²⁵ Living in an independent household is expensive and the ability to do so hinges, in part, on young adults' economic resources as well as the costs of rent and homeownership.²⁶ The next section of this report (and Tables 4, 5, and 6) focuses on differences in the economic characteristics of young adults across three different arrangements: whether they live independently in their own household, live in their parents' household, or live with roommates.

Within the last 10 years, the breadth and speed of change in living arrangements have been tremendous. In 2005, the majority of young people lived independently in their own household (either alone, with a spouse, or an unmarried partner), which was the predominant living arrangement in 35 states. By 2015—just a decade later—only six states had a majority of young people living

²⁴ J. Henretta, "Family Transitions, Housing Market Context, and First Home Purchase by Young Married Households," *Social Forces*, Vol. 66, 1987, pp. 520–536. See also, W. Clark et al., "Tenure Changes in the Context of Micro Level Family and Macro Level Economic Shifts," *Urban Studies*, Vol. 31, 1994, pp. 137–154, and C. Mulder, "Homeownership and Family Formation," *Journal of Housing and the Built Environment*, Vol. 21, 2006, pp. 281–298.

²⁵ E. Klinenberg, *Going Solo: The Extraordinary Rise and Surprising Appeal of Living Alone*, Penguin, New York, NY, 2012. See also, C. Mulder and W. Clark, "Leaving Home and Leaving the State: Evidence from the United States," *Population, Space, and Place*, Vol. 6, 2000, 432–437.

²⁶ M. Hughes, "Home Economics: Metropolitan Labor and Housing Markets and Domestic Arrangements in Young Adulthood," *Social Forces*, Vol. 81, 2003, pp. 1399–1429. See also, J. Ermisch, "Prices, Parents and Young People's Household Formation," *Journal of Urban Economics*, Vol. 45, 1999, pp. 47–71.

independently (Table 3).²⁷ Some areas of the country, like Florida and Nevada, have seen a faster transformation over the past 10 years, while others, like North Dakota and South Dakota, have seen little change (Table 3). Of the top five states where the most young adults lived independently in 2015, all were in Midwest and Plains states. North Dakota ranked the highest with 60 percent of young adults living in their own household and, along with South Dakota, was the only state that has not witnessed a decline in young adults living independently over the last decade. The remaining four of the top five states in 2015 were South Dakota, Iowa, Wyoming, and Nebraska.

Why are there geographic differences in young adult living arrangements? For one, local labor and housing markets shape the ability of young people to find good jobs and affordable housing, which in turn affects whether and when they form their own households. Apart from local markets, patterns in migration may help create geographic differences in young adult living arrangements. For example, single people may be more likely to relocate for school or work. If many single young adults move to the same area, that area might see higher rates of living alone or with roommates. Last, there may be cultural norms in parts of the country that drive particular living arrangements, reflected in higher marriage rates or earlier ages at first marriage.

²⁷ As shown in Table 3, this estimate includes state-like entities such as Washington, DC.

Table 3.

A Decade of Change: The State of Young Adult Living Arrangements

Change in living arrangements for young adults aged 18 to 34 between 2005 and 2015

States	Total 2005	Total 2015	Percent living in parents' home ¹			Percent living independently ²			Percent living with roommates ³		
			In 2005	In 2015	Change	In 2005	In 2015	Change	In 2005	In 2015	Change
Total	65,081,164	70,872,118	26.0	34.1	8.1	51.0	40.7	-10.3	23.0	25.2	2.2
Alabama	995,907	1,029,932	26.9	35.0	8.1	50.2	40.0	-10.2	22.8	25.1	2.3
Alaska	142,895	187,338	24.0	30.0	6.0	57.2	45.2	-12.0	18.8	24.9	6.1
Arizona	1,387,424	1,498,219	20.4	31.6	11.2	54.3	41.6	-12.7	25.3	26.8	1.5
Arkansas	604,430	628,225	22.5	27.5	5.0	57.4	47.9	-9.5	20.1	24.6	4.5
California	8,335,088	9,363,171	27.9	38.1	10.2	44.8	33.1	-11.7	27.3	28.8	1.5
Colorado	1,128,498	1,288,232	18.6	24.6	6.0	57.4	46.9	-10.5	24.1	28.5	4.4
Connecticut	653,418	727,451	32.8	41.6	8.8	46.8	35.3	-11.5	20.5	23.2	2.7
Delaware	179,588	198,119	22.9	36.2	13.3	52.0	39.7	-12.3	25.1	24.1	-1.0
District of Columbia	137,253	206,059	13.5	16.6	3.1	50.4	41.1	-9.3	36.1	42.3	6.2
Florida	3,569,254	4,165,187	25.3	38.3	13.0	49.7	35.0	-14.7	24.9	26.6	1.7
Georgia	2,159,880	2,256,730	23.2	34.2	11.0	52.0	39.9	-12.1	24.8	25.8	1.0
Hawaii	263,263	323,785	32.5	33.7	1.2	40.5	35.9	-4.6	27.0	30.4	3.4
Idaho	331,799	356,749	19.8	26.9	7.1	59.8	49.1	-10.7	20.4	23.9	3.5
Illinois	2,874,201	2,862,173	28.4	36.5	8.1	49.9	40.3	-9.6	21.7	23.2	1.5
Indiana	1,358,496	1,411,567	23.2	31.9	8.7	57.6	46.0	-11.6	19.2	22.1	2.9
Iowa	632,576	653,820	19.8	22.8	3.0	60.2	54.9	-5.3	20.0	22.4	2.4
Kansas	618,385	645,292	21.4	26.0	4.6	57.8	50.8	-7.0	20.9	23.2	2.3
Kentucky	912,390	918,524	25.0	30.0	5.0	56.4	48.1	-8.3	18.6	21.9	3.3
Louisiana	1,031,839	1,066,596	30.5	33.8	3.3	46.8	41.2	-5.6	22.6	25.0	2.4
Maine	249,819	243,869	25.0	31.7	6.7	55.6	47.2	-8.4	19.4	21.1	1.7
Maryland	1,161,924	1,309,727	29.1	38.5	9.4	46.1	35.6	-10.5	24.8	26.0	1.2
Massachusetts	1,333,145	1,473,188	28.7	37.0	8.3	46.9	36.4	-10.5	24.3	26.6	2.3
Michigan	2,147,381	2,091,966	27.6	34.9	7.3	52.0	42.3	-9.7	20.4	22.8	2.4
Minnesota	1,142,094	1,184,810	22.9	27.3	4.4	56.3	49.7	-6.6	20.7	23.0	2.3
Mississippi	647,602	634,479	30.3	36.8	6.5	45.5	37.3	-8.2	24.2	26.0	1.8
Missouri	1,265,360	1,300,061	23.4	28.6	5.2	55.9	48.0	-7.9	20.8	23.4	2.6
Montana	196,172	214,178	19.5	24.1	4.6	58.0	51.3	-6.7	22.6	24.6	2.0
Nebraska	395,110	416,098	20.2	22.7	2.5	59.9	53.8	-6.1	19.9	23.5	3.6
Nevada	565,911	649,537	19.4	31.3	11.9	54.4	40.0	-14.4	26.1	28.8	2.7
New Hampshire	247,070	258,019	27.6	36.5	8.9	53.5	43.5	-10.0	18.8	20.0	1.2
New Jersey	1,730,615	1,858,390	36.1	46.9	10.8	43.2	33.1	-10.1	20.7	20.0	-0.7
New Mexico	424,684	457,390	25.6	36.0	10.4	52.9	40.1	-12.8	21.5	23.9	2.4
New York	4,103,168	4,511,095	33.2	40.6	7.4	42.6	33.1	-9.5	24.2	26.3	2.1
North Carolina	1,911,237	2,140,661	21.7	31.1	9.4	54.9	44.1	-10.8	23.4	24.7	1.3
North Dakota	140,705	192,278	17.6	14.1	-3.5	63.4	60.4	-3.0	19.0	25.5	6.5
Ohio	2,415,973	2,410,813	25.8	31.3	5.5	54.4	45.9	-8.5	19.8	22.8	3.0
Oklahoma	799,224	871,233	21.3	26.7	5.4	57.9	48.6	-9.3	20.8	24.7	3.9
Oregon	824,665	876,835	18.5	26.7	8.2	58.0	44.3	-13.7	23.5	29.0	5.5
Pennsylvania	2,426,315	2,619,241	30.5	37.1	6.6	49.3	41.4	-7.9	20.2	21.5	1.3
Rhode Island	219,786	229,657	28.6	37.1	8.5	46.4	36.3	-10.1	25.0	26.6	1.6
South Carolina	914,915	1,034,157	25.7	33.5	7.8	50.6	40.5	-10.1	23.7	26.0	2.3
South Dakota	167,572	179,718	19.5	19.9	0.4	59.3	56.8	-2.5	21.2	23.3	2.1
Tennessee	1,320,466	1,417,748	24.2	31.4	7.2	54.2	44.0	-10.2	21.6	24.6	3.0
Texas	5,458,959	6,461,979	24.3	33.2	8.9	53.3	42.3	-11.0	22.4	24.5	2.1
Utah	720,498	752,616	21.7	28.6	6.9	57.1	46.3	-10.8	21.1	25.0	3.9
Vermont	120,199	119,405	24.7	30.4	5.7	53.2	45.2	-8.0	22.1	24.5	2.4
Virginia	1,615,582	1,838,572	24.7	32.3	7.6	51.3	41.6	-9.7	24.0	26.1	2.1
Washington	1,434,024	1,642,844	21.2	26.6	5.4	55.5	47.6	-7.9	23.3	25.8	2.5
West Virginia	368,696	356,718	27.4	32.9	5.5	55.6	44.5	-11.1	17.0	22.6	5.6
Wisconsin	1,184,537	1,205,671	23.7	27.4	3.7	55.4	49.7	-5.7	20.9	22.9	2.0
Wyoming	111,172	131,996	18.1	20.9	2.8	61.3	54.7	-6.6	20.6	24.4	3.8

¹ Child of the householder, regardless of the young adult's marital status.² The young adult lives alone, is the householder living with a spouse or unmarried partner, or is the spouse or unmarried partner of the householder.³ Living with other relatives or nonrelatives.

Source: U.S. Census Bureau, 2005 and 2015 American Community Survey, 1-Year Data File.

Table 4.

More Than Half of Younger Millennials Live in Their Parents' Home

Demographic and economic characteristics of young adults aged 18 to 24: 2015

Characteristics	Living in parents' home ¹		Living independently ²		Living with roommates ³	
	Number	Percent	Number	Percent	Number	Percent
Total	15,795,266	100.0	4,458,204	100.0	7,757,228	100.0
DEMOGRAPHICS AND HEALTH						
Sex						
Women	7,316,710	46.3	2,587,170	58.0	3,850,640	49.6
Men	8,478,556	53.7	1,871,034	42.0	3,906,588	50.4
Age						
18 to 19	5,459,426	34.6	249,603	5.6	1,328,036	17.1
20 to 24	10,335,840	65.4	4,208,601	94.4	6,429,192	82.9
Race, Non-Hispanic						
White alone	8,147,667	51.6	2,851,558	64.0	4,054,476	52.3
Black alone	2,349,574	14.9	463,235	10.4	1,202,915	15.5
Asian alone	768,853	4.9	137,164	3.1	534,140	6.9
Other race	665,474	4.2	178,622	4.0	337,825	4.4
Hispanic (any race)	3,863,698	24.5	827,625	18.6	1,627,872	21.0
Has a disability ⁴	1,043,993	6.6	224,079	5.0	413,383	5.3
ECONOMICS AND EDUCATION						
Work Status						
Employed	9,033,467	57.2	3,398,930	76.2	4,981,017	64.2
Worked full-time, year-round	2,813,361	17.8	2,108,857	47.3	2,174,107	28.0
Mean hours worked per week	29.9	X	38.3	X	33.3	X
Unemployed	1,594,298	10.1	247,436	5.6	642,978	8.3
Not in labor force	5,167,501	32.7	811,838	18.2	2,133,233	27.5
Educational Attainment						
Bachelor's degree or higher ⁵	1,312,497	8.3	847,812	19.0	1,004,499	12.9
Associate's degree or some college	6,632,410	42.0	1,929,764	43.3	3,543,912	45.7
High school diploma or less	7,850,359	49.7	1,680,628	37.7	3,208,817	41.4
Enrolled in school	8,463,376	53.6	1,198,279	26.9	3,585,994	46.2
Personal Income⁶						
\$0–\$29,999	14,973,114	94.8	3,415,553	76.6	6,917,118	89.2
\$30,000–\$59,999	736,414	4.7	885,252	19.9	715,064	9.2
\$60,000–\$99,999	70,908	0.4	134,984	3.0	101,290	1.3
\$100,000 or more	13,213	0.1	21,950	0.5	22,876	0.3
HOUSING AND RESIDENCY						
Type						
Single-family home	12,511,540	79.2	1,627,531	36.5	3,975,428	51.2
Apartment or multifamily building	2,420,974	15.3	2,506,900	56.2	3,390,518	43.7
Other housing type	862,752	5.5	323,773	7.3	391,282	5.0
Lived at same address a year ago	14,127,196	89.4	2,157,685	48.4	4,505,942	58.1
Tenure						
Owned home	10,830,698	68.6	802,211	18.0	2,458,831	31.7
Rented	4,964,568	31.4	3,655,993	82.0	5,298,397	68.3

X Not applicable.

¹ Child of the householder, regardless of the young adult's marital status.² The young adult lives alone, or is the householder living with a spouse or unmarried partner, or is the spouse or unmarried partner of the householder.³ Living with other relatives or nonrelatives.⁴ "Has a disability" means the young adult reported having at least one of the following six types of disabilities: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, or independent living difficulty.⁵ Most 18- to 24-year-olds will not have had time to finish a traditional 4-year degree. However, the table shows bachelor's degree so that the other two categories, some college and high school diploma, are still directly comparable with those in Table 5.⁶ Excludes young adults with incomes less than \$0.

Source: U.S. Census Bureau, 2015 American Community Survey, 1-Year Data File.

Table 5.

Less Than Two-Thirds of Older Millennials Live Independently

Demographic and economic characteristics of young adults aged 25 to 34: 2015

Characteristics	Living in parents' home ¹		Living independently ²		Living with roommates ³	
	Total	Percent	Total	Percent	Total	Percent
Total	8,381,719	100.0	24,361,670	100.0	10,118,031	100.0
DEMOGRAPHICS AND HEALTH						
Sex						
Women	3,679,325	43.9	12,662,051	52.0	5,252,256	51.9
Men	4,702,394	56.1	11,699,619	48.0	4,865,775	48.1
Age						
25 to 29	5,496,782	65.6	10,476,186	43.0	5,761,676	56.9
30 to 34	2,884,937	34.4	13,885,484	57.0	4,356,355	43.1
Race, Non-Hispanic						
White alone	4,191,760	50.0	15,525,081	63.7	4,702,087	46.5
Black alone	1,428,202	17.0	2,167,943	8.9	1,836,600	18.2
Asian alone	571,458	6.8	1,553,525	6.4	749,956	7.4
Other race	326,003	3.9	746,193	3.1	365,294	3.6
Hispanic (any race)	1,864,296	22.2	4,368,928	17.9	2,464,094	24.4
Has a disability ⁴	904,027	10.8	1,019,146	4.2	629,653	6.2
ECONOMICS AND EDUCATION						
Work Status						
Employed	5,778,467	68.9	19,869,452	81.6	7,863,056	77.7
Worked full-time, year-round	3,650,765	43.6	15,556,869	63.9	5,616,542	55.5
Mean hours worked per week	37.1	X	41.6	X	39.5	X
Unemployed	850,850	10.2	829,979	3.4	681,695	6.7
Not in labor force	1,752,402	20.9	3,662,239	15.0	1,573,280	15.5
Educational Attainment						
Bachelor's degree or higher	2,067,987	24.7	9,964,959	40.9	2,863,508	28.3
Associate's degree or some college	2,839,777	33.9	7,562,896	31.0	3,210,941	31.7
High school diploma or less	3,473,955	41.4	6,833,815	28.1	4,043,582	40.0
Enrolled in school	1,275,605	15.2	2,563,726	10.5	1,424,952	14.1
Personal Income⁵						
\$0-\$29,999	6,246,561	74.6	10,997,674	45.2	6,402,325	63.3
\$30,000-\$59,999	1,730,304	20.7	8,291,726	34.1	2,705,916	26.8
\$60,000-\$99,999	336,456	4.0	3,653,443	15.0	806,182	8.0
\$100,000 or more	65,105	0.8	1,408,061	5.8	201,060	2.0
HOUSING AND RESIDENCY						
Type						
Single-family home	6,686,540	79.8	14,530,608	59.6	5,478,158	54.1
Apartment or multifamily building	1,232,904	14.7	8,609,516	35.3	4,136,030	40.9
Other housing type	462,275	5.5	1,221,546	5.0	503,843	5.0
Lived at same address a year ago	7,341,159	87.6	18,004,804	73.9	7,177,646	70.9
Tenure						
Owned home	6,230,071	74.3	10,918,075	44.8	3,439,069	34.0
Rented	2,151,648	25.7	13,443,595	55.2	6,678,962	66.0

X Not applicable.

¹ Child of the householder, regardless of the young adult's marital status.² The young adult lives alone, or is the householder living with a spouse or unmarried partner, or is the spouse or unmarried partner of the householder.³ Living with other relatives or nonrelatives.⁴ "Has a disability" means the young adult reported having at least one of the following six types of disabilities: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, or independent living difficulty.⁵ Excludes young adults with incomes less than \$0.

Source: U.S. Census Bureau, 2015 American Community Survey, 1-Year Data File.

Table 6.

One in Four Young People Living at Home Are Neither in School Nor Working

Characteristics of young adults aged 25 to 34 living in the parents' home in 2015

Characteristics	Enrolled or working		Neither enrolled nor working ¹	
	Total	Percent	Total	Percent
Total	6,218,882	100.0	2,162,837	100.0
DEMOGRAPHICS AND HEALTH				
Sex				
Women	2,760,638	44.4	918,687	42.5
Men	3,458,244	55.6	1,244,150	57.5
Age				
25 to 29	4,202,426	67.6	1,294,356	59.8
30 to 34	2,016,456	32.4	868,481	40.2
Has a child	1,087,299	17.5	462,655	21.4
Race, Non-Hispanic				
White alone	3,093,788	49.7	1,097,972	50.8
Black alone	985,022	15.8	443,180	20.5
Asian alone	477,887	7.7	93,571	4.3
Other race	224,231	3.6	101,772	4.7
Hispanic (any race)	1,437,954	23.1	426,342	19.7
Has a disability ²	307,912	5.0	596,115	27.6
EDUCATION				
Bachelor's degree or higher	1,812,320	29.1	255,667	11.8
Associate's degree or some college	2,332,733	37.5	507,044	23.4
High school diploma or less	2,073,829	33.3	1,400,126	64.7
RESIDENCY				
Lived at same address a year ago	5,473,308	88.0	1,867,851	86.4

¹ "Neither enrolled nor working" means that the young adult was not enrolled in classes within the last 3 months, plus they were either unemployed or not engaged in the labor force at the time of interview.

² "Has a disability" means the young adult reported having at least one of the following six types of disabilities: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, or independent living difficulty.

Source: U.S. Census Bureau, 2015 American Community Survey, 1-Year Data File.

Young Adults Who Are Economically Secure Tend to Live Independently

Who young adults live with reflects, in part, their economic security.

Today, of the 28 million young millennials (aged 18 to 24), 16 million—more than half—live in their parents' home, a group that is more likely to be enrolled in school and out of the labor force than their peers in other living arrangements (Table 4). Among older millennials (aged 25 to 34) who lived in their own household in 2015, about 41 percent had at least a bachelor's degree and about two-thirds had a full-time job that employed them year-round (Table 5). In contrast,

their peers who lived with parents or roommates were less likely to have a bachelor's degree or a job that employed them full-time, year-round.

Overall, the picture of living with parents or roommates is one of young people who are working toward a firmer footing. For both young and older millennials in these arrangements, they are more likely to be enrolled in school than their peers living independently (Tables 4 and 5). In line with attitudes about the importance of education for becoming an adult, many young people wait to set up their own household until after they finish school. Living on their own

can be expensive, so young people who live independently tend to have higher incomes, even among young millennials. Among older millennials, more than half of those who live in their own household have incomes of at least \$30,000, compared with only one-third of their peers living with roommates and one-quarter living with parents (Table 5).

Living arrangements are more than just a matter of economics. A higher proportion of older millennials living with parents have a disability of some kind (Table 5). They may be living at home because they need instrumental support or caregiving, factors that could affect

their ability to work. Indeed, adult children who are disabled are more likely to live with their parents.²⁸ Seen in this light, the lower rates of working among people living at home may be linked to poorer health and disability.

A Closer Look at Young People Living at Home: 1 in 4 Are Idle, Neither Going to School nor Working

It is easy to think of young people living in their parents' home as a homogeneous group, as though they were all unemployed and dependent on their parents' support. At 24.2 million people, the population of 18- to 34-year-olds living at home is a large and diverse group.²⁹ Most of them—about 81 percent—are either working or going to school. This should not be surprising because most people aged 18 to 24 are living in their parents' home, attending classes or working part-time. On the other hand, we might be surprised if their older peers do not contribute to the family budget because they have had more time to finish school and find a stable job. Yet, of the 8.4 million 25- to 34-year-olds living at home, about 1 in 4 are idle, meaning they are not in school and do not work (Table 6).

Who are these young adults who are not in the labor force or going to school? They tend to be older millennials who are White or Black and have only a high school education, compared with their peers

²⁸ A. Smits, R. van Gaalen, and C. Mulder, "Parent-Child Coresidence: Who Moves in With Whom and For Whose Needs?" *Journal of Marriage and Family*, Vol. 72, 2010, pp. 1022–1033.

²⁹ The total number of young people living at home comes from Tables 4 and 5, using the American Community Survey. This estimate of 24.2 million does not match the estimate shown in Figure 3, which uses the Current Population Survey. The surveys use different sampling and weighting procedures, which may affect the estimates. See the Methodology for more information.

who are working or going to school while living at home (Table 6). But they may not be idle for want of effort. They are more likely to have a child, so they may be caring for family, and over one-quarter have a disability of some kind (Table 6). That so many are disabled suggests that they have limitations in their ability to attend classes, study, find work, or keep a regular job. Recent stories on boomerang children returning home focus on economic downturns, unforgiving job markets, and high rents.³⁰ Though often overlooked in these stories, young people's health may play an important role in their decision to live with parents.

CONCLUSION

If one theme describes how adulthood has changed over the last 40 years, it is growing complexity. In 1975, there was one predominant adult milestone—family formation—that people largely experienced during their 20s. Today, while the milestones have remained the same, the pathways are more diverse. Those who marry and become parents by their late 20s are the minority; growing shares of young adults live alone, with roommates, or with an unmarried partner. That young people wait to settle down and start families tells us about their behavior, but not how they feel about their experiences. More than half of all Americans believe that getting married and having children are not important to becoming an adult. In contrast, more than 9 in 10 Americans believe that finishing school and being gainfully employed are important milestones of adulthood. What is revealing is the timing of these milestones

³⁰ K. Parker, "The Boomerang Generation: Feeling OK About Living With Mom and Dad," Pew Research Center, Pew Social and Demographic Trends, Washington, DC, 2012. See also, news stories by *Forbes*, the *Wall Street Journal*, *Slate*, and the *New York Times*.

which most Americans believe should happen before marriage. Having a history of work experience, and presumably savings and financial security, as a prelude to settling down suggests that marriage is a capstone experience,³¹ one that comes after (sometimes years after) young people feel financially secure.

The complexity of the pathways to adulthood extends to economic conditions, as well. Today, more young people work full-time and have a college degree than their peers did in 1975, but fewer own their home. Whereas young women have made economic gains, some young men are falling behind. Compared to their peers in 1975, young men are more likely to be absent from the work force and a far higher share today are at the bottom of the income ladder. It is little surprise then that those still living with parents are disproportionately young men. Taken together, the changing demographic and economic experiences of young adults reveal a period of adulthood that has grown more complex since 1975, a period of changing roles and new transitions as young people redefine what it means to become adults.³²

METHODOLOGY

Estimating How Many Young Adults Live in the Parental Home: Differences Between the American Community Survey and Current Population Survey

This study uses both the American Community Survey (ACS) and Current Population Survey (CPS) to estimate the number of young adults living in their parents' home.

³¹ A. Cherlin, *The Marriage-Go-Round: The State of Marriage and the Family in America Today*, Vintage, New York, NY, 2010.

³² J. Silva, "Constructing Adulthood in an Age of Uncertainty," *American Sociological Review*, Vol. 77, 2012, pp. :505–522.

The 2015 ACS estimates that about 24.2 million 18- to 34-year-olds lived in their parents' home (Tables 4 and 5), compared with 22.9 million in the 2016 CPS. Differences between the surveys in data collection methods and coverage, weighting, and editing may affect the estimate. One major difference between the surveys that may affect these numbers is that the ACS estimates of householders are controlled to match the estimate of occupied housing units, while this is not true in the CPS. Therefore, the overall estimate of households in the two surveys differs considerably, which may affect the count of young adults living in their parents' home. For more information on the differences in household estimates across Census Bureau surveys, see the paper by Cresce, Cheng, and Grieves.³³ The CPS has an additional caveat in that the survey counts college students living in dormitories as if they were living in their parents' home, while the ACS counts them in the dormitories (group quarters). The reason that this report includes the CPS estimate is for historical comparisons. The ACS did not begin until 2005, so the study can only look back to 1975 using the CPS.

Data From the General Social Survey on the Milestones of Adulthood

The General Social Survey <<http://gss.norc.org/>> asked about the milestones of adulthood in a special module fielded in 2012, which was developed by the MacArthur Research Network on Transitions to Adulthood. It collected answers from respondents who were aged 18 and older on how important specific milestones

were in order to be considered an adult. The survey asked about all of the milestones in the same way: "People differ in their ideas about what it takes for a young person to become an adult these days. How important is it for them to have/be..."

- Financially independent from their parents/guardians?
- No longer living in their parents' household?
- Completed their formal schooling?
- Employed full-time?
- Capable of supporting a family financially?
- A child?
- Gotten married?

Response categories were extremely important, quite important, somewhat important, not too important, and not important. This report collapses these categories into three groups. As shown in Table 1, extremely important includes respondents who said the milestone was extremely important, somewhat important includes those who said it was quite important or somewhat important, and not important includes respondents who said either not too important or not important at all. For each milestone, respondents who said the experience was at least somewhat important were then asked a follow up question: By what age should the experience normally occur? This report takes the median age that respondents replied and shows it as the ideal age for completing the milestone (Figure 1 and Table 1). Missing data from refusals and don't know answers (typically less than 1 percent of respondents for each question) are excluded from the analysis.

Family Delayed, but Not Forgone

Data on fertility and childbearing is reported only for women because the CPS June Fertility Supplement surveys only female respondents. Although data are reported for 20- to 24-year-olds, the fertility estimates for 1976 also include 18- and 19-year-olds. Estimates on marriage come from the CPS Annual Social and Economic Supplement and use marital status to determine whether respondents were ever married. The category includes people who were at least 18 years old and who reported being married (regardless of whether their spouse was present in the household), separated, divorced, or widowed (Figure 2).

More Young Adults Lived With Parents Than a Spouse in 2016

Figure 3 groups 18- to 34-year-olds into five mutually exclusive living arrangements:

- *Spouse*: Any young adult who lives with a spouse, regardless of whether anyone else is present in the household (e.g., parents, roommates, other family members).
- *Parents' home*: The young adult is reported as the child of the householder and is not living with a spouse or cohabiting partner. Estimates include college students who are living in dormitories.
- *Alone*: The young adult is the only person living in the household.
- *Partner*: The young adult lives with an unmarried partner. For 1975, the estimate of unmarried couples uses an indirect measure called POSSLQ (partners of the opposite sex sharing living quarters), because respondents could not report unmarried partners. POSSLQ includes

³³ A. Cresce, Y. Cheng, and C. Grieves, "Household Estimates Conundrum: Effort to Develop More Consistent Household Estimates Across Surveys," Paper presented at the 2013 meeting of the Federal Committee on Statistical Methodology, Washington, DC.

only households that have just two adults, one man and one woman, who are unrelated to each other, have no spouse present and are at least 18 years old. Children may or may not be present in the household. For 2016, the estimate relies on a direct question asking about the presence of unmarried partners, including all cohabiting partners, regardless of whether they are the householder. The 2016 estimate includes same sex unmarried couples.

- *Other:* All living arrangements that were not already covered, including people who were living with relatives other than a spouse, such as siblings or grandparents, as well as nonrelatives such as roommates.

Race Differences in Living Arrangements

For information about the living arrangement categories, see the notes for Figure 3. The race categories for Asian, White, and Black include young adults who reported

that they were only that race and were not Hispanic (Figure 4). Other races include several groups: young adults who were not Hispanic, and reported either multiple race groups or were American Indian or Alaska Native, or Native Hawaiian or Other Pacific Islander.

The Changing Milestones of Adulthood

Figure 5 shows four common milestones of adulthood:

- *Living away from parents:* Includes any person aged 25 to 34 who is not the child of the householder (i.e., living in the parents' household). The category includes those who are householders, spouse of the householder, roommates, cohabiting partners, and people in any other living arrangement.
- *Ever married:* Includes people who are at least 25 years old and reported being married (regardless of whether their spouse was present in the household), separated, divorced, or widowed.
- *Living with a child:* Living in a household that includes someone under the age of 18. Ideally, this report would use fertility data to see whether respondents had ever become parents, but those data are not available in the CPS. In the 1975 data, it is also difficult to identify parents and children in cases where the parent is not the householder (i.e., identifying subfamilies in someone else's household). As a result, the study uses a recode variable that indicates the presence of children under the age of 18 in the household, which is available for both 1975 and 2016, so that the estimates are directly comparable across time.
- *In the labor force:* Includes any person aged 25 to 34 who is employed or unemployed at the time of the survey. The report counts members of the armed forces as if they were in the labor force.

Economic and Educational Characteristics

Median income was calculated only for 25- to 34-year-olds who were in the labor force (employed or unemployed) (Table 2). Thus, it is a gauge of how the typical worker in 2016 compared with his or her counterpart in 1975. Data on being a homemaker is only available for women in 1975 because at that time the CPS did not ask male respondents whether they were taking care of home or family.

Young Adult Living Arrangements

Tables 3, 4, and 5 group living arrangements in three categories:

- *Living independently:* Young adults are living in their own household. They either live alone, live with a spouse or unmarried partner, or the young adult is the spouse or unmarried partner of the householder.
- *Living in the parents' household:* The young adult is the child of the householder, regardless of the young adult's marital status.

This includes biological, step, and adopted children of the householder.

- *Living with roommates:* Includes young adults living in all other living arrangements, such as with siblings, other relatives (besides parents or spouses), and other nonrelatives.

Accuracy of the Estimates

Statistics that come from surveys are subject to sampling and nonsampling error. Sampling error occurs because surveys measure the characteristics of a sample of people, instead of those of the entire population (as from a census). Sample-based estimates vary depending on the particular sample that is selected from the population, but all survey-based estimates attempt to approximate the actual figures from the population. Measures of the size of sampling error reflect variation in the estimates over all possible samples that could have been selected from the population using the same sampling, data collection, and processing methods. Nonsampling error

in surveys may be a by-product of how the survey is designed, how respondents interpret questions, how able and willing respondents are to provide correct answers, and how accurately the answers are coded and classified. The Census Bureau uses quality control procedures throughout the production process, including overall survey design, question wording, review of interviewer and coder work, and statistical review of reports to minimize these errors (Appendix Tables A, B, C, and D).

Suggested Citation

Vespa, Jonathan, "The Changing Economics and Demographics of Young Adulthood: 1975–2016," *Current Population Reports*, P20-579, U.S. Census Bureau, Washington, DC, 2017.

CONTACT INFORMATION

Jonathan Vespa
jonathan.vespa@census.gov
301-763-7283

Appendix Table A.

A Decade of Change: The State of Young Adult Living Arrangements

Change in living arrangements for young adults aged 18 to 34 between 2005 and 2015

(Standard errors [SE] for Table 3)

States	SE of total 2005 ⁴	SE of total 2015 ⁴	Living in parents' home ¹			Living independently ²			Living with roommates ³		
			SE of percent 2005 ⁴	SE of percent 2015 ⁴	SE of change	SE of percent 2005 ⁴	SE of percent 2015 ⁴	SE of change	SE of percent 2005 ⁴	SE of percent 2015 ⁴	SE of change
Total	17,130	22,432	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2
Alabama	2,892	3,496	0.6	0.5	0.8	0.6	0.7	0.9	0.5	0.7	0.9
Alaska	951	1,291	1.1	1.1	1.6	1.4	1.3	1.9	1.2	1.3	1.8
Arizona	1,550	2,071	0.4	0.4	0.6	0.6	0.5	0.8	0.6	0.5	0.8
Arkansas	2,529	2,905	0.7	0.7	1.0	0.9	0.8	1.2	0.8	0.7	1.1
California	3,318	4,398	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.4
Colorado	1,971	2,585	0.5	0.4	0.6	0.6	0.6	0.8	0.6	0.5	0.8
Connecticut	1,086	1,645	0.6	0.7	0.9	0.6	0.7	0.9	0.7	0.8	1.1
Delaware	587	708	1.1	1.3	1.7	1.4	1.4	2.0	1.4	1.7	2.2
District of Columbia	283	538	1.0	0.9	1.4	1.7	1.2	2.1	1.6	1.5	2.2
Florida	4,053	4,680	0.3	0.3	0.4	0.3	0.4	0.5	0.4	0.4	0.6
Georgia	3,243	4,773	0.3	0.4	0.5	0.5	0.4	0.6	0.4	0.5	0.6
Hawaii	775	1,091	0.9	0.8	1.2	1.1	1.0	1.5	1.2	1.1	1.6
Idaho	1,350	1,838	0.8	1.1	1.4	1.1	1.2	1.6	1.0	1.1	1.5
Illinois	2,152	3,332	0.3	0.3	0.5	0.4	0.3	0.5	0.4	0.3	0.5
Indiana	2,355	2,767	0.4	0.5	0.7	0.6	0.6	0.8	0.5	0.5	0.7
Iowa	1,727	2,429	0.5	0.6	0.8	0.7	0.9	1.1	0.7	0.7	1.0
Kansas	2,111	2,375	0.6	0.7	0.9	0.8	0.9	1.2	0.6	0.8	1.0
Kentucky	2,158	2,355	0.5	0.6	0.8	0.6	0.7	0.9	0.5	0.6	0.8
Louisiana	2,365	3,658	0.6	0.7	0.9	0.6	0.7	0.9	0.6	0.6	0.8
Maine	892	1,136	0.8	1.2	1.5	0.9	1.2	1.5	0.9	1.3	1.6
Maryland	1,691	1,919	0.5	0.4	0.6	0.6	0.5	0.8	0.6	0.5	0.8
Massachusetts	1,524	1,878	0.5	0.4	0.7	0.6	0.4	0.7	0.7	0.5	0.9
Michigan	2,186	2,666	0.4	0.4	0.5	0.4	0.5	0.6	0.4	0.4	0.6
Minnesota	1,723	1,946	0.4	0.4	0.6	0.5	0.5	0.7	0.5	0.5	0.7
Mississippi	2,312	3,032	0.7	0.8	1.1	0.8	0.9	1.2	0.7	0.8	1.1
Missouri	1,802	2,642	0.4	0.4	0.6	0.4	0.6	0.7	0.4	0.6	0.7
Montana	1,132	1,241	0.9	1.2	1.5	1.3	1.3	1.8	1.1	1.3	1.7
Nebraska	1,149	1,802	0.7	0.6	0.9	0.9	0.8	1.2	0.9	0.8	1.2
Nevada	1,550	1,180	0.5	0.7	0.9	0.8	0.7	1.1	0.9	0.8	1.2
New Hampshire	1,073	1,093	1.0	1.0	1.4	1.1	1.3	1.7	1.1	1.1	1.6
New Jersey	1,398	1,877	0.4	0.4	0.6	0.4	0.4	0.6	0.5	0.4	0.6
New Mexico	2,001	1,812	0.9	0.9	1.3	1.0	0.9	1.3	1.1	0.9	1.4
New York	2,634	3,009	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.4
North Carolina	4,034	3,993	0.3	0.5	0.5	0.5	0.5	0.7	0.4	0.4	0.6
North Dakota	834	1,492	0.9	1.1	1.4	1.2	1.6	2.0	1.2	1.4	1.8
Ohio	2,843	3,034	0.3	0.3	0.5	0.4	0.4	0.6	0.4	0.3	0.5
Oklahoma	2,322	2,010	0.5	0.6	0.7	0.6	0.6	0.8	0.6	0.6	0.8
Oregon	1,981	2,194	0.5	0.5	0.7	0.7	0.8	1.1	0.8	0.8	1.1
Pennsylvania	1,951	2,753	0.3	0.3	0.5	0.4	0.3	0.5	0.4	0.3	0.5
Rhode Island	741	1,005	1.2	1.3	1.8	1.4	1.3	1.9	1.5	1.1	1.9
South Carolina	2,562	3,399	0.6	0.6	0.8	0.7	0.6	0.9	0.6	0.5	0.8
South Dakota	966	1,388	0.8	1.1	1.3	1.3	1.4	1.9	1.4	1.3	1.9
Tennessee	2,701	2,937	0.5	0.5	0.7	0.5	0.6	0.8	0.5	0.5	0.7
Texas	4,690	5,868	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.4
Utah	1,281	1,968	0.5	0.6	0.8	0.8	0.7	1.1	0.9	0.8	1.2
Vermont	483	682	1.1	1.5	1.9	1.3	1.8	2.2	1.5	1.7	1.8
Virginia	3,218	4,107	0.4	0.4	0.6	0.5	0.5	0.7	0.5	0.4	0.6
Washington	1,891	2,892	0.4	0.4	0.6	0.6	0.5	0.8	0.7	0.6	0.9
West Virginia	1,367	1,745	0.9	0.9	1.2	0.9	0.9	1.3	0.7	0.9	1.1
Wisconsin	1,863	1,941	0.3	0.4	0.5	0.5	0.5	0.7	0.5	0.4	0.6
Wyoming	913	1,859	1.3	1.3	1.8	1.6	1.9	2.5	1.4	2.0	2.4

¹ Child of the householder, regardless of the young adult's marital status.² The young adult lives alone, is the householder living with a spouse or unmarried partner, or is the spouse or unmarried partner of the householder.³ Living with other relatives or nonrelatives.⁴ Data are based on a sample and are subject to sampling variability. A standard error is a measure of an estimate's variability. The larger the standard error is in relation to the size of the estimate, the less reliable the estimate.

Source: U.S. Census Bureau, 2005 and 2015 American Community Survey, 1-Year Data File.

Appendix Table B.

More Than Half of Younger Millennials Live in Their Parents' Home

Demographic and economic characteristics of young adults aged 18 to 24: 2015

(Standard errors [SE] for Table 4)

Characteristics	Living in parents' home ¹		Living independently ²		Living with roommates ³	
	SE of total ⁴	SE of percent ⁴	SE of total ⁴	SE of percent ⁴	SE of total ⁴	SE of percent ⁴
Total	33,424	X	35,683	X	44,602	X
DEMOGRAPHICS AND HEALTH						
Sex						
Women	22,051	0.1	20,425	0.2	26,332	0.2
Men	21,703	0.1	19,766	0.2	26,358	0.2
Age						
18 to 19	16,760	0.1	6,946	0.1	12,648	0.1
20 to 24	29,096	0.1	33,323	0.1	38,762	0.1
Race, Non-Hispanic						
White alone	24,418	0.1	26,240	0.2	32,067	0.2
Black alone	16,059	0.1	7,929	0.2	13,828	0.2
Asian alone	7,296	Z	3,701	0.1	8,689	0.1
Other race	9,937	0.1	4,265	0.1	5,867	0.1
Hispanic (any race)	16,628	0.1	10,254	0.2	14,297	0.2
Has a disability ⁵	9,013	0.1	4,713	0.1	7,250	0.1
ECONOMICS AND EDUCATION						
Work Status						
Employed	30,320	0.1	29,165	0.2	32,343	0.2
Worked full-time, year-round	18,870	0.1	19,703	0.3	19,570	0.2
Mean hours worked per week	Z	X	0.1	X	0.1	X
Unemployed	11,731	0.1	4,871	0.1	9,782	0.1
Not in labor force	24,784	0.1	10,740	0.2	21,880	0.2
Educational Attainment						
Bachelor's degree or higher ⁶	12,797	0.1	11,051	0.2	12,507	0.1
Associate's degree or some college	28,768	0.1	19,216	0.3	31,878	0.2
High school diploma or less	26,857	0.2	17,410	0.3	20,868	0.2
Enrolled in school	29,823	0.2	15,009	0.2	30,311	0.2
Personal Income						
\$0–\$29,999	32,503	0.1	28,097	0.2	41,541	0.1
\$30,000–\$59,999	9,148	0.1	10,665	0.2	11,017	0.1
\$60,000–\$99,999	2,614	Z	4,049	0.1	4,005	0.1
\$100,000 or more	1,305	Z	1,459	Z	1,981	Z
HOUSING AND RESIDENCY						
Type						
Single-family home	33,780	0.2	22,587	0.3	25,393	0.2
Apartment or multifamily building	21,997	0.1	20,851	0.3	29,807	0.2
Other housing type	12,978	0.1	7,279	0.2	8,593	0.1
Lived at same address a year ago	30,799	0.1	21,860	0.3	28,611	0.2
Tenure						
Owned home	31,987	0.2	15,336	0.3	16,438	0.3
Rented	33,082	0.2	25,899	0.3	46,738	0.3

X Not applicable.

Z Rounds to zero.

¹ Child of the householder, regardless of the young adult's marital status.² The young adult lives alone, is the householder living with a spouse or unmarried partner, or is the spouse or unmarried partner of the householder.³ Living with other relatives or nonrelatives.⁴ Data are based on a sample and are subject to sampling variability. A standard error is a measure of an estimate's variability. The larger the standard error is in relation to the size of the estimate, the less reliable the estimate.⁵ "Has a disability" means the young adult reported having at least one of the following six types of disabilities: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, or independent living difficulty.⁶ Most 18- to 24-year-olds will not have had time to finish a traditional 4-year degree. However, the table shows bachelor's degree so that the other two categories, some college and high school diploma, are still directly comparable with those in Table 5.

Source: U.S. Census Bureau, 2015 American Community Survey 2015, 1-Year Data File.

Appendix Table C.

Less Than Two-Thirds of Older Millennials Live Independently

Demographic and economic characteristics of young adults aged 25 to 34: 2015

(Standard errors [SE] for Table 5)

Characteristics	Living in parents' home ¹		Living independently ²		Living with roommates ³	
	SE of total ⁴	SE of percent ⁴	SE of total ⁴	SE of percent ⁴	SE of total ⁴	SE of percent ⁴
Total	30,551	X	60,737	X	48,935	X
DEMOGRAPHICS AND HEALTH						
Sex						
Women	18,764	0.2	32,723	0.1	26,981	0.2
Men	22,223	0.2	36,168	0.1	30,906	0.2
Age						
25 to 29	23,362	0.2	42,979	0.1	32,209	0.2
30 to 34	16,970	0.2	31,738	0.1	27,705	0.2
Race, Non-Hispanic						
White alone	20,204	0.2	38,405	0.1	31,430	0.2
Black alone	11,785	0.1	14,594	0.1	13,221	0.1
Asian alone	8,556	0.1	12,099	Z	9,600	0.1
Other race	6,266	0.1	9,441	Z	6,909	0.1
Hispanic (any race)	14,052	0.1	19,625	0.1	17,878	0.1
Has a disability ⁵	12,341	0.1	10,012	Z	9,075	0.1
ECONOMICS AND EDUCATION						
Work Status						
Employed	25,492	0.2	55,805	0.1	41,009	0.2
Worked full-time, year-round	18,226	0.2	46,597	0.1	35,109	0.2
Mean hours worked per week	Z	X	Z	X	0.1	X
Unemployed	10,509	0.1	11,235	Z	11,035	0.1
Not in labor force	13,795	0.2	19,905	0.1	17,121	0.1
Educational Attainment						
Bachelor's degree or higher	13,364	0.1	43,616	0.1	20,686	0.2
Associate's degree or some college	17,319	0.2	28,444	0.1	22,872	0.2
High school diploma or less	20,862	0.2	25,589	0.1	29,417	0.2
Enrolled in school	11,726	0.1	21,017	0.1	13,166	0.1
Personal Income						
\$0–\$29,999	28,204	0.2	33,748	0.1	39,073	0.2
\$30,000–\$59,999	15,048	0.2	32,235	0.1	20,360	0.2
\$60,000–\$99,999	7,345	0.1	19,569	0.1	12,734	0.1
\$100,000 or more	2,693	Z	11,216	Z	5,875	0.1
HOUSING AND RESIDENCY						
Type						
Single-family home	26,364	0.2	53,932	0.1	29,941	0.2
Apartment or multifamily building	13,153	0.1	28,494	0.1	31,586	0.2
Other housing type	7,724	0.1	12,583	0.1	9,754	0.1
Lived at same address a year ago	27,479	0.1	55,598	0.1	38,704	0.2
Tenure						
Owned home	26,200	0.2	54,862	0.1	18,181	0.2
Rented	19,107	0.2	33,658	0.1	45,563	0.2

X Not applicable.

Z Rounds to zero.

¹ Child of the householder, regardless of the young adult's marital status.² The young adult lives alone, is the householder living with a spouse or unmarried partner, or is the spouse or unmarried partner of the householder.³ Living with other relatives or nonrelatives.⁴ Data are based on a sample and are subject to sampling variability. A standard error is a measure of an estimate's variability. The larger the standard error is in relation to the size of the estimate, the less reliable the estimate.⁵ "Has a disability" means the young adult reported having at least one of the following six types of disabilities: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, or independent living difficulty.

Source: U.S. Census Bureau, 2015 American Community Survey, 1-Year Data File.

Appendix Table D.

One in Four Young People Living at Home Are Neither in School nor Working

Characteristics of young adults aged 25 to 34 living in the parents' home in 2015

(Standard errors [SE] for Table 6)

Characteristics	Enrolled or working		Neither enrolled nor working ¹	
	SE of total ²	SE of percent ²	SE of total ²	SE of percent ²
Total	26,033	X	13,498	X
DEMOGRAPHICS AND HEALTH				
Sex				
Women	16,564	0.2	10,266	0.3
Men	20,082	0.2	9,724	0.3
Age				
25 to 29	19,612	0.2	10,852	0.4
30 to 34	13,336	0.2	9,869	0.4
Has a child	11,739	0.2	7,042	0.3
Race, Non-Hispanic				
White alone	15,536	0.2	11,269	0.4
Black alone	10,801	0.2	6,705	0.3
Asian alone	7,586	0.1	3,890	0.2
Other race	5,665	0.1	2,980	0.1
Hispanic (any race)	11,955	0.2	7,807	0.3
Has a disability ³	5,855	0.1	9,658	0.4
EDUCATION				
Bachelor's degree or higher	12,427	0.2	5,759	0.3
Associate's degree or some college	15,126	0.2	9,252	0.4
High school diploma or less	16,339	0.2	10,045	0.4
RESIDENCY				
Lived at same address a year ago	23,155	0.2	12,697	0.3

X Not applicable.

¹ Neither enrolled nor working means that the young adult was not enrolled in classes within the last 3 months, plus they were either unemployed or not engaged in the labor force at the time of interview.

² Data are based on a sample and are subject to sampling variability. A standard error is a measure of an estimate's variability. The larger the standard error is in relation to the size of the estimate, the less reliable the estimate.

³ "Has a disability" means the young adult reported having at least one of the following six types of disabilities: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, or independent living difficulty.

Source: U.S. Census Bureau, 2015 American Community Survey, 1-Year Data File.

EXHIBIT 53

Selling Tobacco Products in Retail Stores

Note: On December 20, 2019, the President signed legislation to amend the Federal Food, Drug, and Cosmetic Act, and raise the federal minimum age of sale of tobacco products from 18 to 21 years. It is now illegal for a retailer to sell any tobacco product – including cigarettes, cigars and e-cigarettes – to anyone under 21. FDA will provide additional details on this issue as they become available.

FDA regulates all tobacco products, including e-cigarettes, hookah tobacco, and cigars. If you sell tobacco products, you must comply with all applicable federal laws and regulations for retailers.

This page offers a summary of the federal rules. You can find comprehensive federal requirements for tobacco retailers in the Federal Food, Drug, and Cosmetic Act (</regulatory-information/federal-food-drug-and-cosmetic-act-fdc-act/fdc-act-chapter-ix-tobacco-products>) (FD&C Act), Regulations Restricting the Sale and Distribution of Cigarettes and Smokeless Tobacco and Deeming Tobacco Products To Be Subject to the Federal Food, Drug, and Cosmetic Act (</tobacco-products/rules-regulations-and-guidance/fdas-deeming-regulations-e-cigarettes-cigars-and-all-other-tobacco-products>).

On this page:

- How Do I Comply?
- This is Our Watch
- Rules for Selling
 - Cigarettes, cigarette tobacco, and roll-your-own tobacco
 - Smokeless tobacco
 - Cigars
 - Hookah and pipe tobacco
 - E-cigarettes and other electronic nicotine delivery systems (ENDS)
 - Nicotine gels
 - Dissolvables

Tools for Retailers



Tips for Retailers: Preventing Sales to Minors (https://www.youtube.com/watch?v=LFx-tX_Ueig&feature=youtu.be) [↗](http://www.fda.gov/about-fda/website-policies/website-disclaimer) (<http://www.fda.gov/about-fda/website-policies/website-disclaimer>) (21:24)

Download Slides (/media/114127/download)

Download the “FDA Age Calculator,” a voluntary smartphone application to help retailers comply with federal, state, and local age restrictions for selling tobacco products.



(<https://itunes.apple.com/us/app/fda-age-calculator/id1128878035?mt=8>) [↗](http://www.fda.gov/about-fda/website-policies/website-disclaimer)
(<http://www.fda.gov/about-fda/website-policies/website-disclaimer>)



(<https://play.google.com/store/apps/details?id=gov.fda.CTP.MAC1>) [↗](http://www.fda.gov/about-fda/website-policies/website-disclaimer)
(<http://www.fda.gov/about-fda/website-policies/website-disclaimer>)

How Do I Comply?

These rules apply to all "covered tobacco products (</tobacco-products/compliance-enforcement-training/ctp-glossary>)" beginning August 8, 2016:

- Check photo ID of everyone under age 27 who attempts to purchase any tobacco product.
- Only sell tobacco products to customers age 18 or older.¹
- Do NOT sell tobacco products in a vending machine unless in an adult-only facility.²
- Do NOT give away free samples of tobacco products to consumers, including any of their components or parts.³

These rules, along with **rules specific to each tobacco product**, are listed below.

"This is Our Watch" Program

The "This Is Our Watch (/tobacco-products/retail-sales-tobacco-products/our-watch)" program helps retailers comply with federal tobacco law and regulations and protect minors. "This is Our Watch" program materials include a mix of educational pieces for owners, managers, and clerks, as well as a variety of point-of-purchase tools to inform customers of the law and emphasize the retailer's role.

Do you mix or prepare e-liquids, make or modify vaporizers, or mix loose tobacco and sell any tobacco product? If so, you may be regulated as both a retailer and a tobacco product manufacturer (/tobacco-products/compliance-enforcement-training/pipe-cigar-and-vape-shops-are-regulated-both-retailers-and-manufacturers).

Rules for Cigarettes, Cigarette Tobacco, and Roll-Your-Own Tobacco Sales



- Do NOT sell cigarettes, cigarette tobacco, or roll-your-own tobacco in a vending machine or self-service display unless in an adult-only facility.²
- Do NOT give away free samples of cigarettes, cigarette tobacco, or roll-your-own tobacco to consumers, including any of their components or parts.³
- Do NOT sell cigarettes, cigarette tobacco, or roll-your-own tobacco that contain a characterizing flavor (except menthol or tobacco flavor).
- Do NOT sell cigarette packages containing fewer than 20 cigarettes, including single cigarettes, known as “loosies.”
- Do NOT break open packages of cigarettes, cigarette tobacco, or roll-your-own tobacco to sell products in smaller amounts.

Beginning August 10, 2018:

- Do NOT sell or distribute cigarette tobacco or roll-your-own tobacco products without a warning statement on the package.^{4, 5}
- Do NOT display advertisements for cigarette tobacco or roll-your-own tobacco products without a warning statement.^{4, 5}



(/media/108432/download)

Rules for Smokeless Tobacco Sales

- Check photo ID of everyone under age 27 who attempts to purchase smokeless tobacco.

- Only sell smokeless tobacco to customers age 18 and older.¹
- Do NOT sell smokeless tobacco in a vending machine or self-service display unless in an adult-only facility.
- Do NOT give away free samples of smokeless tobacco unless in a “qualified adult-only facility” and in limited quantities as specified in the law.^{2, 3}
- Do NOT break open smokeless tobacco packages to sell products in smaller amounts.
- Do NOT sell smokeless tobacco without a health warning statement displayed on the package.
- Do NOT display advertisements for smokeless tobacco products without a warning statement.

Rules for Cigar Sales



(/media/108415/download)

- Check photo ID of everyone under age 27 who attempts to purchase cigars.
- Only sell cigars to customers age 18 and older.¹
- Do NOT sell cigars in a vending machine unless in an adult-only facility.²
- Do NOT give away free samples of cigars to consumers, including any of their components or parts.³

Beginning August 10, 2018:

- Do NOT sell or distribute cigars without a health warning statement displayed on the package.^{4, 6}
- Do NOT display advertisements for cigars without a health warning statement.^{4, 6}
- If you sell cigars individually, and not in a product package, you must post a sign with six required warning statements within 3 inches of each cash register.^{4, 6}

Rules for Hookah and Pipe Tobacco Sales

Note: If you mix loose tobacco, and you also sell these products, you will be regulated as both a retailer and a tobacco product manufacturer (/tobacco-products/compliance-enforcement-training/pipe-cigar-and-vape-shops-are-regulated-both-retailers-and-manufacturers).



(/media/108426/download)

- Check photo ID of everyone under age 27 who attempts to purchase hookah tobacco or pipe tobacco.
- Only sell hookah or pipe tobacco to customers age 18 and older.¹
- Do NOT sell hookah and pipe tobacco in a vending machine unless in an adult-only facility.²

- Do NOT give away free samples of hookah or pipe tobacco to consumers, including any of their components or parts.³

Beginning August 10, 2018:

- Do NOT sell or distribute hookah or pipe tobacco without a health warning statement displayed on the package.^{4, 5, 6}
- Do NOT display advertisements for hookah or pipe tobacco without a health warning statement.^{4, 5, 6}

Rules for Sales of E-Cigarettes and Other Electronic Nicotine Delivery Systems (ENDS)

Some examples of ENDS include e-cigarettes, vape pens, e-hookahs, e-cigars, personal vaporizers, and electronic pipes.

Note: *If you mix e-liquids or make or modify vaporizers, and you also sell these products, you will be regulated as both a retailer and a tobacco product manufacturer (/tobacco-products/compliance-enforcement-training/pipe-cigar-and-vape-shops-are-regulated-both-retailers-and-manufacturers).*



(/media/108423/download)

- Check photo ID of everyone under age 27 who attempts to purchase e-cigarettes or other ENDS.

- Only sell e-cigarettes and other ENDS to customers age 18 and older.¹
- Do NOT sell e-cigarettes or other ENDS in a vending machine unless in an adult-only facility.²
- Do NOT give away free samples of e-cigarettes or other ENDS to consumers, including any of their components or parts.³

Beginning August 10, 2018, these rules apply to all “covered tobacco products (/tobacco-products/compliance-enforcement-training/ctp-glossary)”:

- Do NOT sell or distribute e-cigarettes or other ENDS without a health warning statement on the package.^{4, 5}
- Do NOT display advertisements for e-cigarettes or other ENDS without a health warning statement.^{4, 5}

Rules for Sales of Nicotine Gels

- Check photo ID of everyone under age 27 who attempts to purchase nicotine gel.
- Only sell nicotine gel to customers age 18 and older.¹
- Do NOT sell nicotine gel in a vending machine unless in an adult-only facility.²
- Do NOT give away free samples of nicotine gel to consumers.³

Beginning August 10, 2018:

- Do NOT sell or distribute nicotine gel without a health warning statement on the package.^{4, 5}
- Do NOT display advertisements for nicotine gel without a health warning statement.^{4, 5}

Rules for Sales of Dissolvables

These rules apply to dissolvable tobacco products that are not already regulated as smokeless tobacco.

- Check photo ID of everyone under age 27 who attempts to purchase dissolvable tobacco products.
- Only sell dissolvable tobacco products to customers age 18 and older.¹
- Do NOT sell dissolvable tobacco products in a vending machine unless in an adult-only facility.²

- Do NOT give away free samples of dissolvable tobacco products to consumers.³

Beginning August 10, 2018:

- Do NOT sell or distribute a dissolvable tobacco product without a health warning statement on the package.^{4, 5}
- Do NOT display advertisements for dissolvable tobacco products without a health warning statement.^{4, 5}

Why Are These Laws Important?

These laws are designed to make regulated tobacco products less accessible and less attractive to youth. Every day, nearly 2,500 kids smoke their first cigarette and more than 400 kids become cigarette daily smokers.⁷ Additionally, the CDC and FDA found that during 2011-2015, e-cigarette use rose from 1.5 percent to 16.0 percent among high school students.⁸ Many of these children will become addicted before they are old enough to understand the risks. As a retailer, you play an important role in protecting children and adolescents by complying with the law and regulations.

References



Additional Resources

- Required Warning Statements on Tobacco Product Packaging and Advertising (/tobacco-products/retail/retailers-chart-required-warning-statements-tobacco-product-packaging-and-advertising)
- Guidance: Tobacco Retailer Training Programs (/tobacco-products/rules-regulations-guidance/tobacco-retailer-training-programs)
- Retailer Education Materials (/tobacco-products/retail/our-watch)
- FDA's Deeming Regulations for E-Cigarettes, Cigars, and All Other Tobacco Products (/tobacco-products/rules-regulations-guidance/fdas-deeming-regulations-e-cigarettes-cigars-and-all-other-tobacco-products)
- Small Business Assistance (/tobacco-products/compliance-enforcement-training/small-business-assistance-tobacco-product-industry)
- Manufacturing (/tobacco-products/compliance-enforcement-training/manufacturing)
- Products, Ingredients and Components (/products-ingredients-components)

EXHIBIT 54

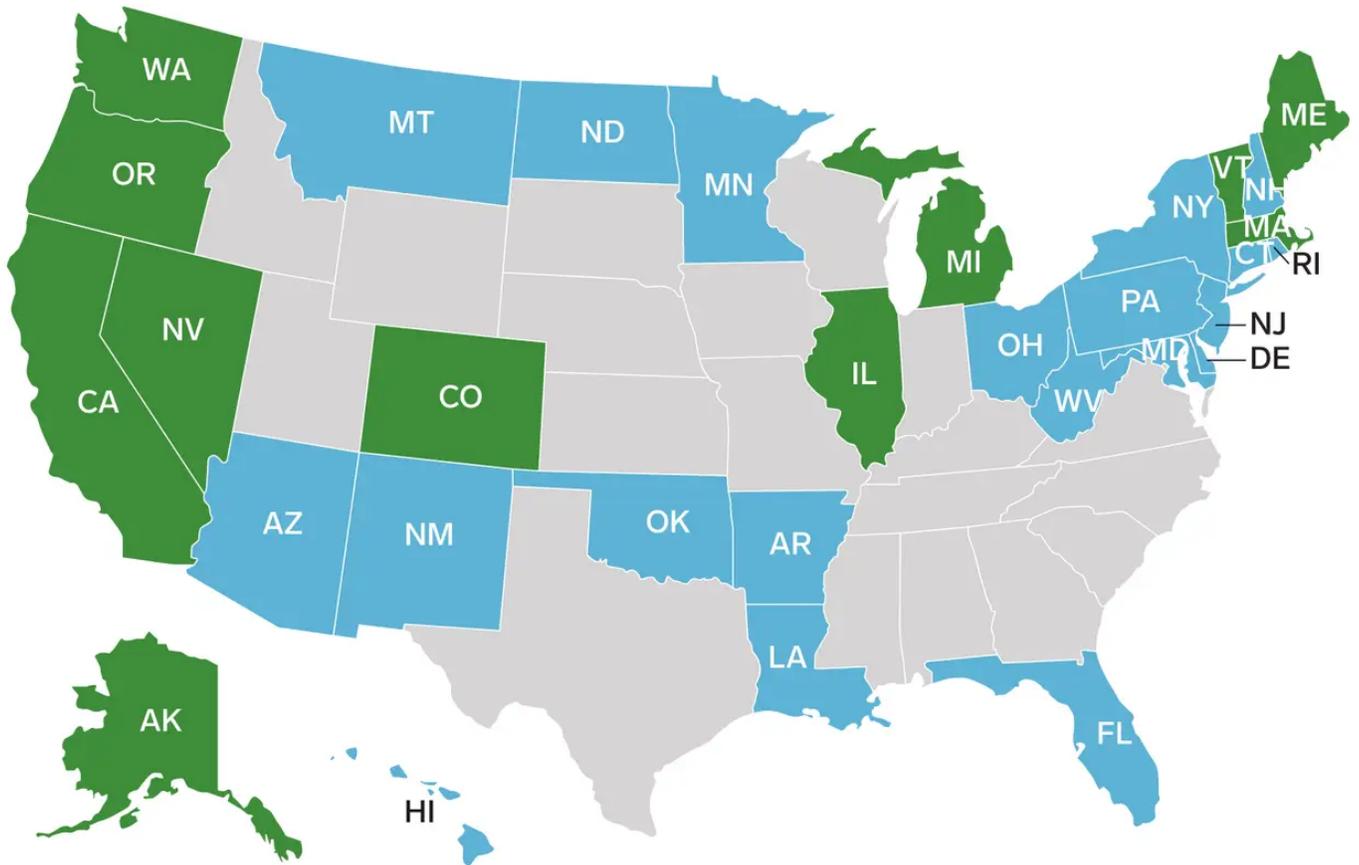
Legal marijuana just went on sale in Illinois. Here are all the states where cannabis is legal.

Jeremy Berke and Skye Gould Jan 1, 2020, 8:41 AM



States where marijuana is legal

■ Legalized recreational and medical marijuana ■ Legalized medical marijuana



BUSINESS INSIDER

Shyanne Gal/Business Insider

- Legal **marijuana** sales begin in Illinois on January 1.
- Marijuana is legal in 11 states for adults over the age of 21, and legal for medical use in 33 states.

- **Visit BI Prime for more stories, and subscribe here for our weekly cannabis newsletter, Cultivated.**
-

Illinois residents can purchase marijuana legally for recreational use, starting today.

That makes Illinois the second midwestern state to make cannabis broadly available. Dispensaries opened for business in Michigan on December 1.

Illinois Governor JB Pritzker signed a legal marijuana bill into law in June. The bill contains a sweeping criminal justice component, expunging the records of potentially hundreds of thousands Illinois residents who have previously been convicted for possessing marijuana under previous laws. Up to 770,000 Illinois residents may qualify for expungement, according to [ABC News](#).

The bill will also proactively create opportunities for minority business owners to capitalize on the new industry.

Read more: [Here's how to land your dream job in the booming cannabis industry](#)

Despite hiccups in New York and New Jersey, marijuana legalization is spreading around the US.

In 2018's midterm elections, Michigan became the 10th state to legalize recreational marijuana, and Utah and Missouri voted to legalize medical marijuana. Deep-red Oklahoma also voted to legalize medical marijuana in 2018, joining numerous other states that have such laws on the books.

Vermont became the first state to legalize marijuana possession — not sale — through its legislature in 2018 as well, rather than via a ballot initiative.

And, President Donald Trump also signed the bipartisan Farm Bill into law in December 2018, which legalized hemp — a plant that's roughly identical to marijuana but doesn't contain THC, a psychoactive compound in marijuana — nationwide.

Hemp is also a source of CBD, or cannabidiol, a popular, if scientifically untested ingredient in many cannabis-infused products.

Eleven states and Washington, DC, have now legalized marijuana for recreational use for adults over 21. And 33 states have legalized medical marijuana.

Read more: Investors are placing huge bets on marijuana as more states legalize THC. Here are the top 25 cannabis startups that have raised the most VC cash.

In October 2018, Canada legalized marijuana federally, becoming the first G7 country to do.

Mexico's Supreme Court also ruled that [marijuana prohibition is unconstitutional](#), paving the way for the country's new leader, Andrés Manuel López Obrador, to follow Canada's lead.

Marijuana prohibition began roughly 80 years ago when the federal government banned the sale, cultivation, and use of the cannabis plant. It remains illegal at the federal level.

Overturning prohibition is one of the few hot-button topics with widespread support.

According to a [recent Pew poll](#), 67% of Americans think marijuana should be legal, and 91% support making medical marijuana legal. Opposition to legalized marijuana has fallen from 52% in 2010, to just 32% as of November 15.

This article was first published in January 2018 and has been updated. Melia Robinson contributed to an earlier version of this post.

Alaska



A marijuana sample is set aside for evaluation at Cannalysis, a cannabis testing laboratory, in Santa Ana, California. AP Photo/Chris Carlson

Adults 21 and over can light up in Alaska. In early 2015, the northernmost US state made it legal for residents to use, possess, and transport [up to an ounce of marijuana](#)— roughly a sandwich bag full — for recreational use. The first pot shop opened for business in late 2016.

Alaska has pounced on the opportunity to make its recreational pot shops a destination for tourists. More than **two million people visit Alaska** annually and spend \$2 billion.

California



A woman holds marijuana for sale at the MedMen store in West Hollywood, California U.S. January 2, 2018. REUTERS/Lucy Nicholson

California was the first state to legalize medical marijuana back in 1996. California became even more pot-friendly in 2016 when it made it legal to use and carry up to an ounce of marijuana.

The law also permits adults 21 and over to buy up to eight grams of marijuana concentrates, which are found in edibles, and grow no more than six marijuana plants per household.

Getting Californians to buy legal weed — rather than from the black market — has been challenging since the law took effect, [The New York Times reports](#).

Colorado



In this Sept. 25, 2018 photo, a worker holds a marijuana plant leaf in a massive tomato greenhouse being renovated to grow pot in Delta, British Columbia. AP

Photo/Ted S. Warren

In Colorado, [there are more marijuana dispensaries](#) than Starbucks and McDonalds locations combined. The state joined Washington in becoming the first two states to fully legalize the drug in 2012.

Residents and tourists over the age of 21 can buy up to one ounce of marijuana or eight grams of concentrates. Some Colorado [counties and cities](#) have passed more restrictive laws.

Illinois



Illinois Governor J.B. Pritzker delivers remarks at the North America's Building Trades Unions (NABTU) 2019 legislative conference in Washington, U.S., April 9,

2019 REUTERS/Jeenah Moon

Illinois lawmakers in June passed a bill that legalizes the possession and commercial sale of marijuana in the state, starting on January 1.

Governor JB Pritzker, who made marijuana legalization a core component of his campaign for the governor's office, signed the bill into law earlier this year.

Legal marijuana sales in the state start on January 1, but you'll only be able to buy cannabis in a handful of locations initially. Just 28 dispensaries will be ready to sell recreational marijuana, [according to The Chicago Tribune](#).

For its part, Illinois is the first state to legalize marijuana sales through the state legislature, rather than a ballot initiative.

Maine





Employees sort through harvested cannabis plants at Hexo Corp's facilities in Gatineau, Quebec, Canada, September 26, 2018. REUTERS/Chris Wattie

A ballot initiative in 2016 gave Mainers the right to possess up to 2.5 ounces of marijuana, more than double the limit in most other states.

Maine's legislature is still ironing out the details of how, and when, recreational pot shops will open in the state.

Massachusetts





Unfinished pre-rolls, medicinal cannabis cigarettes, rest in container at left, Thursday, July 12, 2018, at Sira Naturals medical marijuana cultivation facility, in Milford, Mass. AP Photo/Steven Senne

In 2016, Massachusetts gave residents the green light to carry and use an ounce of marijuana and grow up to 12 plants in their homes.

The first pot shops opened in the state last year, with more to come, reports [The Boston Globe](#).

Michigan





An attendant weighs marijuana at the Far West Holistic Center dispensary, Wednesday, Nov. 7, 2018, in Detroit AP Photo/Carlos Osorio

Voters in Michigan passed Proposition 1 in 2018, making it the first state in the Midwest to [legalize the possession and sale of marijuana](#) for adults over the age of 21. The bill allows adults to possess up to 2.5 ounces of marijuana and allows residents to grow up to 12 plants at home.

The law is more permissive than other states with legal marijuana: Most allow residents to only possess up to an ounce at a time.

Marijuana dispensaries in Michigan officially opened on December 1.

"The end of prohibition is historic," James Daly, the owner of a Michigan dispensary [told The Associated Press](#). "We wanted to rip the Band-Aid off."

Nevada





People buy marijuana products at the Essence cannabis dispensary, Saturday, July 1, 2017, in Las Vegas. Nevada dispensaries were legally allowed to sell recreational marijuana starting at 12:01 a.m. Saturday. John Locher/AP

Residents and tourists who are 21 and over can buy an ounce of marijuana or one-eighth of an ounce of edibles or concentrates in Nevada — while supplies last. Less than two weeks after sales of recreational weed began on July 1, 2017, many stores [ran out of marijuana](#) to sell.

The state has earned nearly [\\$20 million in marijuana tax revenue](#) since the market launched.

There's bad news if you want to grow your own bud, though. Nevada residents [must live 25 miles outside](#) the nearest dispensary in order to be eligible for a grower's license.

Oregon





Marijuana-based products are displayed at the "Oregon's Finest" medical marijuana dispensary in Portland, Oregon April 8, 2014. Anthony Bolante/Reuters

Oregonians have enjoyed the right to carry an ounce of weed and grow up to four plants at home since 2015.

Sales in Oregon pot shops have exploded since legalization: they're expected to top \$1 billion by 2020, reports The [Portland Business Journal](#).

Vermont





An employee cuts cannabis plants in a laboratory at the headquarters of AGES agency in Vienna, Austria March 15, 2018. REUTERS/Leonhard Foeger

Vermont became the first state to [legalize marijuana through the legislature](#), rather than a ballot initiative, when Republic Governor Phil Scott signed a bill into law in January 2018.

Adults in the Green Mountain State can carry up to an ounce of marijuana and grow no more than two plants for recreational use. The new law went into effect in July 2018. But the bill is limited in scope. It doesn't establish a legal market for the production and sale of the drug.

Washington





An employee checks cannabis plants at a medical marijuana plantation in northern Israel March 21, 2017 REUTERS/Nir Elias

Dispensaries in Washington have [raked in over \\$1 billion](#) in non-medical marijuana sales since the drug was legalized for recreational use in 2012.

The state allows people to carry up to an ounce of marijuana, but they must [require the drug for medicinal purposes](#) in order to be eligible for a grower's license.

Washington, D.C.





AP

Residents in the nation's capital voted overwhelmingly to legalize marijuana for adult use in November 2014.

The bill took effect in 2015, allowing people to possess two ounces or less of marijuana and "gift" up to an ounce, if neither money nor goods or services are exchanged.

New York and New Jersey may be next.





New York Governor Andrew Cuomo and New York Mayor Bill De Blasio (L). Kevin Hagen/AP

Since Massachusetts opened its first pot shops in November 2018, other states around the Northeast are considering legalization more seriously.

New York Governor Andrew Cuomo [made legalizing marijuana a top priority](#) for the first hundred days of his third term as governor, though that hasn't panned out. New York's legislative session ended on June 19, and the state was unable to pass marijuana reform.

And while New Jersey Governor Phil Murphy hasn't yet given up on legalization, it's not likely to happen this year after lawmakers couldn't reach an agreement on a marijuana legalization bill.

It's possible that New Jersey residents will vote on legal marijuana as a ballot initiative in 2020.

While the federal government under President Trump is no friend to marijuana reform laws, it's likely that we'll see action from Congress — with a

Democrat-controlled House — easing tax burdens and banking restrictions on marijuana businesses and expanding access to medical marijuana next year.

EXHIBIT 55

Expanded Homicide Data Table 8**Murder Victims**

by Weapon, 2014–2018

Weapons	2014	2015	2016	2017	2018
Total	12,278	13,780	15,318	15,195	14,123
Total firearms:	7,803	9,103	10,372	11,006	10,265
Handguns	5,342	6,176	6,762	7,051	6,603
Rifles	235	215	300	390	297
Shotguns	238	247	247	264	235
Other guns	88	151	172	180	167
Firearms, type not stated	1,900	2,314	2,891	3,121	2,963
Knives or cutting instruments	1,545	1,525	1,558	1,609	1,515
Blunt objects (clubs, hammers, etc.)	431	436	464	472	443
Personal weapons (hands, fists, feet, etc.) ¹	668	647	664	710	672
Poison	9	8	12	15	5
Explosives	6	1	1	0	4
Fire	55	63	78	96	72
Narcotics	70	69	118	110	78
Drowning	12	12	9	8	9
Strangulation	84	96	97	89	70
Asphyxiation	93	105	92	111	90
Other weapons or weapons not stated	1,502	1,715	1,853	969	900

¹ Pushed is included in personal weapons.

NOTE: The Uniform Crime Reporting Technical Refresh enables updating of prior years' crime data; therefore, data presented in this table may not match previously published data.

EXHIBIT 56



SEARCH GUN LAWS FACTS RESOURCES MEDIA ABOUT

TAKE ACTION

Concealed Carry

The carrying of concealed, loaded guns in public places can quickly escalate everyday conflicts into deadly altercations, causing tragic, irreversible damage to innocent lives. These dangers are amplified when the permitting standards for concealed carry are weakened. Despite this public safety risk, the gun lobby continues to push dangerous proposals that would weaken or eliminate the permitting requirements for carrying concealed firearms in public.

- FEDERAL LAW
- STATE LAW
- KEY ELEMENTS

BACKGROUND

Historically, almost every state prohibited or strictly limited the carrying of concealed, loaded weapons (also known as CCW) in public places. These restrictions were among the earliest gun laws adopted in the United States. In the late 20th century, some states began to grant law enforcement discretion to issue concealed carry permits to individuals who passed a background check and received firearm safety training and/or demonstrated a particular need to carry hidden, loaded guns in public. At the behest of

the gun lobby, however, many states have weakened those permit requirements in recent years—and 15 states have eliminated the permit requirement entirely.

These changes have expanded the number of people who have permits to carry hidden, loaded handguns and the number of public locations in which they may be carried.

- Estimates suggest that 9 million US adults carry loaded handguns monthly.¹ 3 million of these gun owners carry loaded handguns every day.²
- Proportionally fewer people carry concealed loaded handguns in states that have strong concealed carry permitting standards.³

Guns carried in public pose a substantial threat to public safety. A robust body of academic literature shows that **when more people carry guns in public, violent crime increases.**

- The most comprehensive and rigorous study of concealed carry laws found that in states with weak permitting laws, violent crime rates were 13% to 15% higher than predicted had such laws not been in place.⁴
- Weak concealed-carry permitting laws are also associated with 11% higher rates of homicide committed with handguns compared with states with stronger permitting systems.⁵

There is also some evidence that lax concealed carry laws increase other undesirable outcomes, including gun thefts and unintentional gun injuries.

- People who carried firearms at least once in the past month were three times more likely to have had a firearm stolen than other gun owners.⁶
- Similarly, one analysis suggests that unintentional firearm injuries may occur more frequently after states weaken permitting standards.⁷

In addition to the robust evidence showing the dangers of permissive public carry laws, **there is no research that suggests expanding public carry has any public safety benefits.**

- Firearms are rarely used successfully in self-defense. In fact, individuals successfully defend themselves with a gun in less than one percent of crimes.⁸
- In the rare instances in which firearms are used in self defense, research shows that using a firearm did not reduce a person's chance of being injured during criminal victimization more than other various forms of protection did.⁹

- Carrying a firearm may actually increase a victim's risk of firearm injury during the commission of a crime.¹⁰

SUMMARY OF FEDERAL LAW

FEDERALLY MANDATED CCW

In recent years, the gun lobby has been pushing federal legislation that would mandate that each state recognize concealed carry permits from every other state. **So far, such efforts have been unsuccessful.** Many states have extremely lax permitting laws; ten states do not even require a permit to carry concealed. Forcing states with strong CCW laws like California and New York to comply with weak laws from states like Florida and Louisiana will endanger public safety and make it significantly harder for police to enforce gun laws proven to save lives.

LAW ENFORCEMENT CCW

Federal law provides that certain law enforcement officers may carry concealed firearms. Any "qualified law enforcement officer" with proper agency-issued identification may carry a concealed firearm.¹¹ "Qualified retired law enforcement officer" with proper identification may also carry a concealed firearm.¹²

Both statutes supersede state and local laws regarding concealed carry by law enforcement except in certain circumstances. States are not precluded from allowing private persons or entities to prohibit or restrict the possession of concealed firearms on their property by current or retired law enforcement. States also are not precluded from prohibiting or restricting the possession of firearms by current or retired law enforcement on any state or local government property, installations, buildings, bases, or parks.

BACKGROUND CHECK EXCEPTION

Significantly, a person holding a state-issued permit allowing the person to acquire or possess firearms (e.g., a concealed weapons permit) is not required to undergo a background check if the permit was issued: (1) within the previous five years in the state in which the transfer is to take place; and (2) after an authorized government official has conducted a background investigation to verify that possession of a firearm would not be unlawful.¹³ Permits issued after November 30, 1998 qualify as exempt only if the approval process included a NICS check.¹⁴

This exemption threatens public safety because it allows a prohibited person to acquire a firearm when the person falls into a prohibited category after issuance of the state permit and the state has not immediately revoked the permit. Under the federal exemption, no background check is required and the seller would have no way to learn that the prospective purchaser is prohibited from possessing firearms. For more information about this exemption, see our summary on [Background Check Procedures](#).

SUMMARY OF STATE LAW

Every state—as well as the District of Columbia—allows the carrying of concealed weapons in some form. **Thirty-five states generally require a state-issued permit in order to carry concealed weapons in public** (CCW permit). The remaining 15 (Alaska, Arizona, Idaho, Kansas, Kentucky, Maine, Mississippi, Missouri, New Hampshire, North Dakota, Oklahoma, South Dakota, Vermont, West Virginia, and Wyoming) generally allow individuals to carry concealed weapons in public without a permit. (However, 14 of these 15 states still issue CCW permits; individuals may desire them to qualify for an exemption from federal law’s background check requirements when purchasing a firearm, or so that they may carry concealed weapons in other states).

Of the 35 states that generally require a CCW permit in order to carry concealed weapons in public, eight states and the District of Columbia have “may issue” laws, which grant the issuing authority wide discretion to deny a CCW permit to an applicant if, for example, the authority believes the applicant lacks good character or lacks a good reason for carrying a weapon in public. 14 “shall issue” states provide the issuing authority a limited amount of discretion, and 13 “shall issue” states provide no discretion to the issuing authority.

Nearly every state places some restrictions on where concealed firearms may be carried, such as restrictions on carrying in bars, schools, and hospitals, and at public sporting events.

“May Issue” States

California¹⁵

Connecticut¹⁶

Delaware¹⁷

District of Columbia¹⁸

Hawaii¹⁹

Maryland²⁰

Massachusetts²¹

New Jersey²²

New York²³

Limited Discretion “Shall Issue” States

Alabama²⁴

Arkansas²⁵

Colorado²⁶

Georgia²⁷

Illinois²⁸

Indiana²⁹

Iowa³⁰

Minnesota³¹

Montana³²

Oregon³³

Pennsylvania³⁴

Rhode Island³⁵

Utah³⁶

Virginia³⁷

No Discretion “Shall Issue” States

Florida³⁸

Louisiana³⁹

Michigan⁴⁰

Nebraska⁴¹

Nevada⁴²

New Mexico⁴³

North Carolina⁴⁴

Ohio⁴⁵

South Carolina⁴⁶

Tennessee⁴⁷

Texas⁴⁸

Washington⁴⁹

Wisconsin⁵⁰

No CCW Permit Is Required

Alaska⁵¹

Arizona⁵²

Idaho⁵³

Kansas⁵⁴

Kentucky⁵⁵

Maine⁵⁶

Mississippi⁵⁷

Missouri⁵⁸

New Hampshire⁵⁹

North Dakota⁶⁰

Oklahoma⁶¹

South Dakota⁶²

Vermont⁶³

West Virginia⁶⁴

Wyoming⁶⁵

“MAY” VERSUS “SHALL” ISSUE LAWS

“**May issue**” laws give significant discretion to the issuing official to grant or deny the permit, based on the guidance of various statutory factors. **Even if the general requirements are met, the official is not required to issue the permit.** This kind of law allows permitting authorities to consider factors that may not have been included in the language of a state’s CCW permitting statutes. Nine states have laws that can truly be categorized as “may issue.”

In “shall issue” states, law enforcement officials are generally required to issue a permit to anyone who meets certain minimal statutory requirements (e.g., that the person is not a convicted felon or mentally incompetent). Among states with shall issue laws, some states provide the issuing authority no discretion to deny a permit if the person meets these requirements. In contrast, other states have “shall issue” statutes that still give issuing authorities some degree of discretion to deny a permit if, for example, there is reasonable suspicion to believe that the applicant is a danger to self or others. These “limited discretion” states fall into a separate category that lies between pure “shall issue” and true “may issue” states.

As noted above, fifteen states (Alaska, Arizona, Idaho, Kansas, Kentucky, Maine, Mississippi, Missouri, New Hampshire, North Dakota, Oklahoma, South Dakota, Vermont, West Virginia, and Wyoming) now allow the carrying of concealed weapons without a permit, although all but Vermont issue CCW permits.

QUALIFICATIONS FOR CONCEALED WEAPONS PERMITS

The strongest seven concealed carry permitting systems require CCW applicants to demonstrate good cause as to why the applicant needs a permit. In addition, ten states also require the applicant to be of good character before a permit is issued. In roughly half

the states, CCW applicants are also required to demonstrate some level of knowledge of firearm use and/or firearm safety.

States Requiring a Showing of Good Cause

Seven states require CCW permit applicants to demonstrate good cause or a justifiable need to carry a concealed weapon. In California, for example, good cause exists to issue a CCW permit when there is a clear and present danger to the applicant or the applicant's spouse, family, or employees. **Generally, a credible threat to the applicant's safety that cannot be alleviated through other legal channels constitutes good cause when applying for a CCW permit.** Maryland requires an applicant to demonstrate "a good and substantial reason to wear, carry, or transport a handgun, such as a finding that the permit is necessary as a reasonable precaution against apprehended danger." New York requires an applicant to demonstrate "proper cause," and New Jersey allows a court to issue a permit only if it is satisfied that the applicant "has a justifiable need to carry a handgun."

Other states further delineate the circumstances that constitute good cause or justifiable need: Massachusetts requires the applicant to show a "good reason" to fear injury to his or her person or property, or any other proper reason for carrying a concealed firearm. Delaware issues concealed weapons licenses only "for personal protection or the protection of the person's property." Hawaii grants licenses to carry concealed weapons "[i]n an exceptional case, when an applicant shows reason to fear injury to the applicant's person or property." Connecticut and Washington DC are the only "may issue" states that do not require the applicant to demonstrate a reason for a permit.

States that Require a Showing of Good Cause for Issuance of a Concealed Weapons Permit.⁶⁶

California
Delaware
Hawaii
Maryland
Massachusetts
New Jersey
New York

States Requiring Applicants to be of Good Character or a Suitable Person, or Allowing for Denial When There is Reason to Believe a Person is Dangerous

Eight "may issue" and two limited-discretion "shall issue" states (Georgia and Indiana), as well as the District of Columbia, require the licensing authority to consider the

character of the applicant. Connecticut, Hawaii, Massachusetts, and the District of Columbia allow permits to be issued only to “suitable persons.” California, Delaware, Georgia, and New York require the licensing authority to find that the applicant is of “good moral character.” New Jersey requires that three “reputable persons” who have known the applicant for at least three years certify that the applicant is of “good moral character and behavior.” Delaware also requires that the applicant include with his or her application a certificate signed by five “respectable citizens” of the county in which the applicant resides stating that the applicant is of good moral character, has a reputation for peace and good order, and that possession of a concealed deadly weapon by the applicant is necessary for the protection of the applicant or the applicant’s property. Indiana requires that the applicant be of good character and reputation. Rhode Island requires a person to either have a suitable character or make a “proper showing of need.”

The remaining limited discretion “shall issue” states do not technically have a “good character” requirement, but allow a CCW application to be denied to a person who is not categorically ineligible if law enforcement can show a documented reason to believe the person is dangerous.

States that Require Applicants to be of Good Character or a Suitable Person:⁶⁷

California
Connecticut
Delaware
District of Columbia
Georgia
Hawaii
Indiana
Maine (permit not required for CCW)
Massachusetts
New Jersey
New York
Rhode Island (as an alternative to a proper showing of need)

States Without a “Character” Requirement that Allow Denials When There is Reason to Believe the Person is Dangerous:⁶⁸

Alabama
Arkansas
Colorado
Illinois
Iowa
Minnesota

Missouri (permit not required for CCW)
Montana
North Dakota (permit not required for CCW)
Oregon
Pennsylvania
South Dakota (permit not required for CCW)
Utah
Virginia
Wyoming (permit not required for CCW)

States Requiring Applicants to Demonstrate Knowledge of Firearm Use and/or Safety

More than half of the states and the District of Columbia require a CCW permit applicant to demonstrate that they have received training in firearm use and/or safety. Among “may issue” states, California, Connecticut, Delaware, Hawaii, Massachusetts, New Jersey, Rhode Island, and the District of Columbia, require applicants to complete a firearm safety course, or otherwise demonstrate their qualification to use a firearm safely.

Delaware’s firearm safety training requirement, which applies to the applicant’s initial CCW license only, is particularly strong, and specifies that the training course must include instruction regarding:

- Knowledge and safe handling of firearms and ammunition;
- Safe storage of firearms and ammunition and child safety;
- Safe firearms shooting fundamentals;
- Federal and state laws pertaining to the lawful purchase, ownership, transportation, use, and possession of firearms;
- State laws pertaining to the use of deadly force for self-defense; and
- Techniques for avoiding a criminal attack and how to manage a violent confrontation, including conflict resolution.

Delaware also requires that the training include live fire-shooting exercises on a range, including the expenditure of a minimum of 100 rounds of ammunition, and identification of ways to develop and maintain firearm-shooting skills. Finally, Rhode Island requires applicants to obtain a certification that they are qualified to use a handgun of a caliber equal to or larger than the one they seek to carry. The certification can be obtained by

passing a firing test conducted by a range officer or pistol instructor. **Such thorough training requirements help ensure that only highly trained individuals are allowed to carry concealed firearms in public areas.**

Among “shall issue” states, Illinois, Michigan, North Carolina, South Carolina and Texas require live firing as part of the firearm training component of the law.

States Requiring CCW Applicants to Demonstrate Knowledge of Firearm Use and/or Safety.⁶⁹

- Alaska (permit not required for CCW)
- Arizona (permit not required for CCW)
- Arkansas
- California
- Connecticut
- Colorado
- Delaware
- Hawaii
- Idaho (permit not required for CCW)
- Illinois
- Iowa
- Florida
- Kansas (permit not required for CCW)
- Kentucky (permit not required for CCW)
- Maine (permit not required for CCW)
- Massachusetts
- Michigan
- Minnesota
- Missouri (permit not required for CCW)
- Montana
- Nebraska
- Nevada
- New Jersey
- New Mexico
- North Carolina
- North Dakota (permit not required for CCW)
- Ohio
- Oklahoma
- Oregon
- Rhode Island
- South Carolina

Tennessee

Texas

Utah

West Virginia (permit not required for CCW)

Wyoming (permit not required for CCW)

STATES LIMITING THE LOCATIONS WHERE CONCEALED WEAPONS MAY BE CARRIED

Almost every state imposes at least some restrictions on the locations in which concealed weapons may be carried. For more information, see our page on [Location Restrictions](#).

OTHER RESTRICTIONS ON PERMITS

State concealed weapons permits vary in duration and renewal processes. The strongest laws limit the duration of permits and require applicants for renewal of a permit to undergo a complete background check and complete safety training and testing. Strong state laws also require the immediate revocation of a permit if the permit-holder becomes ineligible for the permit or violates a law regarding firearms.

State laws also vary regarding the carrying of concealed weapons by individuals who have obtained a permit from a different state. The strongest state laws limit the carrying of concealed weapons to individuals who have obtained a permit from that state. Other states limit carrying to individuals with permits from states that have similar requirements for their permits. The states with the weakest laws allow carrying by individuals with permits from any state that recognizes that state's permit, or by individuals with permits from any state.

KEY LEGISLATIVE ELEMENTS

The features listed below are intended to provide a framework from which policy options may be considered. A jurisdiction considering new legislation should consult with counsel.

- A license or permit to carry is required.
- Law enforcement has full discretion to issue permits (*nine states are pure "may issue" states*) based on strict guidelines, including, but not limited to, a showing of both:

- Good moral character, and
- Good cause for requesting a CCW permit.
- In addition to background checks, applicants are required to have safety training and to pass written and hands-on tests demonstrating knowledge of firearm laws and safety (*27 states require some form of firearm training/knowledge*).
- Applicants must be 21 years of age or over.
- Restrictions are placed on the locations where carrying concealed weapons is allowed, prohibiting the carrying of concealed weapons in sensitive areas such as schools, courthouses, hospitals, mental health institutions, and public sporting events.
- Permits are of limited duration and may be renewed only upon satisfaction of all conditions and testing, including background checks.
- Permits are subject to revocation in cases where holder becomes a prohibited purchaser or fails to comply with applicable federal, state, and local firearms laws.

NOTES >

SIGN UP FOR UPDATES

First Name

Last Name

Email

Zip

SIGN UP

POLICY AREAS

STATES

TAKE ACTION

ABOUT

Copyright 2018 Giffords Law Center to Prevent Gun Violence. All Rights Reserved. Legal Disclaimer.

EXHIBIT 57

NBER WORKING PAPER SERIES

THE IMPACT OF RIGHT TO CARRY LAWS AND THE NRC REPORT:
THE LATEST LESSONS FOR THE EMPIRICAL EVALUATION OF LAW AND POLICY

Abhay Aneja
John J. Donohue III
Alexandria Zhang

Working Paper 18294
<http://www.nber.org/papers/w18294>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 2012

The authors wish to thank David Autor, Alan Auerbach, Phil Cook, Peter Siegelman, Hugh LaFollette, and an anonymous referee for helpful comments, Todd Elder for assistance in understanding the technique of testing for omitted variable bias, Akshay Rao, Vikram Rao, Andrew Baker, and Kyle Weber for outstanding research assistance, and Stanford Law School and Yale Law School for financial support. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2012 by Abhay Aneja, John J. Donohue III, and Alexandria Zhang. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

The Impact of Right to Carry Laws and the NRC Report: The Latest Lessons for the Empirical Evaluation of Law and Policy

Abhay Aneja, John J. Donohue III, and Alexandria Zhang

NBER Working Paper No. 18294

August 2012, Revised November 2014

JEL No. K0

ABSTRACT

For over a decade, there has been a spirited academic debate over the impact on crime of laws that grant citizens the presumptive right to carry concealed handguns in public – so-called right-to-carry (RTC) laws. In 2004, the National Research Council (NRC) offered a critical evaluation of the “More Guns, Less Crime” hypothesis using county-level crime data for the period 1977-2000. 15 of the 16 academic members of the NRC panel essentially concluded that the existing research was inadequate to conclude that RTC laws increased or decreased crime. One member of the panel thought the NRC's panel data regressions showed that RTC laws decreased murder, but the other 15 responded by saying that “the scientific evidence does not support” that position.

We evaluate the NRC evidence, and improve and expand on the report's county data analysis by analyzing an additional six years of county data as well as state panel data for the period 1979-2010. We also present evidence using both a more plausible version of the Lott and Mustard specification, as well as our own preferred specification (which, unlike the Lott and Mustard model presented in the NRC report, does control for rates of incarceration and police). While we have considerable sympathy with the NRC's majority view about the difficulty of drawing conclusions from simple panel data models and re-affirm its finding that the conclusion of the dissenting panel member that RTC laws reduce murder has no statistical support, we disagree with the NRC report's judgment on one methodological point: the NRC report states that cluster adjustments to correct for serial correlation are not needed in these panel data regressions, but our randomization tests show that without such adjustments the Type 1 error soars to 22 - 73 percent.

Our paper highlights some important questions to consider when using panel data methods to resolve questions of law and policy effectiveness. We buttress the NRC's cautious conclusion regarding the effects of RTC laws by showing how sensitive the estimated impact of RTC laws is to different data periods, the use of state versus county data, particular specifications (especially the Lott-Mustard inclusion of 36 highly collinear demographic variables), and the decision to control for state trends.

Across the basic seven Index I crime categories, the strongest evidence of a statistically significant effect would be for aggravated assault, with 11 of 28 estimates suggesting that RTC laws increase this crime at the .10 confidence level. An omitted variable bias test on our preferred Table 8a results suggests that our estimated 8 percent increase in aggravated assaults from RTC laws may understate the true harmful impact of RTC laws on aggravated assault, which may explain why this finding is only significant at the .10 level in many of our models. Our analysis of the year-by-year impact of RTC laws also suggests that RTC laws increase aggravated assaults. Our analysis of admittedly imperfect gun aggravated assaults provides suggestive evidence that RTC laws may be associated with large increases in this crime, perhaps increasing such gun assaults by almost 33 percent.

In addition to aggravated assault, the most plausible state models conducted over the entire 1979-2010 period provide evidence that RTC laws increase rape and robbery (but usually only at the .10 level). In contrast, for the period from 1999-2010 (which seeks to remove the confounding influence of the crack cocaine epidemic), the preferred state model (for those who accept the Wolfers proposition that one should not control for state trends) yields statistically significant evidence for only one crime -- suggesting that RTC laws increase the rate of murder at the .05 significance level. It will be worth exploring whether other methodological approaches and/or additional years of data will confirm the results of this panel-data analysis and clarify some of the highly sensitive results and anomalies (such as the occasional estimates that RTC laws lead to higher rates of property crime) that have plagued this inquiry for over a decade.

Abhay Aneja
Stanford Law School
559 Nathan Abbott Way
Stanford, CA 94305
aaneja@stanford.edu

Alexandria Zhang
Johns Hopkins University
Baltimore, Maryland
azhang4@jhu.edu

John J. Donohue III
Stanford Law School
Crown Quadrangle
559 Nathan Abbott Way
Stanford, CA 94305
and NBER
donohue@law.stanford.edu

I. Introduction

The debate on the impact of “shall-issue” or “right-to-carry” (RTC) concealed handgun laws on crime—which has now raged on for over a decade—is a prime example of the many difficulties and pitfalls that await those who try to use observational data to estimate the effects of changes in law or policy.² John Lott and David Mustard initiated the “More Guns, Less Crime” discussion with their widely cited 1997 paper arguing that the adoption of RTC laws has played a major role in reducing violent crime. However, as Ayres and Donohue (2003a) note, Lott and Mustard’s period of analysis ended just before the extraordinary crime drop of the 1990s. They concluded that extending Lott and Mustard’s dataset beyond 1992 undermined the “More Guns, Less Crime” (MGLC) hypothesis. Other studies have raised further doubts about the claimed benefits of RTC laws (for example, see Black and Nagin, 1997 and Ludwig, 1998).

But even as the empirical support for the Lott and Mustard thesis was weakening, its political impact was growing. Legislators continued to cite this work in support of their votes on behalf of RTC laws, and the “More Guns, Less Crime” claim has been invoked often in support of ensuring a personal right to have handguns under the Second Amendment. In the face of this scholarly and political ferment, in 2003, the National Research Council (NRC) convened a committee of top experts in criminology, statistics, and economics to evaluate the existing data in hopes of reconciling the various methodologies and findings concerning the relationship between firearms and violence, of which the impact of RTC laws was a single, but important, issue. With so much talent on board, it seemed reasonable to expect that the committee would reach a decisive conclusion on this topic and put the debate to rest.

The bulk of the NRC report on firearms, which was finally issued in 2004, was uncontroversial. The chapter on RTC laws was anything but. Citing the extreme sensitivity of

² The term “RTC laws” is used interchangeably with “shall-issue laws” in the guns and crime literature.

point estimates to various panel data model specifications, the NRC report failed to narrow the domain of uncertainty about the effects of RTC laws. Indeed, it may have increased it.

However, while the NRC report concluded there was no reliable statistical support for the “More Guns, Less Crime” hypothesis, the vote was not unanimous. One dissenting committee member argued that the committee's own estimates revealed that RTC laws did in fact reduce the rate of murder. Conversely, a different member went even further than the majority’s opinion by doubting that *any* econometric evaluation could illuminate the impact of RTC laws owing to model specification and endogeneity issues.

Given the prestige of the committee and the conflicting assessments of both the substantive issue of RTC laws' impact and the suitability of empirical methods for evaluating such laws, a reassessment of the NRC’s report would be useful for researchers seeking to estimate the impact of other legal and policy interventions. Our systematic review of the NRC's evidence—its approach and findings—also provides important lessons on the perils of using traditional observational methods to elucidate the impact of legislation. To be clear, our intent is not to provide what the NRC panel could not—that is, the final word on how RTC laws impact crime. Rather, we show how fragile panel data evidence can be, and how a number of issues must be carefully considered when relying on these methods to study politically and socially explosive topics with direct policy implications.

The outline of this paper is as follows. Section II offers background on the debate over RTC laws, and Section III describes relevant aspects of the NRC report in depth. Section IV discusses how the NRC majority presented some panel data models based on the Lott and Mustard specification in support of the conclusion that one could not reach a definitive conclusion about the impact of RTC laws. While this conclusion was correct, the models

contained an array of errors that opened the door for the Wilson dissent to argue that RTC laws reduce murder. We discuss these errors in depth and show that Wilson would have been unable to make his dissent if the errors in the presented models (and standard error calculations) had been corrected.

Sections V and VI explore two key econometric issues in evaluating RTC laws—whether to control for state-specific trends (which the NRC panel did not address) and whether to adjust standard errors to account for serial or within-group correlation (we show that the NRC report was in error when it concluded such adjustment was not needed). Section VII extends the analysis through 2006, and Section VIII offers improvements to the NRC model by revising the regression specification in accordance with past research on crime. Section IX discusses the issue of whether the impact of RTC laws can be better estimated using county- or state-level data. Section X delves further into the issue of omitted variable bias in assessing the impact of RTC laws, and in particular, how the difficult-to-measure effect of the crack epidemic may influence our estimates. Section XI offers concluding comments on the current state of the research on RTC laws, the difficulties in ascertaining the causal effects of legal interventions, and the dangers that exist when policy-makers can simply pick their preferred study from among a wide array of conflicting estimates.

II. Background on the Debate

In a widely-discussed 1997 paper, “Crime, Deterrence, and Right-to-Carry Concealed Handguns,” John Lott and David Mustard (1997) argued, based on a panel-data analysis, that right-to-carry laws were a primary driving force behind falling rates of violent crime. Lott and Mustard used county-level crime data (including county and year fixed effects, as well as a set of

control variables) to estimate the impact of RTC laws on crime rates over the time period 1977-1992. In essence, Lott and Mustard's empirical approach was designed to identify the effect of RTC laws on crime in the ten states that adopted them during this time period. Using a standard difference-in-difference model, the change in crime in RTC regions is compared with the change in crime in non-RTC regions. The implicit assumption is that the controls included in the regression will explain other movements in crime across states, and the remaining differences in crime levels can be attributed to the presence or absence of the RTC laws.

Lott and Mustard estimated two distinct difference-in-difference-type models to test the impact of RTC laws: a dummy variable model and a trend, or "spline," model.³ The "dummy model" tests whether the average crime level in the pre-passage period is statistically different from the post-passage crime level (after controlling for other factors). The "spline model" measures whether crime *trends* are altered by the adoption of RTC laws. Lott and Mustard noted that the spline approach would be superior if the intervention caused a reversal in a rising crime rate. Such a reversal could be obscured in a dummy variable model that only estimates the average change in crime between the pre- and post-passage periods. An effective RTC law might show no effect in the dummy model if the rise in the pre-passage crime rate and the fall in the post-passage rate were to leave the average "before" and "after" crime levels the same.

³ In Lott's "dummy model" specification, RTC laws are modeled as a dummy variable which takes on a value of one in the first full year after passage and retains that value thereafter (since no state has repealed its RTC law once adopted). In Lott's "trend model," RTC laws are modeled as a spline variable indicating the number of years post-passage. In prior work, including previous drafts of this article, we had followed this specification choice. But this approach adds noise to this key RTC variable because of heterogeneity across states in the effective dates of RTC laws. Accordingly, we decided to modify our approach to these laws in the most recent version of this paper to more precisely model the impact of the RTC laws based on the actual effective dates of these statutes. Using the text of relevant statutes and information on the court cases that challenged them, we determined the exact date when each state's RTC law took effect. (A more precise description of what was involved in this process can be found in Footnote 17.) Our "dummy model" specification uses a variable that takes a value of one for every full year after each law takes effect and is equal to the fraction of the year that the law is in effect the first year it is implemented. Similarly, our "trend model" specification uses a spline variable indicating the number of years post-passage which takes into account the portion of the year the law was initially implemented.

In both regression models, Lott and Mustard included only a single other criminal justice explanatory variable -- county-level arrest rates -- plus controls for county population, population density, income, and thirty-six(!) categories of demographic composition. As we will discuss shortly, we believe that many criminological researchers would be concerned about the absence of important explanatory factors such as the incarceration rate and the level of police force.

Lott and Mustard's results seemed to support the contention that laws allowing the carry of concealed handguns lead to less crime. Their estimates suggested that murder, rape, aggravated assault, and overall violent crime fell by 4 to 7 percent following the passage of RTC laws. In contrast, property crime rates (auto theft, burglary, and larceny) were estimated to have increased by 2 to 9 percent. Lott and Mustard thus concluded that criminals respond to RTC laws by substituting violent crime with property crime to reduce the risk that they would be shot (since, according to them, victims are more often absent during the commission of a property crime). They also found that the MGLC contention was strengthened by the trend analysis, which ostensibly suggested significant *decreases* in murder, rape, and robbery (but no significant increases in property crime).

From this evidence, Lott and Mustard (1997) concluded that permissive gun-carrying laws deter violent crimes more effectively than any other crime reduction policy: "concealed handguns are the most cost-effective method of reducing crime thus far analyzed by economists, providing a higher return than increased law enforcement or incarceration, other private security devices, or social programs like early education." They went even further by claiming that had remaining non-RTC states enacted such legislation, over 1,400 murders and 4,100 rapes would have been avoided nationwide, and that each new handgun permit would reduce victim losses by up to \$5,000.

A. The Far-Reaching Impact of “More Guns, Less Crime”

The first "More Guns, Less Crime" paper and Lott's subsequent research (and pro-gun advocacy) have had a major impact in the policy realm. Over the past decade, politicians as well as interest groups such as the National Rifle Association have continually trumpeted the results of this empirical study to oppose gun control efforts and promote less restrictive gun-carrying laws. Lott has repeatedly invoked his own research to advocate for the passage of state-level concealed-carry gun laws, testifying on the purported safety benefits of RTC laws in front of several state legislatures, including Nebraska, Michigan, Minnesota, Ohio, and Wisconsin (Ayres and Donohue 2003a).

The impact of the Lott-Mustard paper can also be seen at the federal level. In 1997, ex-Senator Larry Craig (R-Idaho) introduced the Personal Safety and Community Protection Act with Lott's research as supporting evidence. This bill was designed to allow state nonresidents with valid handgun permits in their home state to possess concealed firearms (former football athlete Plaxico Burress sought to invoke this defense when he accidentally shot himself in a Manhattan nightclub with a gun for which he had obtained a Florida permit). According to Craig, Lott's work confirmed that positive externalities of gun-carrying would result in two ways: by affording protection for law-abiding citizens during criminal acts, and by deterring potential criminals from ever committing offenses for fear of encountering an armed response.⁴ Clearly, Lott's work has provided academic cover for policymakers and advocates seeking to justify the view—on public safety grounds—that the 2nd Amendment conferred a private right to possess handguns.

⁴ 143 CONG. REC. S5109 (daily ed. May 23, 1997) (statement of Sen. Craig). The bill was again introduced in 2000 by Congressman Cliff Stearns (R-Florida), who also cited Lott's work. 146 CONG. REC. H2658 (daily ed. May 9) 2000) (statement of Rep. Stearns).

Indeed, this proposed legislation, now derisively referred to as “Plaxico’s Law,” is a perennial favorite of the NRA and frequently introduced by supportive members of Congress (Collins 2009).

B. Questioning “More Guns, Less Crime”

Immediately after the publication of the Lott-Mustard paper, scholars started raising serious questions about the theoretical and empirical validity of the “More Guns, Less Crime” hypothesis. For example, Zimring and Hawkins (1997) claimed that the comparison of crime between RTC and non-RTC states is inherently misleading because of factors such as deprivation, drugs, and gang activity, which vary significantly across gun-friendly and non-gun-friendly states (and are often difficult to quantify). To the extent that the relatively better crime performance seen in shall-issue states during the late 1980s and early 1990s was the product of these other factors, researchers may be obtaining biased impact estimates. Underscoring this point, Ayres and Donohue (2003a) pointed out that crime rose across the board from 1985 to 1992, and most dramatically in non-RTC states. Since the data set used in Lott and Mustard (1997) ended in 1992, it could not capture the most dramatic reversal in crime in American history.

Figures 1-7 depict the trends of violent and property crimes over the period 1970-2010. For each of the seven crimes, we calculate average annual crime rates for four groupings of states: non-RTC states (those states that had not passed RTC laws by 2006), states that adopted RTC laws over the period 1985-1988 (“early adopters”), those that adopted RTC laws over the period 1989-1991 (“mid-adopters”), and those that adopted RTC laws over the period 1994-1996 (“late adopters”). The crime rate shown for each group is a within-group average, weighted by population. The figures corroborate Ayres and Donohue’s point: crime rates declined sharply across the board beginning in 1992. In fact, there was a steady *upward* trend in crime rates in the years leading up to 1992, most distinctly for rape and aggravated assault. Moreover, the average crime rates in non-RTC states seemed to have dropped even more drastically than those in RTC

states, which suggests that crime-reducing factors other than RTC laws were at work.

Figure 1:

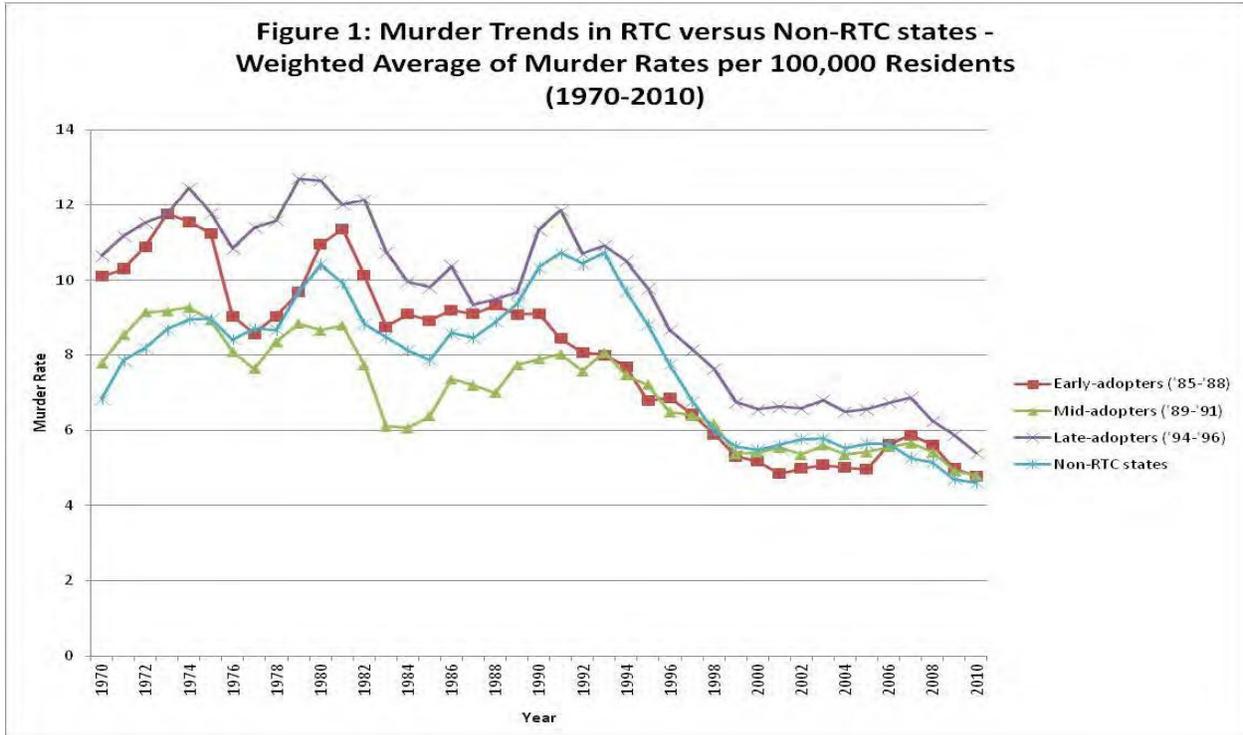


Figure 2:

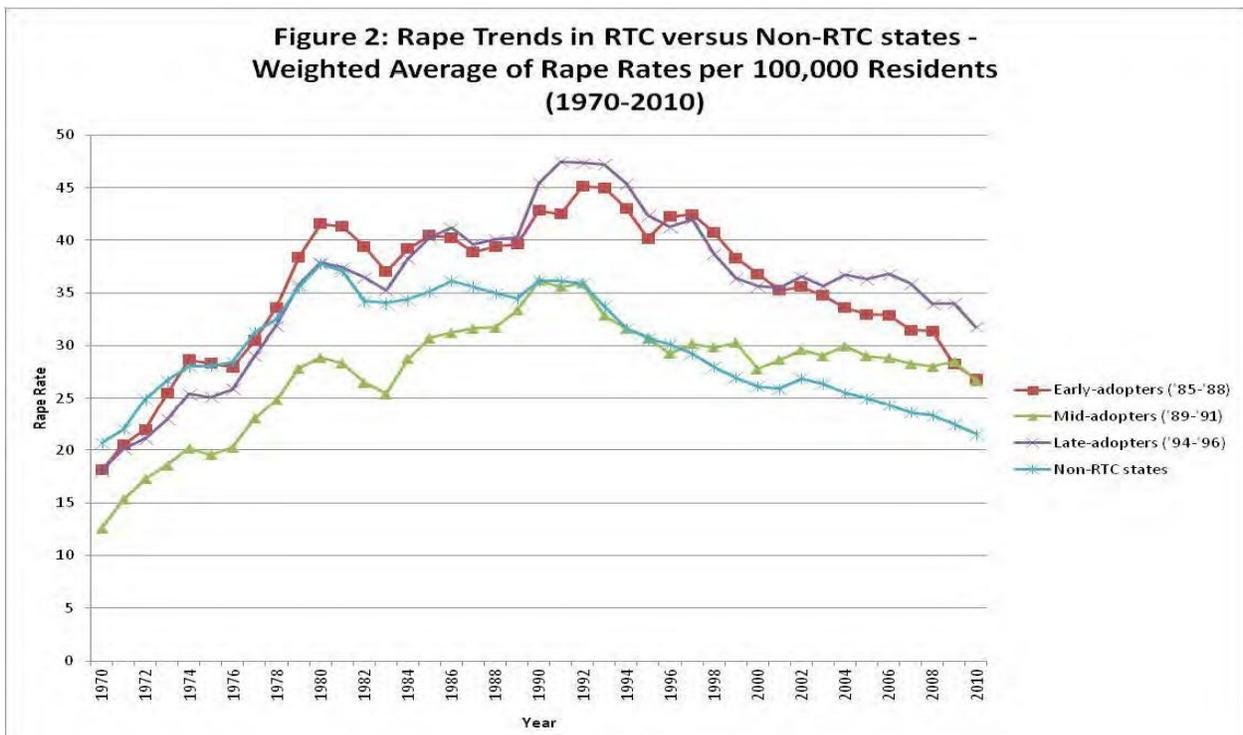


Figure 3:

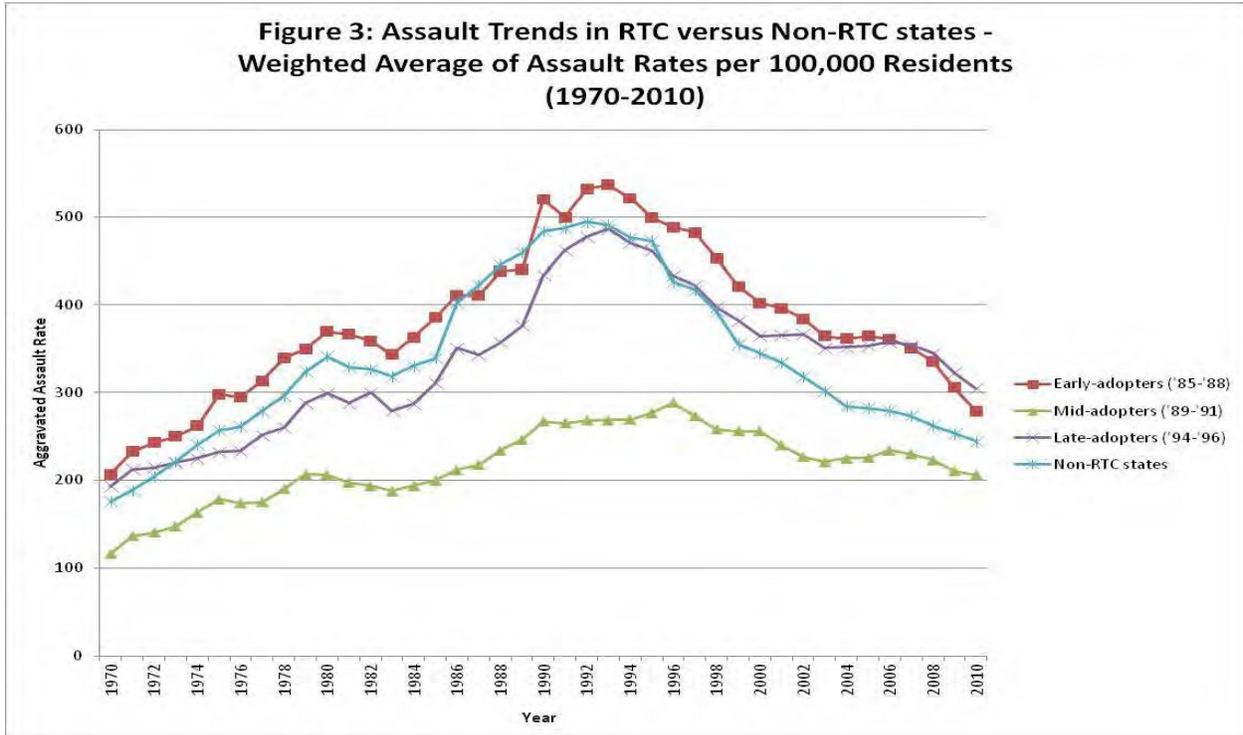


Figure 4:

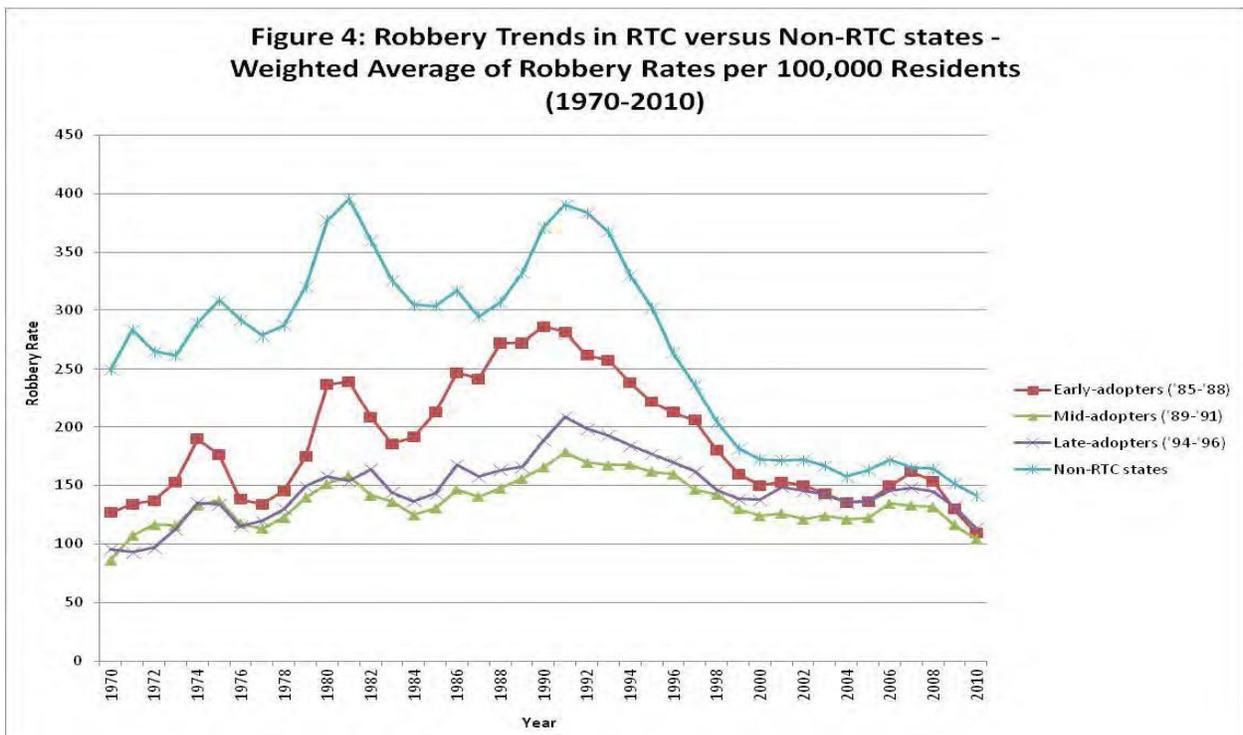


Figure 5:

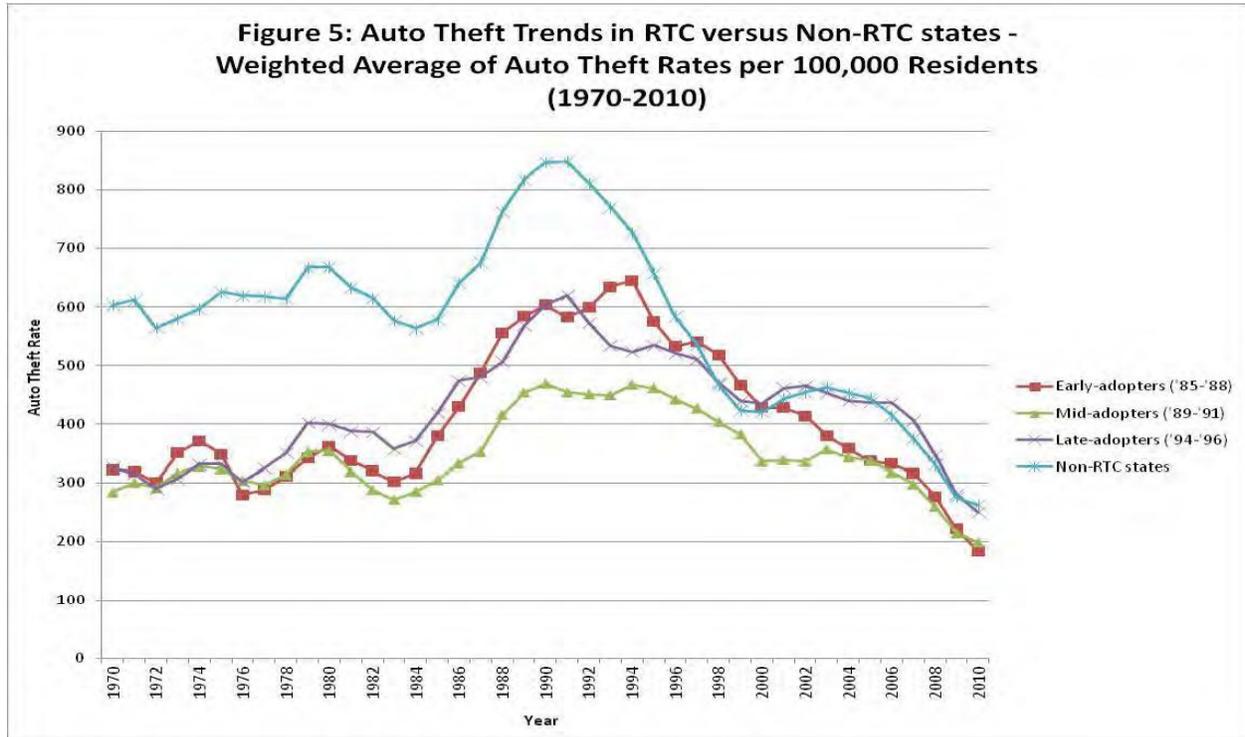


Figure 6:

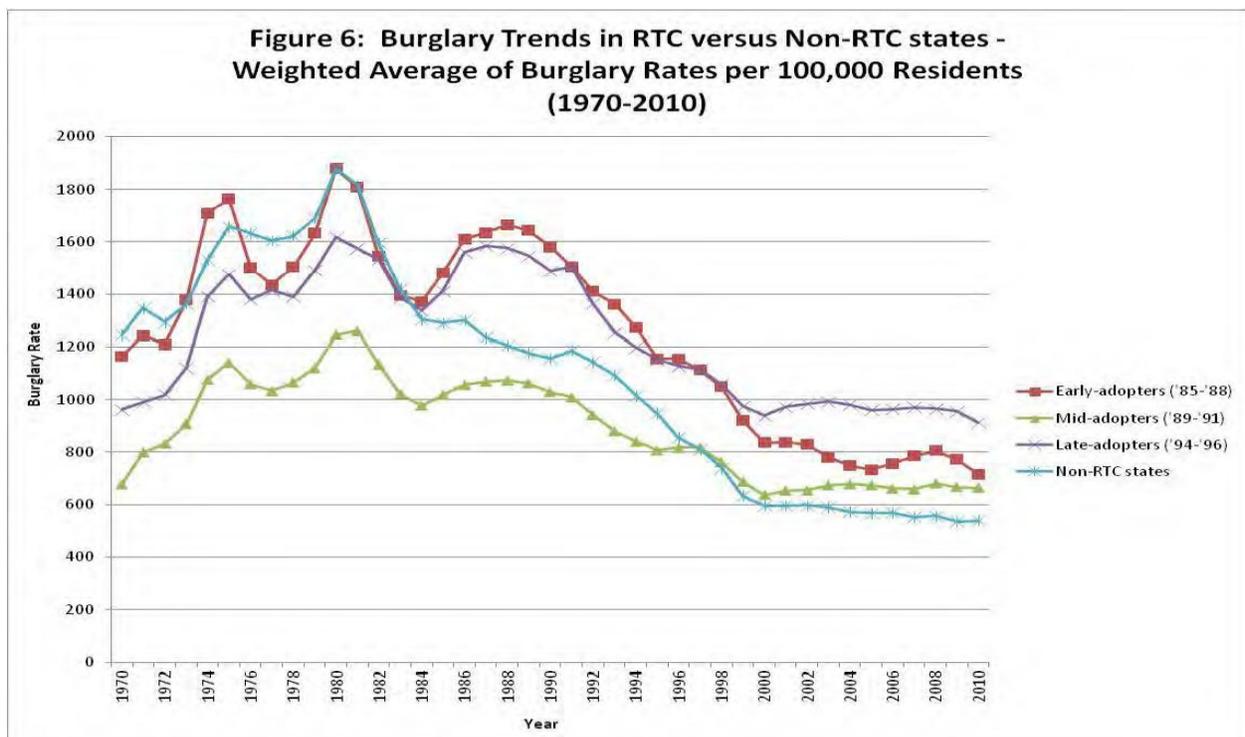
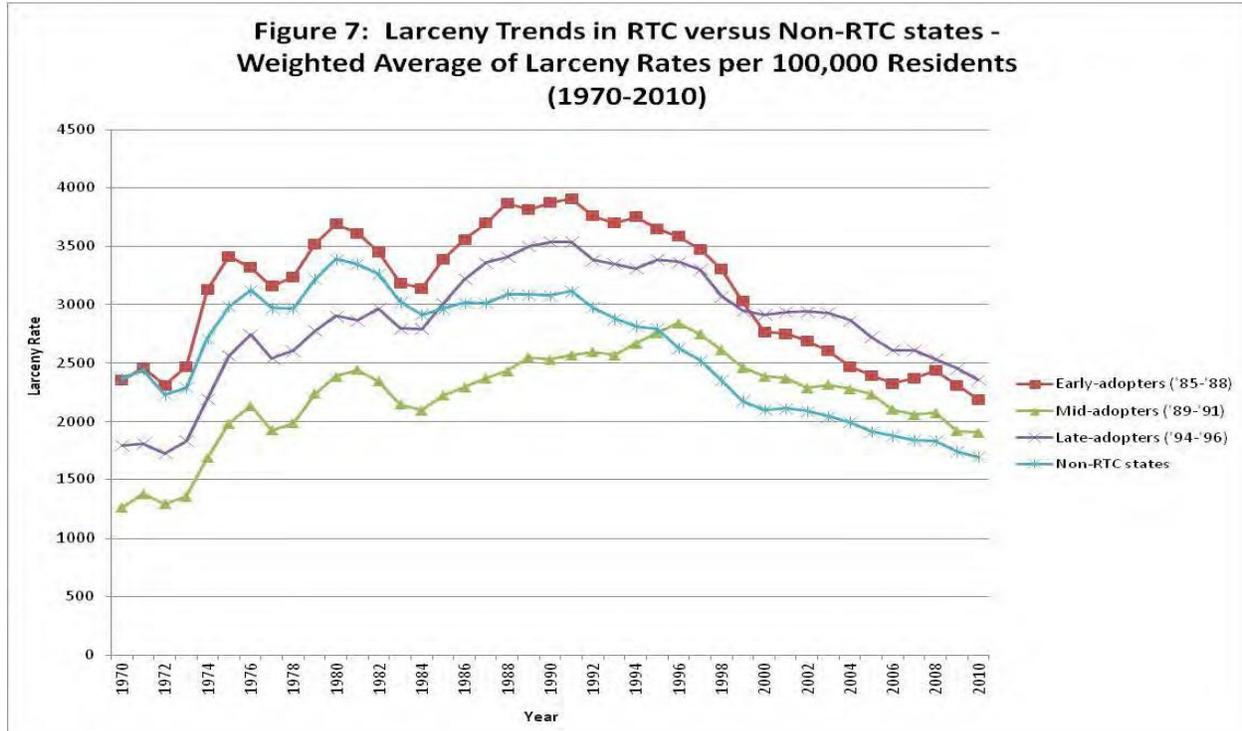


Figure 7:

Ayres and Donohue (2003a) also recommended the use of a more general model, referred to as the “hybrid model,” which essentially combined the dummy variable and spline models, to measure the immediate *and* long-run impact of RTC laws on crime. Since the hybrid model nests both the dummy and spline models, one can estimate the hybrid and generate either of the other models as a special case (depending on what the data show). This exercise seemed to weaken the MGLC claim. Their analysis of the county data set from 1977-1997 using the Lott-Mustard specification (revised to measure state-specific effects) indicated that RTC laws across all states *raised* total crime costs by as much as \$524 million.

Just as Lott had identified a potential problem with the dummy model (it might understate a true effect if crime followed either a V-shaped or inverted V-shaped pattern), there is a potential problem with models (such as the spline and the hybrid models) that estimate a post-passage linear trend. Early adopters of RTC laws have a far more pronounced impact on the

trend estimates of RTC laws than later adopters, since there may only be a few years of post-passage data available for a state that adopts RTC laws close to the end of the data period. If those early adopters were unrepresentative of low crime states, then the final years of the spline estimate would suggest a dramatic drop in crime, not because crime had in fact fallen in adopting states, but because the more representative states had dropped out of the estimate (since there would be no post-passage data after, say, three years for a state that had adopted the RTC law only three years earlier, but there would be such data for Maine and Indiana, which were the earliest RTC adopters). We recognize that each model has limitations, and present the results of all three in our tables below.⁵

III. Findings of the National Research Council

The sharply conflicting academic assessments of RTC laws specifically and the impact of firearms more generally, not to mention the heightened political salience of gun issues, prompted the National Research Council to impanel a committee of experts to critically review the entire range of research on the relationships between guns and violence. The blue-chip committee, which included prominent scholars such as sociologist Charles Wellford (the committee chair), political scientist James Q. Wilson, and economists Joel Horowitz, Joel Waldfogel, and Steven Levitt, issued its wide ranging report in 2004.

While the members of the panel agreed on the major issues discussed in eight of the nine chapters of the NRC report, the single chapter devoted to exploring the causal effects of RTC laws on crime proved to be quite contentious. After reviewing the existing (and conflicting)

⁵We note that in the latest version of his book, Lott (2010) criticizes the hybrid model, but he fails to appreciate that the problem with the hybrid model –and with the spline model he prefers—is that they both yield estimates that are inappropriately tilted down as the more representative states drop out of the later years, which drive the post-passage trend estimates. An apples to apples comparison that included the identical states to estimate the post-passage trend would not suggest a negative slope. This is clear in Figure 1 and Table 1 of Ayres and Donohue (2003a).

literature and undertaking their own evaluation of Lott's county-level crime data, 15 of the 16 academic members of the committee concluded that the data provided no reliable and robust support for the Lott-Mustard contention. In fact, they believed the data could not support any policy-relevant conclusion. In addition, they claimed they could not estimate the true impact of these laws on crime because: (1) the empirical results were imprecise and highly sensitive to changes in model specification, and (2) the estimates were not robust when the data period was extended eight years beyond the original analysis (through 2000), a period during which a large number of states adopted the law.

A. The NRC Presents Two Sets of Estimates of the Impact of RTC Laws

One can get an inkling of the NRC majority's concern about model sensitivity by examining Table 1 below, which reports estimates from the NRC report on the impact of RTC laws on seven crimes. The Table 1b estimates are based on the Lott and Mustard (1997) dummy and spline models using county data for the period 1977-2000 with the full set of Lott and Mustard controls. The Table 1a estimates use the same data but provide a more sparse specification that drops the Lott and Mustard controls and provides estimates with no covariates other than year and county fixed effects. The vastly different results produced by these different models gave the majority considerable pause. For example, if one believed the dummy model in Table 1b, then RTC laws considerably *increased* aggravated assault and robbery, while the spline model in Table 1b suggested RTC laws *decreased* the rate of both of these crimes. Noting that the RTC impact estimates disagreed across their two models (dummy and spline) for six of the seven crime categories, the NRC report concluded that there was no reliable scientific support for the more guns, less crime thesis.

Table 1**Table 1a⁶**

Estimated Impact of RTC Laws – Published NRC Estimates – No Controls, All Crimes, County Data, 1977-2000

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-1.95 (1.48)	17.91*** (1.39)	12.34*** (0.90)	19.99*** (1.21)	23.33*** (0.85)	19.06*** (0.61)	22.58*** (0.59)
Spline Model:	0.12 (0.32)	-2.17*** (0.30)	-0.65*** (0.20)	-0.88*** (0.26)	0.57*** (0.19)	-1.99*** (0.13)	-0.71*** (0.13)

Table 1b⁷

Estimated Impact of RTC Laws – Published NRC Estimates – Lott-Mustard Controls, All Crimes, County Data 1977-2000

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-8.33*** (1.05)	-0.16 (0.83)	3.05*** (0.80)	3.59*** (0.90)	12.74*** (0.78)	6.19*** (0.57)	12.40*** (0.55)
Spline Model:	-2.03*** (0.26)	-2.81*** (0.20)	-1.92*** (0.20)	-2.58*** (0.22)	-0.49** (0.19)	-2.13*** (0.14)	-0.73*** (0.13)

Interestingly, the conflicting estimates of Table 1 also led to substantial intra-panel dissention, with two members of the Committee writing separately from the NRC's majority evaluation of RTC laws. One sought to refute the majority's skepticism, and one sought to reinforce it. Noted political scientist James Q. Wilson offered the lone dissent to the Committee's report, claiming that Lott and Mustard's "More Guns, Less Crime" finding actually held up under the panel's reanalysis. Specifically, Wilson rejected the majority's interpretation of the

⁶Estimations include year and county fixed effects, and are weighted by county population. Standard errors are in parentheses below estimations. Robust standard errors are not used in the published NRC estimates. * Significant at 10%; ** Significant at 5%; *** Significant at 1%. Throughout this paper, the standard errors appear just below the corresponding parameter estimate.

⁷ Estimations include year and county fixed effects, and are weighted by county population. Standard errors are provided beneath point estimates in parentheses. Robust standard errors are not used in the published NRC estimates. The control variables (adopted from the Lott-Mustard model) include: arrest rate, county population, population density, per capita income measures, and 36 demographic composition measures indicating the percentage of the population belonging to a race-age-gender group. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

regression estimates seen in Table 1. Although the majority saw sharp conflicts in the Table 1b results between the dummy and spline models, Wilson was impressed that for one of the seven crimes -- murder -- the dummy and spline models of Table 1b generated estimates that seemingly suggested there were statistically significant drops in crime associated with RTC laws. This agreement in the Table 1b murder estimates led him to heartily endorse the "More Guns, Less Crime" view. Indeed, after dismissing papers that had cast doubt on the MGLC hypothesis (such as Black and Nagin, 1998) on the grounds that they were "controversial," Wilson concluded: "I find the evidence presented by Lott and his supporters suggests that RTC laws do in fact help drive down the murder rate, though their effect on other crimes is ambiguous" (NRC Report, p. 271.).

The Committee penned a response to Wilson's dissent (separate from its overall evaluation of RTC legislation), which stressed that the only disagreement between the majority and Wilson (throughout the entire volume on gun issues) concerned the impact of RTC laws on murder. They noted that, while there were a number of negative estimates for murder using the Lott-Mustard approach, there were also several positive estimates that could not be overlooked. In addition, as the NRC panel noted, even the results for murder failed to support the MGLC contention when restricting the period of analysis to five years or less after law adoption.⁸ The important task was to try to reconcile these contradictions—and the panel majority believed that was not possible using the existing data.

Committee member (and noted econometrician) Joel Horowitz was the ardent skeptic, and not without merit. Horowitz joined the refutation of Wilson but also authored his own appendix discussing at length the difficulties of measuring the impact of RTC laws on crime

⁸ The importance of this restriction on the post-passage data was mentioned earlier: as states dropped out of the post-passage data, the estimated impact of RTC laws became badly biased (since one was no longer deriving the estimated effect from a uniform set of states).

using observational rather than experimental data.⁹ He began by addressing a number of flaws in the panel-data approach. First, if factors other than the adoption of the RTC law change but are not controlled for in the model, then the resulting estimates would not effectively isolate the impact of the law (we demonstrate the likelihood of this possibility in Section X below). Second, if crime increases before the adoption of the law at the same rate it decreases after adoption, then a measured zero-difference would be misleading. The same problem arises for multiyear averages. Third, the adoption of RTC laws may be a *response* to crime waves. If such an endogeneity issue exists, the difference in crime rates may merely reflect these crime waves rather than the effect of the laws. Lastly, as even Lott (2000) found in his data, RTC states differ noticeably from non-RTC states (e.g., RTC states are mainly Republican and had low but rising rates of crime). It would not be surprising if these distinctive attributes influence the measured effect of RTC laws. In this event, looking at the impact of RTC laws in current RTC states may not be useful for predicting the likely result if these laws were adopted in very different states.

Ideally, states would be randomly selected to adopt RTC laws, thereby eliminating the systematic differences between RTC states and non-RTC states. In the absence of such randomization, researchers introduce controls to try to account for these differences, which generates debate over which set of controls is appropriate. Lott (2000) defended his model by claiming that it included “the most comprehensive set of control variables yet used in a study of crime” (p. 153). But Horowitz was unimpressed by Lott’s claim, noting that it is possible to control for too many variables – or too few. He pointed out that Donohue (2003) found a significant relationship between crime and *future* adoption of RTC legislation, suggesting the likelihood of omitted variable bias and/or the endogenous adoption of the laws. Horowitz

⁹ While his chapter is directed at the analysis of RTC laws, Horowitz's comments applied to an array of empirical studies of policy that were discussed throughout the entire NRC volume.

concluded by noting that there is no test that can determine the right set of controls: “it is not possible to carry out an empirical test of whether a proposed set of X variables is the correct one...it is largely a matter of opinion which set [of controls] to use” (NRC Report, p. 307). Noting the likelihood of misspecification in the evaluation of RTC laws, and that estimates obtained from a misspecified model can be highly misleading, he concluded that there was little hope of reaching a scientifically supported conclusion based on the Lott-Mustard/NRC model (or any other).¹⁰

B. The Serious Need for Reassessment

The story thus far has been discouraging for those hoping for illumination of the impact of legislation through econometric analysis. If the NRC majority is right, then years of observational work by numerous researchers, topped off with a multi-year assessment of the data by a panel of top scholars, were not enough to pin down the actual impact of RTC laws. If Horowitz is right, then the entire effort to estimate the impact of state right-to-carry policies from observational data is doomed. Indeed, there may be simply too much that researchers do not know about the proper structure of econometric models of crime. Notably, however, the majority did not join Horowitz in the broad condemnation of all observational microeconometrics for the study of this topic. Perhaps a model that better accounts for all relevant, exogenous, crime-influencing factors and secular crime trends could properly discern the effects of RTC laws – whether supporting or refuting the Wilson conclusion that RTC laws reduce murder. On the other hand, an examination of additional models might only serve to strengthen the NRC majority conclusion that the models generated estimates that were too

¹⁰ Note that this nihilistic conclusion was very close to that found by a more recent NRC report investigating the deterrent effect of the death penalty. Daniel S. Nagin and John V. Pepper, editors, *Deterrence and the Death Penalty* (2012). This recent NRC report reviewed 30 years of studies on this deterrence question and found the entire literature to be “uninformative.”

variable to provide clear insight into the effect of RTC laws on crime.

IV. Panel Data Estimates in the NRC Report

Previous research on guns and crime has shown how data and methodological flaws can produce inaccurate conclusions. In a follow-up to their initial 2003 *Stanford Law Review* paper, Ayres and Donohue (2003b) demonstrated how coding errors can yield inaccurate and misleading estimates of the effect of RTC laws on crime. Commenting on a study in support of the MGLC premise by Florenz Plassman and John Whitley (2003), Ayres and Donohue (2003b) described numerous coding flaws. After correcting these errors, the existing evidence supporting the “More Guns, Less Crime” hypothesis evaporated.

A. The NRC’s Panel-Data Models

Since the NRC panel based their reported estimates on data provided by John Lott, we thought it prudent to carefully examine the NRC committee’s own estimates. With the help of the NRC committee members who provided the NRC 1977-2000 county data set, we were ultimately able to generate the NRC panel data estimates.¹¹ Once we fully understood the way in which these NRC estimates were generated (shown in Table 1 above), it became clear that the NRC report presented estimates that essentially had three flaws: 1) the specification (used by Lott and Mustard) was problematic in a number of dimensions; 2) the standard errors were incorrect in two ways, both of which made the results appear more significant than they were; and 3) there were some errors in the data, which had been supplied by Lott.

Given the NRC majority conclusion that the Lott and Mustard thesis was not supported by the data, it was a reasonable choice to simply take the Lott and Mustard data and

¹¹ The initial published version of this article -- Aneja, Donohue, and Zhang (2011) -- noted that we had originally failed to replicate the NRC results, with our efforts complicated because the Committee had misplaced the do files that generated the NRC estimates. After publication, we were informed of the precise specification the NRC had employed, which did generate the published NRC estimates (although these estimates are flawed in the manner described in the text).

specifications and adhere to their method of computing standard errors. In essence, the NRC majority was shrewdly saying, “Even if we fully accept everything that Lott and Mustard have argued for, we still find no support for their conclusion.” The only problem with the NRC majority approach, though, was that presenting the estimates in Table 1b above opened the door for James Q. Wilson to argue that some support for RTC laws could be gleaned from the ostensibly conflicting evidence.

Wilson’s claim, once again, was that Table 1b spoke with clarity, albeit on only one point. He conceded that the Lott and Mustard dummy and spline estimates conflicted for six of the seven crime categories, but since they both showed statistically significant reductions in murder, Wilson claimed that the murder finding was robust and he concluded that RTC laws save lives. The NRC majority responded that Table 1a did not similarly suggest that RTC laws reduced murder but Wilson swatted that response aside by saying that a model with no covariates would not be as persuasive as the Table 1b models with covariates. The NRC majority could have countered Wilson’s claim far more effectively if they had simply shown that the Lott and Mustard model was highly assailable and greatly underestimated its standard errors. Indeed, nothing would have been left standing for Wilson to construct a positive story of RTC laws if the NRC majority had simply calculated the correct standard errors for the Table 1b models, since doing so would have eliminated any claim that the RTC laws generated a statistically significant reduction in murder or any other crime.

B. Problems with the Lott and Mustard Models and Data Published in the NRC Report

Our goal in this section is to improve on the estimates presented in the NRC report (Table 1 above) by correcting what we consider to be clear errors in the Lott and Mustard specification, data, and standard errors. Thus, we began by constructing our own county-level data set, which

we will refer to as the "Updated 2013 Data Set." We create the same variables found in Lott's data—crime rates, demographic composition, arrest rates, income, population, and population density—and extend our new set to 2006 (the NRC data ended in 2000).¹² This data extension will also provide us an opportunity to explore how the NRC's results are affected when using more current data. As we will see in Section VII, the additional years of data will also enable us to estimate the effect of six additional state adoptions of RTC laws not present in the NRC analysis: Michigan (2001), Colorado (2003), Minnesota (2003), Missouri (2004), New Mexico (2004), and Ohio (2004).¹³

We obtained our county crime data from the University of Michigan's Interuniversity Consortium for Political and Social Research, which maintains the most comprehensive collection of UCR data. Unfortunately, county-level crime data for 1993 is currently unavailable. The National Archive of Criminal Justice Data recently discovered an error in the crime data imputation procedure for 1993 and for this reason, has made 1993 data inaccessible until the error has been corrected. Thus, for all of the following tables with estimates using our updated county data, we are missing values for 1993.

In Table 2, we will replicate and extend the Table 1 NRC estimates correcting for three errors: 1) some data errors that were transmitted to the NRC when they used the Lott county data set; 2) a clear specification error in the arrest rate controls; and 3) the failure to use both robust and clustered standard errors. We also modify the RTC variables used in this analysis to take into account additional information that we have gathered on the effective dates of these laws.

¹² We also add 0.1 to *all zero* crime values before taking the natural log in our county-level data set, as the NRC did.

¹³ Kansas and Nebraska adopted RTC laws which took effect in 2007, which is too late to be captured in our analysis. A more complete explanation of how these years were determined can be found in Footnote 17 and Appendix G.

1. The Lott Data Errors Used in the NRC Estimates

In our original efforts at trying to replicate the NRC estimates derived from their Lott data set, we discovered a number of small errors in that data set.¹⁴ First, Philadelphia's year of adoption is coded incorrectly—as 1989 instead of 1995. Second, Idaho's year of adoption is coded incorrectly—as 1991 instead of 1990. Third, the area variable, which is used to compute county density, has missing data for years 1999 and 2000. Fourth, we determined that the NRC data set was missing all county identifiers for 1999 and 2000, which meant that both these years were dropped for the NRC estimates depicted in Table 1. Our analysis corrects all these errors.

2. Lott and Mustard's Erroneous Arrest Rate Variables

Since the NRC report followed the Lott-Mustard specification, the regressions it presented (which we reproduce in Table 1) used arrest rates as the sole criminal justice control variable in estimating the effect of RTC laws. Although we have already noted Lott's claim that his is "the most comprehensive set of control variables yet used in a study of crime," in fact, the Lott and Mustard model omits controls for police and incarceration, which many studies -- e.g., Kovandzic, Vieraitis, and Boots, (2009) -- have found to be key influences on crime (we will re-introduce those variables in Section VIII).

Lott and Mustard's use of the arrest rate variables is not a good modeling choice in general, and the particular approach that Lott and Mustard employed is especially problematic.¹⁵

¹⁴ We know all too well how easy it is to make these small but annoying errors in creating these data sets, since regrettably we had a few similar errors in our own data set in the Aneja, Donohue, Zhang (2011) published version, which are all corrected here. None of the main conclusions of the published paper were altered by those errors, some of which are set forth in footnote 18.

¹⁵ Even apart from the considerable data problems with the county arrest rates, the measure is also not well defined. Ideally, one might like a measure showing the likelihood that one who commits a certain crime will be arrested. The Lott and Mustard arrest rates instead are a ratio of arrests to crimes, which means that when one person kills many, for example, the arrest rate falls, but when many people kill one person, the arrest rate rises since only one can be arrested in the first instance and many can in the second. The bottom line is that this "arrest rate" is not a probability

To see the concern, note that the NRC's model (Table 1b in this paper) is trying to explain the level of seven individual Index I crime categories while using a control that is computed as a crime-specific arrest rate, which is the number of arrests for a given crime divided by the contemporaneous number of crimes. Thus, murder in 1990 is “explained” by the ratio of arrest to murders in 1990. Econometrically, it is inappropriate to use this contemporaneous measure since it leaves the dependent variable on both sides of the regression equation (at a minimum, a better approach would lag this variable one year, as discussed in Ayres and Donohue (2009)). Better still, one could alternatively use the broad categories of violent and property crimes to compute arrest rates, as have many recent papers (such as, Moody and Marvell, 2008). We adopt this latter approach for all of our regressions in this paper and also lag the arrest rate one year to reduce the endogeneity problem.

3. The Erroneous Standard Errors in the NRC Estimates

Surprisingly, when the NRC presented its estimates (which we reproduce in Table 1), the NRC report did not make the very basic adjustment to their standard errors to correct for heteroskedasticity. Since Hal White's paper discussing this correction has been the single most cited paper in all of economics since 1970,¹⁶ the failure to make this standard adjustment was unexpected. Accordingly, in all of our own estimates, we use robust standard errors.

Even more significant in terms of the results, though, is the issue of whether one must cluster the standard errors. The statistical consequence of the NRC committee's failure to use robust and clustered standard errors is to massively understate the reported standard errors (and consequently to overstate the level of significance). Unlike the issue of robust standard errors,

and is frequently greater than one because of the multiple arrests per crime. For an extended discussion on the abundant problems with this pseudo arrest rate, see Donohue and Wolfers (2009).

¹⁶ Kim, E.H.; Morse, A.; Zingales, L. (2006). "What Has Mattered to Economics since 1970?". *Journal of Economic Perspectives* 20 (4): 189–202.

the Committee report actually addressed the issue of clustering, concluding that this adjustment was not necessary. In Section V, we will show that this was an error. Therefore, we will from this time forward only present results based on the clustering adjustment to our standard errors.

C. Improving on the Table 1 Estimates by Using Better Data and Slightly Improved Lott and Mustard Models

Having just identified three problems with the estimates presented by the NRC, we now seek to fix them. To be clear about our approach, we use annual county-level crime data for the United States from 1977 through either 2000 (to conform to the NRC report) or 2006. We explore the impact of RTC laws on seven Index I crime categories by estimating the reduced-form regression:

$$Y_{it} = \eta \text{RTC}_{jt} + \alpha_i + \theta_t + \beta_{jt} + \gamma X_{ijt} + \varepsilon_{it} \quad (1)$$

where the dependent variable Y_{it} denotes the natural log of the individual violent and property crime rates for county i and year t . Our explanatory variable of interest—the presence of an RTC law within state j in year t —is represented by RTC_{jt} . The exact form of this variable shifts according to the three variations of the model we employ (these include our modified version of the Lott and Mustard dummy and spline models, as well as the Ayres and Donohue hybrid model.) Owing to new information that we have gathered about the RTC laws of various states, we use our own modified dummy and spline variables that take into account the exact date when these laws were implemented.¹⁷

¹⁷ As noted in Footnote 3, in the dummy variable approach, the RTC variable is a dichotomous indicator that equals the fraction of the year that the law is in effect the first year the law is implemented and equals one each full year thereafter. In the spline model, the RTC variable indicates the number of post-passage years (adjusted by the fraction of the year the law is first in effect). The hybrid specification contains both dummy and trend variables. Using the effective date when laws were implemented rather than simply assuming that laws take effect one year after passage changes the initial year of a number of RTC laws. In addition, some states (e.g., Texas) passed RTC laws that technically “took effect” on one date but which specified another date when permits could begin to be issued. We treat these states as if their laws took effect on the second date. We also took court-mandated delays in

The variable α_i indicates county-level fixed effects (unobserved county traits) and θ_t indicates year effects. As we will discuss below, there is no consensus on the use of state-specific time trends in this analysis, and the NRC report did not address this issue. Nevertheless, we will explore this possibility, with β_{jt} indicating state-specific trends, which are introduced in selected models. Since neither Lott and Mustard (1997) nor the NRC (2004) focus on state trends, this term is dropped when we estimate their models. The term X_{ijt} represents a matrix of observable county and state characteristics thought by researchers to influence criminal behavior. The components of this term, however, vary substantially across the literature. For example, while Lott uses only “arrest rates” as a measure of criminal deterrence, we discuss the potential need for other measures of deterrence, such as incarceration levels or police presence, which are measured at the state level.

Table 2 reproduces the regressions depicted in Table 1, while correcting for the three problems mentioned above (the inaccurate Lott data, the poorly constructed Lott arrest ratios, and the incorrect standard errors), changing the manner in which RTC dates were determined, and using our reconstruction of the county dataset from 1977 through 2000 (which omits the flawed 1993 county data). Tables 2a and 2b represent our improved estimates of what the NRC reported and we depict in Tables 1a and 1b. Table 2b appends our hybrid model, which estimates the effect of RTC laws with both a dummy and a spline component (thus nesting the individual dummy and spline models).

The bottom line is that the superior Table 2 estimates look nothing like the Table 1 estimates presented in the NRC report. Table 1 shows estimated effects that are almost

implementing RTC laws into account when determining when permits would actually first be issued (and the corresponding value of the RTC dummy). In short, the process of reviewing the effective dates of different RTC laws led us to change the effective year of a number of these laws, changes which are described in greater detail in Appendix G.

uniformly statistically significant -- at times suggesting crime increases and at times suggesting crime decreases. Table 2 shows far fewer statistically significant effects, but every one of which suggests RTC laws *increase* crime -- for rape, aggravated assault, robbery, auto theft, burglary, and larceny. There is not even a hint of any crime declines.

Recall that James Q. Wilson thought that the most important regressions to look at were those presented in Table 1b, because they provided the full set of controls from the Lott and Mustard specification. While for six of the seven crime categories the story that emerged from Table 1b varied sharply on whether one looked at the dummy or the spline model, Wilson was content to find a beneficial RTC effect on murder because the Table 1 estimates for murder both appeared to be negative and significant.

When we switch to Table 2b, however, we see that there is nothing resembling a statistically significant impact of RTC laws on murder. In fact, we see that assault, auto theft, and larceny now have estimates that are simultaneously statistically significant and positive for both the dummy and spline model. Thus, the results that Professor Wilson found to be consistent evidence of RTC laws reducing murder (see Table 1b) disappear with better data and a superior specification.¹⁸

¹⁸ In the process of reviewing our previous published models and data from ADZ (2011), we discovered some errors in the two data sets that we had constructed (the so-called updated 2009 county data and updated 2009 state data), which are corrected in this paper. For the county data set, we miscoded the state trend variable for Arkansas. Second, Kansas counties had been incorrectly coded as belonging to Kentucky for years 1997-2006. Third, our spline and hybrid models had included a counter variable to capture the effect of a post-passage trend, but they inadvertently omitted the overall trend variable off of which this post-passage trend was to be estimated. Fourth, Vermont was coded as a “may issue” state instead of a “shall issue” state, although this did not affect our results owing to the inclusion of state fixed effects in our regressions. Fifth, the real per capita income measures from our previous datasets had been calculated incorrectly, and these changes have been made for real per capita income and income maintenance, unemployment insurance, and retirement payments. (This last change was also made to the state data set.)

In addition to these errors that we discovered, Moody, Lott, Marvell, and Zimmerman (2012) identified three other errors: duplicative observations for Alaska county 2060 were improperly included for 1996, Kansas' year of adoption was coded incorrectly as 1996 instead of 2006, and South Dakota's year of adoption was coded incorrectly as 1986 instead of 1985. All of these errors have been corrected in the tables prepared for this paper.

In fact, this was essentially the message of the NRC report. Small changes made the estimates bounce around so much that it was difficult to reach any conclusion about the true causal impact of RTC laws. Perhaps it might have been helpful to Wilson if the majority had gone one step further and presented something like the alternative results from Table 2. As we will see in the ensuing sections, there are many additional avenues that could have been explored to probe the robustness of the Table 1b findings that Wilson had accepted so unquestioningly.

We will explore these factors in subsequent sections: Section VI will explore whether one should control for individual state trends in crime, section VII will look at additional years of data (adding data beyond 2000 to 2006), section VIII will alter the Lott and Mustard specification (beyond the already mentioned correction for the contemporaneous, crime-specific arrest rates and changing the method used to construct the two RTC variables), section IX will go beyond the county data to look at state data, and Section X will consider the additional problem of potential omitted variable bias. But a key aspect of the Table 2 results is that the standard errors were adjusted using the cluster command, and this is one area where the NRC majority stumbled in concluding that this adjustment was not needed. Section V will now address the clustering question.

Moody, Lott et al also claimed that Florida's year of adoption was coded incorrectly as 1989 instead of 1987 but this simply reflects their misreading of our coding. Our county data does not have crime information for Florida counties in the year 1988 (this is evident in the NRC data set as well), so observations for Florida's counties in this year are dropped. Thus, while it may seem that our first year of adoption is erroneously coded as 1989, this simply reflects the fact that we have not included observations for 1988. Note that we maintained consistency with our other trend variables by beginning the post-passage variable counter with a value of "2" in year 1989 to demonstrate 2 years since the passage of RTC legislation.

For the state data set in ADZ (2011), we note the following corrections: both North and South Dakota should show RTC adoption in year 1985. Similarly, Oregon's date of adoption for its RTC law should have been 1989 instead of 1990 in the state data set.

Additional changes made to the RTC indicator variables used in this paper are described in footnotes 3 and 17, as well as Appendix G. The state dataset has also been re-constructed with the most recently available data, the sources of which are provided with this paper at http://works.bepress.com/john_donohue/.

Table 2**Table 2a**¹⁹

Estimated Impact of RTC Laws – with ADZ Changes – No Controls, All Crimes, 1977-2000

Dataset: ADZ Updated 2013 County Data (without 1993 data)

Changes: Updated Dataset, Robust and Clustered Standard Errors, Alternative RTC Dates

<i>All figures reported in %</i>	<i>All figures reported in %</i>						
	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-0.07 (8.48)	34.43 (24.72)	22.85 (19.88)	26.21* (15.02)	32.76 (21.20)	32.24 (22.51)	38.42 (26.15)
Spline Model:	0.65 (0.88)	4.41* (2.61)	3.83* (2.07)	2.96 (1.86)	4.41* (2.44)	4.65* (2.42)	5.59* (2.93)

Table 2b

Estimated Impact of RTC Laws – with ADZ Changes – Lott-Mustard Controls, All Crimes, 1977-2000

Dataset: ADZ Updated 2013 County Data (without 1993 data)

Changes: Updated Dataset, Lagged Violent/Property Arrest Rates, Robust and Clustered Standard Errors, Alternative RTC Dates

<i>All figures reported in %</i>	<i>All figures reported in %</i>						
	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-1.13 (7.15)	17.60 (11.88)	17.01*** (6.16)	11.69* (6.11)	19.54*** (7.15)	10.70** (5.07)	20.89*** (5.75)
Spline Model:	-0.08 (0.82)	1.35 (1.42)	1.76* (0.92)	0.70 (0.84)	1.99** (0.77)	0.86 (0.71)	1.97* (1.01)
Hybrid Post-Passage Dummy:	-1.11 (7.96)	16.41 (10.34)	13.14** (6.04)	12.04* (6.93)	15.28* (7.74)	9.73* (5.63)	17.28*** (4.71)
Trend Effect:	-0.00 (0.90)	0.28 (1.26)	0.91 (0.99)	-0.08 (0.83)	1.00 (0.71)	0.23 (0.78)	0.85 (0.92)

¹⁹ All table estimations include year and county fixed effects, and are weighted by county population. Standard errors are robust and clustered at the state level. * Significant at 10%; ** Significant at 5%; *** Significant at 1%. In Table 2b, the control variables (adopted from the Lott-Mustard model) include: lagged arrest rates, county population, population density, per capita income measures, and 36 demographic composition measures indicating the percentage of the population belonging to a race-age-gender group.

V. Debate over the Clustering of Standard Errors

A. Is Clustering Necessary?

Aside from neglecting to use heteroskedastic-robust standard errors, the NRC committee also did not use a cluster adjustment. Research has found that the issue of whether to “cluster” the standard errors has a profound impact on assessments of statistical significance. This issue gained prominence beginning primarily with a 1990 paper by Brent Moulton. Moulton (1990) pointed to the possible need for the clustering of observations when treatments are assigned at a group-level. In such cases, there is an additive source of variation that is the same for all observations in the group, and ignoring this unique variation leads to standard errors that are underestimated. Lott, however, suggests that clustered standard errors are not needed (Lott 2004), claiming that county-level fixed effects implicitly control for state-level effects, and therefore, clustering the standard errors by state is unnecessary.

The NRC committee (2004) sided with Lott on this point, stating that “there is no need for adjustments for state-level clustering.” (p. 138). However, we *strongly* believe the committee was mistaken in this decision. One must account for the possibility that county-level disturbances may be correlated within a state during a particular year by clustering the standard errors by state. There is also a second reason for clustering that the NRC report did not address. Specifically, serial correlation in panel data can lead to major underestimation of standard errors. Indeed, Bertrand, Duflo, and Mullainathan (2004) point out that even the Moulton correction alone may be insufficient for panel-data estimators that utilize more than two periods of data due to autocorrelation in both the intervention variable and the outcome variable of interest. Wooldridge (2003, 2006), as well as Angrist and Pischke (2009), suggest that clustering the standard errors by state (along with using heteroskedasticity-robust standard errors) will help

address this problem, and at least provide a lower bound on the standard errors.

B. Using Placebo Laws to Test the Impact of Clustering

Our Table 2 estimates (which include clustering) reveal that this adjustment makes a major difference in the results generated by the Lott and Mustard models that the NRC report adopted in its analysis -- completely wiping out any sign of statistically significant crime reductions attributable to RTC laws. But who is correct on the clustering issue—Lott, Mustard, and the NRC panel on the one hand, or Angrist, Pischke, and several other high-end applied econometricians on the other? To address this important question we run a series of placebo tests. In essence, we randomly assign RTC laws to states, and re-estimate our model iteratively (1000 times), recording the number of times that the variable(s) of interest are “statistically significant” at the 5% level. For this experiment, we use our most flexible model: the hybrid model (that incorporates both a dummy and a trend variable) with the controls employed by the NRC.

We run five versions of this test. In our first test, we generate a placebo law in a random year for all 50 states and the District of Columbia. Once the law is applied, it persists for the rest of our data period (beginning the year after the law’s randomly generated effective date), which is how laws were coded in our original analysis. We run 1000 trials (where each trial consists of a randomly generated set of RTC passage years) and then proceed to take a simple average of the percentage of significant dummy variable and spline variable estimates. In our second test, we apply a placebo law in a random year to the 32 states that had actually implemented right-to-carry laws between 1979 and 2006. The remaining 19 states are assumed to either have no RTC law or to have had one during the entire analysis period.²⁰ Here again we run 1000 trials in

²⁰ For the purposes of this analysis we do not consider Nebraska or Kansas to have passed an RTC law during this period. These states passed RTC laws in 2006; however, their laws did not take effect until 2007.

which each iteration consists of randomly generated RTC passage years and proceed to take a simple average of the percentage of significant estimates. Third, we randomly select 32 states to receive a placebo law in a random year (to ensure that any random sample of 32 states does not have the potential to inaccurately bias results, we repeat this entire procedure 5 times – that is, we take 5 samples of 32 random states and for each sample, run the aforementioned process of assigning a random year of RTC adoption 1000 times). Then, we take a simple average of the number of statistically significant dummy variable and spline estimates. Thus, we are, in effect, counting the number of significant dummy and trend estimates generated from 5000 hybrid regressions. Fourth, we apply a placebo law in a random year to the 19 states which did not pass RTC laws within the period, dropping the other 32 states from our dataset, and take the simple average of the statistically significant dummy variable and spline estimates. Finally, we randomly select 12 of the 19 states (to correspond to the previous randomly generated 32 states) to receive an RTC in a randomized year of adoption and iterate this process 1,000 times over five separate samples. The results of these five tests are presented in Table 3.

Given the random assignment, one would expect to reject the null hypothesis of no effect of these randomized “laws” roughly 5 percent of the time if the standard errors in our regressions are estimated correctly. Instead, the table reveals that the null hypothesis is rejected 21-69 percent of the time for murder and robbery with the dummy variable and even more frequently with the trend variable (35-73 percent). Clearly, this exercise suggests that the standard errors used in the NRC report are far too small.

Table 3b replicates the exercise of Table 3a, but now uses the cluster correction for standard errors (by state). Table 3b suggests that clustering standard errors does not excessively reduce significance, as the NRC panel feared. In fact, the percentages of “significant” estimates

produced in all three versions of the test still lie well beyond the 5% threshold. Similar results are found when we replicate Tables 3a and 3b using a random selection of either 32 or 12 states while employing the dummy model instead of the hybrid model (we do not show those results here). All of these tests show that if we do *not* cluster the standard errors, the likelihood of obtaining significant estimates is astonishingly (and unreasonably) high. The conclusion we draw from this exercise is that clustering is clearly needed to adjust the standard errors in these panel-data regressions. Accordingly, we use this clustering adjustment for all remaining regressions in this paper.

Table 3²¹**Table 3a**Percentage of Significant Estimates (5% Level) – Lott-Mustard Controls, 1977-2006 – **No Clustered Standard Errors**

Dataset: ADZ Updated 2013 County Data (without 1993 data)

Hybrid Model

<i>All figures reported in %</i>		Dummy Variable	Trend Variable
1. All 50 States + DC:	Murder	45.8	67.5
	Robbery	53.8	63.9
2. Exact 32 States:	Murder	64.6	72.0
	Robbery	68.9	73.0
3. Random 32 States:	Murder	56.1	68.3
	Robbery	56.6	62.7
4. All 19 States:	Murder	21.7	34.9
	Robbery	36.3	45.4
5. Random 12 States:	Murder	23.6	42.1
	Robbery	39.0	46.6

Table 3bPercentage of Significant Estimates (at the 5% Level) – Lott-Mustard Controls, 1977-2006 – **With Clustered Standard Errors**

Dataset: ADZ Updated 2013 County Data (without 1993 data)

Hybrid Model

<i>All figures reported in %</i>		Dummy Variable	Trend Variable
1. All 50 States + DC:	Murder	8.8	13.2
	Robbery	7.8	8.5
2. Exact 32 States:	Murder	10.9	11.4
	Robbery	8.1	9.8
3. Random 32 States:	Murder	11.0	13.3
	Robbery	8.5	7.6
4. All 19 States:	Murder	13.9	12.9
	Robbery	12.7	13.8
5. Random 12 States:	Murder	15.9	18.7
	Robbery	14.1	14.4

²¹ Simulation based on NRC with-controls model, which, similar to above estimations, includes year fixed effects, county fixed effects, and weighting by county population. The control variables (adopted from the Lott-Mustard model) include: lagged arrest rate, county population, population density, per capita income measures, and 36 demographic composition measures indicating the percentage of the population belonging to a race-age-gender group. All ten tests use robust standard errors.

VI. Debate over the Inclusion of Linear Trends

An important issue that the NRC did not address was whether there was any need to control for state-specific linear trends. Inclusion of state trends could be important if, for example, a clear pattern in crime rates existed before a state adopted an RTC law that continued into the post-passage period. On the other hand, there is also a potential danger in using state-specific trends if their inclusion inappropriately extrapolates a temporary swing in crime long into the future or otherwise mars the estimate of the dynamic effect of the policy shock (Wolfers 2006). Lott and Mustard (1997) never controlled for state-specific trends in analyzing handgun laws in their main analysis (only adding these trends for one robustness check mentioned in a footnote), while Moody and Marvel (2008) always controlled for these trends. Ayres and Donohue (2003a) presented evidence with and without such trends.

Table 4 replicates the NRC's full model (with the appropriate clustering adjustment) from Table 2b with one change: here we add a linear state trend to this county-data model. Strikingly, Table 4 suggests that RTC laws increase aggravated assault by roughly 3-4 percent each year, but no other statistically significant effect is observed. Thus, the addition of state trends eliminates the potentially problematic result of RTC laws increasing property crimes, which actually increases our confidence in these results. Certainly an increase in gun carrying and prevalence induced by a RTC law could well be thought to spur more aggravated assaults. Nonetheless, one must at least consider whether the solitary finding of statistical significance is merely the product of running seven different models, is a spurious effect flowing from a bad model, or reflects some other anomaly (such as changes in the police treatment of domestic violence cases, which could confound the aggravated assault results).²²

²² We tested this theory by creating a new right-hand side dummy variable that identified if a state passed legislation requiring law enforcement officials to submit official reports of all investigated domestic violence cases. Eight

Table 4²³

Estimated Impact of RTC Laws – Lott-Mustard Controls, 1977-2000 – Clustered Errors and State Trends
 Dataset: ADZ Updated 2013 County Data (without 1993 data)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-0.82 (6.44)	-5.23 (11.23)	9.90 (6.20)	1.41 (7.52)	5.73 (8.22)	-1.29 (5.98)	3.61 (5.56)
Spline Model:	-0.30 (1.54)	-3.77 (4.79)	4.11** (1.79)	1.00 (2.50)	1.56 (1.97)	0.13 (1.96)	1.34 (2.05)
Hybrid Post-Passage Dummy:	-0.53 (6.06)	-1.34 (7.60)	5.91 (6.07)	0.38 (7.49)	4.34 (7.88)	-1.51 (5.94)	2.33 (5.41)
Trend Effect:	-0.27 (1.46)	-3.70 (4.54)	3.79** (1.79)	0.98 (2.54)	1.32 (1.90)	0.21 (1.98)	1.22 (2.07)

VII. Extending the Data Through 2006

Thus far we have presented panel-data regression results for the period 1977-2000. Since more data are now available, we can further test the strength of the MGLC premise over time by estimating the NRC Lott and Mustard covariates specification on data extended through 2006. Table 5a presents our estimates (with clustering), which can be compared with Table 2b (which also clusters the standard errors in the main NRC model, but is estimated on the shorter time period). This comparison reveals that the additional six years of data do not substantially change the picture that emerged in Table 2b showing that RTC laws *increase* aggravated assault, auto theft, burglary, and larceny (although the results showing an increase in aggravated assault are

states have passed this legislation of which we are aware: Florida (1984), Illinois (1986), Louisiana (1985), New Jersey (1991), North Dakota (1989), Oklahoma (1986), Tennessee (1995), and Washington (1979). We included this dummy variable when running both the NRC specification (through 2000) and our preferred specification (through 2006) without state-specific trends, and found that this dummy indicator of domestic violence reporting statutes did not undermine our general finding that RTC laws *increase* aggravated assaults.

²³ Estimations include year and county fixed effects and are weighted by county population. Robust standard errors are provided beneath point estimates in parentheses. The control variables (adopted from the Lott-Mustard model) include: lagged arrest rate, county population, population density, per capita income measures, and 36 demographic composition measures indicating the percentage of the population belonging to a race-age-gender group. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

stronger with the additional years of data for the dummy model).

Table 5b simply adds state trends to the Table 5a model, which can then be compared to Table 4 (clustering, state trends, and 1977-2000 county data). Collectively, these results suggest that the added six years of data do not appreciably change the results from the shorter period. The inclusion of state trends on the longer data set suggests that RTC laws *increase* aggravated assault by roughly 8-9 percent.

Table 5²⁴**Table 5a**

Estimated Impact of RTC Laws – Lott-Mustard Controls, 1977-2006 – Clustered Standard Errors

Dataset: ADZ Updated 2013 County Data (without 1993 data)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-3.03 (6.46)	15.45 (14.68)	15.30*** (5.12)	7.55 (5.23)	17.72** (7.59)	11.20** (4.67)	16.40*** (5.15)
Spline Model:	-0.20 (0.59)	0.98 (1.25)	1.05 (0.71)	0.43 (0.53)	1.01 (0.63)	0.36 (0.46)	1.05* (0.53)
Hybrid Post-Passage Dummy:	-2.61 (6.72)	13.65 (12.51)	13.06*** (4.58)	6.97 (6.15)	16.30** (7.08)	11.90** (5.41)	14.45*** (5.29)
Trend Effect:	-0.09 (0.60)	0.39 (0.96)	0.49 (0.71)	0.13 (0.61)	0.31 (0.51)	-0.15 (0.52)	0.42 (0.55)

Table 5b

Estimated Impact of RTC Laws – Lott-Mustard Controls, 1977-2006 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 County Data (without 1993 data)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	0.03 (5.61)	-8.30 (10.75)	9.45** (4.33)	6.79 (6.19)	9.20 (6.16)	3.71 (4.93)	6.03 (5.14)
Spline Model:	-0.44 (0.99)	-5.57 (4.49)	1.65 (1.48)	-0.54 (1.83)	-0.84 (1.81)	-1.37 (1.54)	-1.54 (1.66)
Hybrid Post-Passage Dummy:	0.23 (5.68)	-5.85 (9.28)	8.79** (4.18)	7.09 (6.11)	9.66* (5.76)	4.37 (4.71)	6.78 (4.78)
Trend Effect:	-0.45 (1.01)	-5.46 (4.40)	1.48 (1.47)	-0.68 (1.83)	-1.03 (1.76)	-1.45 (1.53)	-1.67 (1.65)

²⁴ Estimations include year and county fixed effects, and are weighted by county population. Robust standard errors are provided beneath point estimates in parentheses. The control variables (adopted from the Lott-Mustard model) include: lagged arrest rate, county population, population density, per capita income measures, and 36 demographic composition measures indicating the percentage of the population belonging to a race-age-gender group. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

VIII. Revising the Lott-Mustard Specification

We have already suggested that the Lott and Mustard specification that the NRC employed is not particularly appealing along a number of dimensions. The most obvious problem – omitted variable bias has already been alluded to: the Lott and Mustard (1997) model had no control for incarceration, which Wilson considered to be one of the most important influences on crime in the last 20 years. In addition to a number of important omitted variables, the Lott-Mustard model adopted by the NRC includes a number of questionable variables, such as the dubious ratio of arrests to murders, and the 36 (highly collinear) demographic controls.

To explore whether these specification problems are influencing the regression estimates, we revise the NRC models in a number of ways. First, we completely drop Lott and Mustard's flawed contemporaneous arrest rate variable and add in two preferable measures of state law enforcement/deterrence: the incarceration rate and the rate of police.²⁵ Second, we add two additional controls to capture economic conditions: the unemployment rate and the poverty rate, which are also state-level variables. Finally, mindful of Horowitz's admonition that the Lott-Mustard model might have *too many* variables (including demographic controls that are arguably irrelevant to the relationship between the guns and crime, and may have a spurious, misleading effect), we decided not to follow the NRC in using the 36 demographic controls employed by Lott-Mustard. Instead, we adhered to the more customary practice in the econometrics of crime and controlled only for the demographic groups considered to be most involved with criminality (as offenders and victims), namely the percentage of black and white males between ages 10 and

²⁵ We also estimated the model with the arrest rate (lagged by one year to avoid endogeneity concerns), and the results were qualitatively similar to Table 6a except that dummy variable estimates for Rape (10%), Assault (1%), Robbery (5%), Auto (5%), Burglary (1%), and Larceny (1%) are now all significant. For Table 6b, the dummy variable estimates for murder, burglary, and larceny shift from negative to positive (but still remain insignificant) and assault and auto theft become positive and significant at the 10% level.

40 in each county.²⁶

The results with this new specification are presented in Tables 6a-6b (which correspond to Tables 5a-5b estimated using the Lott and Mustard specification). Note that had the NRC panel used our preferred specification while maintaining its view that neither clustering nor controls for state trends are needed, we would have overwhelming evidence that RTC laws *increase* crime.²⁷ We don't show these regression results since we are convinced that clustering is needed, although of course when we cluster in Table 6a, the point estimates remain the same (while significance is drastically reduced). Table 6b shows that this model is sensitive to whether we control for state trends, since adding these trends reverses the sign of most of our estimates (while making all of them statistically insignificant). Essentially, our preferred specification shows almost no statistically significant crime effects (with the large standard errors reflecting a considerable degree of uncertainty).

²⁶ To test the robustness of this specification to changes in the demographic controls, we also estimated the following variants from our 6 demographic controls: only black males between ages 10 and 40 (three variables); only black males between ages 10 and 30 (two variables); and black and white males between ages 10 and 30 (four variables). The results were again qualitatively similar across our tests.

²⁷ Re-estimating Table 6a without clustering (no state trends) shows all dummy variable point estimates (except murder) positive and significant at the 1% level. The murder dummy variable is positive, but not significant. For the spline model, all spline estimates (except murder) are positive and significant at the 1% level, whereas murder is positive and significant at the 5% level.

Table 6²⁸**Table 6a**

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1977-2006 – Clustered Standard Errors
Dataset: ADZ Updated 2013 County Data (without 1993 data)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	1.59 (7.63)	25.33 (18.81)	22.65 (19.54)	22.27 (14.82)	27.46 (21.81)	30.08 (23.09)	31.33 (26.54)
Spline Model:	0.38 (0.82)	2.81 (1.76)	3.19 (1.95)	2.58* (1.53)	3.07 (2.25)	3.64 (2.38)	4.19 (2.72)
Hybrid Post-Passage Dummy:	-0.43 (7.75)	14.75 (15.38)	8.74 (17.15)	12.20 (12.83)	15.81 (17.82)	15.49 (19.46)	13.56 (21.54)
Trend Effect:	0.40 (0.86)	2.11 (1.45)	2.77 (1.81)	2.01 (1.42)	2.32 (1.97)	2.91 (2.17)	3.55 (2.41)

Table 6b

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1977-2006 – Clustered Standard Errors and State Trends
Dataset: ADZ Updated 2013 County Data (without 1993 data)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-2.66 (6.34)	-15.99 (13.35)	-2.36 (11.59)	2.73 (8.58)	1.26 (11.70)	-6.39 (13.18)	-7.06 (14.71)
Spline Model:	-0.43 (1.26)	-7.93 (5.54)	0.58 (2.66)	-0.60 (2.41)	-0.71 (2.98)	-2.23 (3.05)	-2.68 (3.42)
Hybrid Post-Passage Dummy:	-2.50 (6.56)	-12.80 (12.20)	-2.62 (12.09)	3.00 (8.95)	1.56 (12.14)	-5.50 (13.73)	-6.00 (15.24)
Trend Effect:	-0.38 (1.31)	-7.69 (5.50)	0.63 (2.75)	-0.66 (2.48)	-0.74 (3.08)	-2.13 (3.17)	-2.57 (3.55)

²⁸ Estimations include year and county fixed effects and are weighted by county population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and six demographic composition measures. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

IX. State versus County Crime Data

In their initial study, Lott and Mustard (1997) tested the “More Guns, Less Crime” hypothesis by relying primarily on county-level data from the FBI’s *Uniform Crime Reports* (UCR).²⁹ These FBI reports present yearly estimates of crime based on monthly crime data from local and state law enforcement agencies across the country. The NRC report followed Lott and Mustard in this choice and presented regression estimates using only county data. Unfortunately, according to criminal justice researcher Michael Maltz, the FBI’s county-level data is highly problematic.

The major problem with county data stems from the fact that law enforcement agencies voluntarily submit crime data to the FBI. As a result, the FBI has little control over the accuracy, consistency, timeliness, and completeness of the data it uses to compile the UCR reports. In a study published in the *Journal of Quantitative Criminology*, Maltz and Targonski (2002) carefully analyzed the shortcomings in the UCR data set and concluded that UCR county-level data is unacceptable for evaluating the impact of RTC laws. For example, in Connecticut, Indiana, and Mississippi, over 50% of the county-level data points are missing crime data for more than 30% of their populations (Maltz and Targonski 2002). In another thirteen states, more than 20% of the data points have gaps of similar magnitude. Based on their analysis, Maltz and Targonski (2002) concluded that:

“County-level crime data cannot be used with any degree of confidence... The crime rates of a great many counties have been underestimated, due to the exclusion of large fractions of their populations from contributing to the crime counts. Moreover, counties in those states with the most coverage gaps have laws permitting the carrying of concealed weapons. How these shortcomings can be compensated for is still an open question... it is clear, however, that in their current condition, county-level UCR crime statistics cannot be used for evaluating the effects of changes in policy” (pp. 316-317).

²⁹ Lott and Mustard present results based on state-level data, but they strongly endorse their county-level over their state-level analysis: “the very different results between state- and county-level data should make us very cautious in aggregating crime data and would imply that the data should remain as disaggregated as possible” (Lott and Mustard, 1997, p. 39).

Because of the concerns raised about county-level crime data, it is prudent to test our models on state-level data. According to Maltz and Targonski (2003), state-level crime data are less problematic than county-level data because the FBI's state-level crime files take into account missing data by imputing all missing agency data. County-level files provided by NACJD, however, impute missing data only if an agency provides at least six months of data; otherwise, the agency is dropped completely (Maltz 2006). As with our estimations using county-level data, we compiled our state-level data from scratch, and will refer to it as "Updated 2013 State-level Data."³⁰

A. State Data Results Using the Lott-Mustard Specification

Unsurprisingly, the regression results reproduced using state-level data are again different from the NRC committee's estimates using county-level data. This is shown in Table 7a, which presents the results from the NRC's specification (the Lott-Mustard model) on state data through 2010, with the cluster adjustment.³¹ Table 7b simply adds state trends. When we compare these state-level estimates to the county-level estimates (using the Updated 2013 County-Level Data Set), we see that there are marked differences. Considering the preceding discussion on the reliability—or lack thereof—of county data, this result may be unsurprising.³² Looking across

³⁰ State poverty data for years 1977 and 1978 are unavailable from the census. Thus all regressions run on our state dataset are effectively using data from 1979 onwards. State poverty figures from 1980 onwards come from the Census Bureau's Historical Poverty Table 21 found at (<http://www.census.gov/hhes/www/poverty/data/historical/people.html>). The data for 1979 comes from the Census Statistical Abstract for 1982.

³¹ Our placebo test on county data showed that standard errors needed to be adjusted by clustering. In Appendix A, we again find that clustering is needed for state data. Thus, all our state-level estimates include clustering.

³² We also estimated the model on data through 2000 (the last year in the NRC report). Though those results are not shown here, our point estimates for this model are qualitatively similar to those shown in Tables 7a. Interestingly, the patterns of statistical significance are extremely different. For example, when Table 7a is estimated through the year 2000, there is a statistically significant decline in aggravated assault in the hybrid model with no other impact on violent crime. When estimated to the year 2010, however, Table 7a shows no statistically significant decline in aggravated assault and evidence of declines in rape and robbery. Moreover, while Table 7b shows some hints of crime declines for rape and aggravated assault when estimated through 2000, when the data is extended for another

the models with and without state linear trends, there is evidence of increases in aggravated assault and murder and decreases in robbery, burglary, auto theft, and rape after the passage of RTC laws.

As Ayres and Donohue (2003; 1231) noted, the most important driver of the ostensible decline in crime from RTC laws comes from the Lott and Mustard use of 36 highly collinear demographic variables. The Ayres and Donohue finding that “The results are incredibly sensitive to the inclusion of various seemingly unimportant demographic controls” still applies even after augmenting the data set with 10 more years of data. To demonstrate the strong influence of these variables, we rerun the regression shown in Table 7a after substituting a more defensible set of 6 controls for black and white men in the higher crime ages (the ADZ demographic variables) for the full set of 36 controls used in the Lott-Mustard specification. Examining the results of this process (shown in Table 7c) reveals that 27 out of the 28 resulting estimates of the effect of RTC laws on crime are positive, with at least some evidence of statistical significant crime increases for 5 of the 7 crime categories. The story is somewhat muddier when state trends are added (Table 7d), but the strongest effect in this modified version of the Lott and Mustard specification on more complete data suggests substantial and statistically significant increases in aggravated assaults.

decade, the table shows only statistically significant evidence of *increases* in aggravated assault. We also estimate the NRC's no-controls model through 2010 on the state-level data. See Appendix B for these results.

Table 7³³**Table 7a**

Estimated Impact of RTC Laws – Lott-Mustard Controls, 1977-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Aggravated						
	Murder	Rape	Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-2.96 (3.60)	-5.07** (2.23)	-0.69 (4.56)	-7.53** (2.92)	1.78 (4.03)	-3.35* (1.92)	2.24 (1.76)
Spline Model:	0.49 (0.36)	-0.23 (0.38)	0.64 (0.62)	0.03 (0.45)	-0.54 (0.32)	-0.26 (0.35)	0.39 (0.25)
Hybrid Post-Passage Dummy:	-4.91 (3.59)	-4.70* (2.68)	-2.94 (3.76)	-8.28*** (3.01)	3.75 (4.48)	-2.75 (1.90)	1.10 (1.59)
Trend Effect:	0.62* (0.34)	-0.12 (0.42)	0.71 (0.60)	0.24 (0.43)	-0.63* (0.35)	-0.19 (0.35)	0.37 (0.25)

Table 7b

Estimated Impact of RTC Laws – Lott-Mustard Controls, 1977-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Aggravated						
	Murder	Rape	Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-0.87 (3.48)	-3.54 (2.43)	-2.93 (3.07)	-3.91 (2.76)	2.20 (3.10)	-2.28 (1.51)	0.45 (1.36)
Spline Model:	0.70 (0.75)	0.03 (0.60)	1.70*** (0.56)	0.23 (0.86)	-1.62** (0.74)	0.20 (0.55)	0.18 (0.44)
Hybrid Post-Passage Dummy:	-1.50 (3.39)	-3.68 (2.59)	-4.49 (3.02)	-4.23 (2.74)	3.68 (3.20)	-2.53 (1.68)	0.31 (1.46)
Trend Effect:	0.76 (0.73)	0.17 (0.63)	1.87*** (0.56)	0.39 (0.85)	-1.75** (0.79)	0.29 (0.57)	0.16 (0.45)

³³ Estimations include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables (adopted from the Lott-Mustard model) include: lagged arrest rate, state population, population density, per capita income measures, and 36 demographic composition measures indicating the percentage of the population belonging to a race-age-gender group. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 7 (Continued)³⁴**Table 7c**

Estimated Impact of RTC Laws – Lott-Mustard Controls (with ADZ Demographic Variables), 1977-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	2.20 (6.84)	9.67* (5.37)	7.86 (5.42)	12.04 (8.97)	17.15 (10.70)	11.21* (6.22)	10.40** (4.55)
Spline Model:	0.62 (0.64)	0.86 (0.59)	1.18* (0.67)	1.59* (0.80)	1.39 (0.93)	0.95 (0.61)	1.05** (0.43)
Hybrid Post-Passage Dummy:	-1.21 (5.78)	6.54 (4.76)	2.22 (4.62)	4.82 (6.86)	12.55 (8.30)	7.96 (4.81)	6.31* (3.75)
Trend Effect:	0.66 (0.59)	0.61 (0.56)	1.09 (0.68)	1.40** (0.69)	0.90 (0.70)	0.64 (0.51)	0.80** (0.39)

Table 7d

Estimated Impact of RTC Laws – Lott-Mustard Controls (with ADZ Demographic Variables), 1977-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	0.77 (3.91)	-4.65* (2.41)	-3.33 (3.55)	-2.01 (3.16)	3.10 (4.72)	-0.63 (1.90)	0.24 (1.87)
Spline Model:	0.46 (0.72)	0.15 (0.59)	1.82** (0.68)	-0.26 (0.95)	-1.49* (0.78)	0.02 (0.59)	-0.39 (0.55)
Hybrid Post-Passage Dummy:	0.43 (3.95)	-4.88* (2.50)	-4.83 (3.38)	-1.86 (3.29)	4.31 (4.63)	-0.66 (2.15)	0.54 (2.05)
Trend Effect:	0.45 (0.72)	0.31 (0.60)	1.97*** (0.67)	-0.20 (0.98)	-1.63** (0.79)	0.04 (0.63)	-0.41 (0.58)

³⁴ Estimations include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables (adopted from the Lott-Mustard model) include: lagged arrest rate, state population, population density, per capita income measures, and the six demographic composition measures used in the ADZ model. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

B. State Data Results Using the ADZ Preferred Specification

Table 8 mimics Table 7 in that we again employ state data through 2010 but now we use our preferred set of controls. Here the ostensible evidence that RTC laws increase crime is very strong: all three models in Table 8a have positive coefficients for every crime category, and 12 of the 28 coefficients are statistically significant. Table 8b once again shows highly significant evidence (in the spline model and in the trend effect of the hybrid model) that RTC laws increase aggravated assault. Some significant but conflicting predictions for auto theft emerge with both dummy effects positive and significant, while both trend effects are negative and significant. None of the remaining coefficients are statistically significant.³⁵

While there are a number of differences in the modified Lott-Mustard specification versus the ADZ specification, the most important difference in generating the different estimates of the impact of RTC laws is the Lott-Mustard use of 36 demographic variables. We illustrate this in Table 8c, by substituting Lott's chosen thirty-six demographic variables in place of our own. Under this specification, RTC laws are no longer associated with any statistically significant increases in crime and rape, robbery, and auto theft appear to decline. Adding state trends in Table 8d brings back a result similar to that in Table 7d: aggravated assault rises sharply and auto theft seems to fall with the adoption of RTC laws.

³⁵ As a robustness check for the Tables 8a and 8b results, we explored the effect of dropping the states with the highest residual variances from the aggravated assault regressions in these two tables. Appendix C shows the results of this exercise. Essentially, the basic patterns of Tables 8a and 8b persist, but evidence of RTC laws increasing aggravated assault is strengthened when the high variance states are dropped from Table 8a and somewhat weakened when dropped from Table 8b.

Table 8³⁶**Table 8a**

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1979-2010 – Clustered Standard Errors
Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>		Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:		3.31 (6.51)	11.53** (5.73)	8.03* (4.46)	13.85* (8.03)	17.83* (8.95)	12.54* (6.28)	10.80** (4.70)
Spline Model:		0.58 (0.64)	0.82 (0.63)	1.05* (0.60)	1.27 (0.82)	1.20 (0.80)	0.81 (0.63)	0.85* (0.49)
Hybrid Post-Passage Dummy:		0.82 (5.35)	9.23* (4.79)	3.91 (4.01)	9.58 (6.86)	14.59* (7.47)	10.46* (5.21)	8.18** (4.00)
Trend Effect:		0.56 (0.58)	0.51 (0.58)	0.92 (0.62)	0.95 (0.77)	0.72 (0.66)	0.46 (0.55)	0.58 (0.46)

Table 8b

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1979-2010 – Clustered Standard Errors and State Trends
Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>		Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:		-0.74 (3.94)	-3.16 (2.30)	-1.80 (3.61)	1.66 (3.16)	8.72* (4.50)	0.87 (2.19)	1.03 (1.83)
Spline Model:		0.77 (0.74)	-0.25 (0.65)	1.88** (0.80)	-0.23 (0.79)	-1.32* (0.76)	-0.08 (0.64)	-0.59 (0.52)
Hybrid Post-Passage Dummy:		-1.33 (3.86)	-3.05 (2.34)	-3.23 (3.51)	1.87 (3.33)	9.90** (4.42)	0.95 (2.31)	1.49 (1.98)
Trend Effect:		0.81 (0.72)	-0.16 (0.65)	1.99** (0.79)	-0.29 (0.83)	-1.64** (0.73)	-0.11 (0.66)	-0.64 (0.55)

³⁶ These regressions include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and six demographic composition measures.

* Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 8 (Continued)**Table 8c³⁷**

Estimated Impact of RTC Laws – ADZ Preferred Controls (with Lott-Mustard demographic variables), 1979-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-4.55 (3.46)	-5.46** (2.50)	0.48 (4.23)	-6.62** (3.23)	3.87 (3.14)	-3.29 (2.16)	0.98 (1.95)
Spline Model:	0.21 (0.35)	-0.30 (0.35)	0.64 (0.58)	-0.26 (0.46)	-0.75* (0.38)	-0.38 (0.33)	0.13 (0.27)
Hybrid Post-Passage Dummy:	-5.51 (3.46)	-4.91* (2.73)	-1.47 (3.59)	-6.27* (3.49)	6.43* (3.45)	-2.34 (2.22)	0.66 (2.01)
Trend Effect:	0.33 (0.35)	-0.19 (0.37)	0.68 (0.56)	-0.12 (0.46)	-0.89** (0.37)	-0.33 (0.33)	0.11 (0.28)

Table 8d

Estimated Impact of RTC Laws – ADZ Preferred Controls (with Lott-Mustard demographic variables), 1979-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-0.32 (3.27)	-2.36 (2.54)	-2.50 (3.08)	-0.21 (2.60)	5.29** (2.30)	-0.74 (1.61)	1.12 (1.19)
Spline Model:	0.96 (0.73)	0.05 (0.60)	1.92*** (0.69)	0.49 (0.88)	-1.36* (0.75)	0.38 (0.56)	0.09 (0.46)
Hybrid Post-Passage Dummy:	-1.17 (3.10)	-2.49 (2.65)	-4.26 (3.00)	-0.64 (2.59)	6.65*** (2.32)	-1.10 (1.68)	1.08 (1.30)
Trend Effect:	1.01 (0.69)	0.14 (0.62)	2.09*** (0.69)	0.51 (0.89)	-1.62** (0.76)	0.43 (0.58)	0.05 (0.48)

³⁷ These regressions include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and thirty-six demographic composition measures.

* Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Given the strong influence that demographic variables have on the estimated effect of RTC laws on crime, it is important to reflect on why we prefer our demographic variables to the specification used in the Lott-Mustard model. The first thing to note about the Lott-Mustard specification is that it is entirely idiosyncratic: no other major study in the entire empirical literature on crime has used the sheer number of demographic controls found in the Lott-Mustard model. In fact, many published papers use fewer demographic controls than the six that we include in our own preferred model. Table 9 modifies our specification by reducing our six demographic controls to only three that represent the size of the younger black male population (in the three age groups of 10-19, 20-29 and 30-39). The effect of this change can be seen by comparing Table 9a to 8a (no state trends) and Table 9b to 8b (with state trends). Beginning with the first comparison, we see that using even fewer demographic controls only strengthens our finding that RTC laws are generally associated with higher, not lower, crime rates. Table 9a suggests that RTC laws caused every crime category apart from murder to rise by 9.5 percent or more. The comparison of Tables 9b and 8b (with state trends) shows that changing the demographic variables has a small influence on the results when controls are included for state trends. Nevertheless, reducing the number of demographic variables in Table 9b does not change our finding that there is no evidence that RTC laws decrease violent crime.³⁸

³⁸ A fairly standard set of demographics that can be seen in the crime literature includes controls for a few age categories across all races combined with a single identifier of the percentage of blacks in the state. Table D1 and D2 in Appendix D provide this tweak to the ADZ model by putting in four such demographic variables – the percent of the population falling into the three age categories of 10-19, 20-29, and 30-39 plus the percent black -- in place of the ADZ six demographic variables. The results for violent crime are not dramatically different from the main ADZ models of Tables 8a and 8b. Table D1's and Table 8a's estimated violent crime increases for rape, aggravated assault, and robbery are substantial in both sets of dummy variable estimates and significant at the .10 level or better, but only Table 8a has one of these estimates rise to the level of significance at the .05 level (for rape).

Table 9³⁹**Table 9a**

Estimated Impact of RTC Laws – ADZ Preferred Controls (with 3 demographic variables), 1979-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>		Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:		3.01 (5.71)	10.77** (5.36)	9.69** (3.84)	14.66** (7.29)	19.65** (7.76)	13.26** (5.51)	11.24** (4.25)
Spline Model:		0.50 (0.60)	0.87 (0.59)	1.04* (0.54)	1.26 (0.75)	1.08 (0.72)	0.89 (0.56)	0.88* (0.45)
Hybrid Post-Passage Dummy:		0.84 (4.71)	8.00* (4.43)	5.79 (3.78)	10.49 (6.71)	17.37** (6.82)	10.87** (4.85)	8.51** (3.82)
Trend Effect:		0.47 (0.56)	0.60 (0.55)	0.84 (0.57)	0.90 (0.74)	0.49 (0.65)	0.52 (0.52)	0.59 (0.44)

Table 9b

Estimated Impact of RTC Laws – ADZ Preferred Controls (with 3 demographic variables), 1979-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>		Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:		0.23 (3.81)	-3.46 (2.76)	1.01 (3.33)	4.24 (3.19)	11.14** (4.41)	1.93 (2.21)	1.67 (1.79)
Spline Model:		0.48 (0.67)	-0.16 (0.58)	1.52* (0.79)	-0.31 (0.74)	-0.77 (0.74)	-0.20 (0.64)	-0.95* (0.48)
Hybrid Post-Passage Dummy:		-0.06 (3.74)	-3.41 (2.80)	0.08 (3.18)	4.50 (3.34)	11.78** (4.44)	2.08 (2.30)	2.28 (1.97)
Trend Effect:		0.48 (0.65)	-0.08 (0.59)	1.52* (0.79)	-0.41 (0.76)	-1.04 (0.73)	-0.25 (0.65)	-1.00* (0.50)

³⁹ These regressions include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and three demographic composition measures.

* Significant at 10%; ** Significant at 5%; *** Significant at 1%.

C. The 36 Demographic Controls Should Not be Used in Crime Regressions

In his book *More Guns, Less Crime*, Lott concedes that he “overcontrolled” for demographic composition out of an abundance of caution, in order to avoid potentially problematic omitted variable bias. However, it is well known that introducing a large number of highly collinear variables into a regression model can lead to highly unstable results.⁴⁰ To test for the degree of collinearity among the independent variables when the Lott-Mustard demographic variables are used in Table 8c, we run auxiliary regressions of one independent variable on the remaining explanatory variables and analyze the resulting variance inflation factor (VIF).⁴¹ Table 10 shows that the RTC variable has an uncomfortably high VIF greater than 5 in both the dummy and spline models when the 36 demographic controls are used. Using the 6 ADZ variables (or the more limited set of 3 demographics) reduces the multicollinearity for the RTC dummy to a tolerable level (with VIFs always below 5). Nonetheless, the degree of multicollinearity for the individual demographics (showing three different black-male categories) can be seen to be astonishingly high with 36 demographic controls and still high with even more limited demographic controls. This analysis makes us highly skeptical of any estimates of the impact of RTC laws that employ the Lott-Mustard set of 36 demographic controls.

⁴⁰ For a longer discussion of the consequences that multicollinearity can have on a regression model, see Studenmund (1997).

⁴¹ The VIF is an estimate of the extent to which multicollinearity has increased the variance of the estimated coefficient. A VIF of five or more, calculated as the inverse of the difference between 1 and the coefficient of determination (R^2) from the auxiliary regression, is evidence of severe multicollinearity.

Table 10⁴²					
<i>VIF Calculations</i>		RTC	Black Male: 10-19	Black Male: 20-20	Black Male: 30-39
36 Demographic Controls:	Dummy Variable Model:	5.9	13888.9	1733.1	1788.9
	Spline Mode:	7.0	13888.9	1733.1	1785.7
6 Demographic Controls:	Dummy Variable Model:	4.1	158.8	91.4	74.1
	Spline Model:	4.8	158.4	90.8	75.6
3 Demographic Controls:	Dummy Variable Model:	3.8	136.5	82.1	67.7
	Spline Model:	4.4	136.8	82.6	68.8

D. Addressing the Problem of Endogenous Adoption of RTC Laws

The problem of endogenous adoption of RTC laws during a period of rising crime that is unique to a state is obviously a concern, since this would likely bias the estimated effect of the law in a way that would make the law appear more favorable in reducing crime (as crime ultimately returned to prior mean levels). One way to address this concern is to restrict the analysis to a period such as 1999-2010, which is a far more stable period of crime in the US. The 1999-2010 period does not include the immense increases and then declines associated with the rise and fall of the crack epidemic, which threatened a key assumption of the panel data model of crime (since these dramatic crime shifts were not uniform across states and thus could not be expected to be adequately captured by year fixed effects). Table 11a restricts the analysis of the basic ADZ model to this date range, with the hope that this estimation on a more limited sample involving only 8 states that adopted RTC laws during that time frame will eliminate enough endogeneity bias to offset the cost of having a smaller sample size. This approach generates evidence that RTC laws increased the rate of murder but had no other statistically

⁴² These regressions include year and state fixed effects, and are weighted by state population. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, and per capita income measures. The number of demographic variables (excluding the explanatory variable for which the VIF is calculated) varies by row in the table. The VIF is calculated as $1/(1-R^2)$.

significant impact on crime for the 8 changing states. Table 11b shows that if state trends need to be controlled for, the results become more varied, with some crime declines (in rape and larceny and possibly auto theft) and a possible crime increase in aggravated assault.

Table 11⁴³

Table 11a

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1999-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	7.40 (5.84)	3.00 (3.50)	4.76 (3.73)	-3.55 (5.23)	-0.21 (4.07)	1.79 (3.40)	-3.18 (2.64)
Spline Model:	1.47** (0.55)	0.34 (0.42)	1.10 (0.67)	0.12 (0.43)	-0.61 (0.73)	0.59 (0.38)	0.15 (0.33)
Hybrid Post-Passage Dummy:	6.73 (6.06)	2.85 (3.51)	4.26 (3.82)	-3.62 (5.31)	0.08 (4.05)	1.52 (3.52)	-3.27 (2.66)
Trend Effect:	1.42*** (0.53)	0.32 (0.42)	1.07 (0.67)	0.14 (0.44)	-0.61 (0.73)	0.58 (0.39)	0.18 (0.33)

Table 11b

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1999-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	5.70 (5.30)	4.66 (3.57)	6.00* (3.24)	1.04 (6.66)	1.66 (5.48)	1.91 (4.11)	-0.38 (2.43)
Spline Model:	1.03 (3.24)	-2.94** (1.22)	-1.70 (1.40)	-1.41 (1.93)	-5.36* (2.79)	-0.92 (1.41)	-1.72** (0.85)
Hybrid Post-Passage Dummy:	5.79 (5.32)	4.44 (3.53)	5.87* (3.21)	0.93 (6.75)	1.24 (5.26)	1.84 (4.07)	-0.52 (2.34)
Trend Effect:	1.10 (3.23)	-2.89** (1.22)	-1.64 (1.35)	-1.40 (1.91)	-5.35* (2.76)	-0.90 (1.37)	-1.72** (0.85)

X. Additional Concerns in the Evaluation of Legislation Using Observational Data

We now turn to three critical issues that must be considered when using panel data to evaluate the impact of legislation and public policy (and gun laws in particular). First, we discuss the possibility of difficult-to-measure omitted variables and how such variables can shape estimates of policy impact. We are particularly concerned with how the crack epidemic of the 1980s and 1990s may bias results in the direction of finding a beneficial effect. Second, we explore pre-adoption crime trends in an attempt to examine the potentially endogenous adoption of right-to-carry legislation. Finally, given that the intent of right-to-carry legislation is to increase gun-carrying in law-adopting states, we explore whether these laws may have had a particular effect on gun-related assaults (which is the one crime category that has generated somewhat consistent results thus far).

A. Further Thoughts on Omitted Variable Bias

As discussed above, we believe it is likely that the NRC's estimates of the effects of RTC legislation are marred by omitted variable bias. In our attempt to improve (at least to a degree) on the original Lott-Mustard model, we included additional explanatory factors, such as the incarceration and police rates, and removed extraneous variables (such as unnecessary and collinear demographic measures). We recognize, however, that there are additional criminogenic influences for which we cannot fully control. In particular, we suspect that a major shortcoming of all of the models presented is the inability to account for the possible influence of the crack-

⁴³ These regressions include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this "preferred" specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and six demographic composition measures. The states that adopted shall issue laws during the time period are Colorado (2003), Kansas (2007), Michigan (2001), Minnesota (2003), Missouri (2004), Nebraska (2007), New Mexico (2004), and Ohio (2004).

* Significant at 10%; ** Significant at 5%; *** Significant at 1%.

cocaine epidemic on crime.⁴⁴

Many scholars now suggest that rapid growth in the market for crack cocaine in the late 1980s and the early 1990s was likely one of the major influences on increasing crime rates (and violent crimes in particular) during this period (Levitt 2004). Moreover, the harmful criminogenic effect of crack was likely more acute in urban areas of states slow to adopt RTC laws. Meanwhile, many rural states adopted such laws during this era. If this was indeed the case, this divergence between states could account for much of the purported “crime-reducing” effects attributed by Lott and Mustard to gun laws (which were then supported by scholars such as James Q. Wilson). The regression analysis would then identify a relationship between rising crime and the failure to adopt RTC legislation, when the actual reason for this trend was the influence of crack (rather than the passage of the RTC law).

We now explore how results from our main models vary when we restrict the analysis to the time periods before and after the peak of the American crack epidemic. According to Fryer et al. (2005), the crack problem throughout most of the country peaked at some point in the early 1990s. Coincidentally, the original Lott-Mustard period of analysis (1977-1992) contains years that likely represent the height of crack-induced crime problem. With this in mind, we run our main regressions after breaking up our dataset into two periods: the original Lott-Mustard period

⁴⁴ Although Lott and Mustard (1997) do attempt to control for the potential influence of crack cocaine through the use of cocaine price data based on the U.S. Drug Enforcement Agency's STRIDE program, we find their approach wanting for both theoretical and empirical reasons. First, a control for crack should capture the criminogenic influence of the crack trade on crime. We know that prior to 1985, there was no such influence in any state and that after some point in the early to mid-1990s this criminogenic influence declined strongly. Since there is little reason to believe that cocaine prices would be informative on the criminogenic influence of crack in particular geographic areas, it is hard to see how the cocaine price data could be a useful control. Second, the data that Lott and Mustard use is itself questionable. Horowitz (2001) argues forcefully that STRIDE data is not a reliable source of data for policy analyses of cocaine. The data are mainly records of acquisitions made to support criminal investigations in particular cities, and are not a random sample of an identifiable population. Moreover, since the STRIDE data is at the city-level, we are not sure how this would be used in a county-level analysis. The data was collected for 21 cities, while there are over 3,000 counties in the U.S. In addition, the data is missing for 1988 and 1989, which are crucial years in the rise of the crack epidemic in poor urban areas. Lott and Mustard drop those years of analysis when including cocaine prices as a control.

of analysis (1979-1992) as well as the post-Lott-Mustard period (1993-2010). We first present the results for the era that includes the crack epidemic (1979-1992)⁴⁵ on our preferred model. We run these regressions (with clustered standard errors) on state-level data, with and without state trends. These results are presented in Tables 12a and 12b. We then estimate the same models on the post-crack period (see Tables 13a and 13b).

Note that, with a simple naive reading, the regression results in Table 12 from the initial 14-year time period (1979-1992) do suggest that violent crime rates are dampened by RTC laws if state trends are not needed and that murder, rape, and robbery may have declined if state trends are needed. If we look at the following 18 year period from 1993 – 2010 in Table 13, however, there is no longer any evidence of a statistically significant decline in violent crimes. Instead, RTC laws are associated with higher rates of murder, aggravated assault, robbery, and burglary. This evidence supports the theory that the initial Lott and Mustard finding was likely the result of the crime-raising impact of crack in non-RTC states.

⁴⁵ As mentioned in footnote 29, poverty data is not available before 1979. Thus, although the Lott-Mustard period originally was 1977-1992, for our preferred specification the analysis covers 1979-1992.

Table 12⁴⁶**Table 12a**

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1979-1992 – Clustered Standard Errors
 Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Aggravated						
	Murder	Rape	Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-4.88 (4.28)	-7.28** (3.40)	-9.71** (4.48)	-5.46 (4.02)	7.95* (4.38)	-3.12 (2.70)	-0.20 (1.51)
Spline Model:	-1.48 (1.18)	-0.93 (0.63)	-0.30 (1.53)	-2.49*** (0.60)	0.27 (0.83)	-0.42 (0.75)	0.04 (0.30)
Hybrid Post-Passage Dummy:	-1.02 (5.02)	-7.20* (3.67)	-13.75** (5.64)	2.58 (5.06)	11.14** (5.13)	-2.97 (3.56)	-0.49 (1.69)
Trend Effect:	-1.35 (1.40)	-0.03 (0.77)	1.42 (1.19)	-2.81*** (0.86)	-1.12 (0.81)	-0.05 (0.84)	0.10 (0.31)

Table 12b

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1979-1992 – Clustered Standard Errors and State Trends
 Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Aggravated						
	Murder	Rape	Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-4.83 (4.27)	-6.19** (2.81)	-2.93 (2.75)	-2.80 (5.25)	1.37 (4.54)	-1.86 (3.07)	2.75 (2.32)
Spline Model:	-5.56** (2.34)	-0.39 (1.22)	-0.72 (1.07)	-4.03* (2.21)	-1.17 (1.79)	-1.96 (1.19)	0.86 (1.07)
Hybrid Post-Passage Dummy:	5.65 (6.22)	-7.95*** (2.83)	-2.56 (3.61)	5.11 (6.88)	4.58 (4.20)	1.76 (3.99)	1.98 (2.54)
Trend Effect:	-6.62** (2.95)	1.11 (1.15)	-0.23 (1.34)	-5.00* (2.76)	-2.03 (1.87)	-2.29 (1.44)	0.49 (1.23)

⁴⁶ Estimations include year and state fixed effects and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and six demographic composition measures. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 13⁴⁷**Table 13a**

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1993-2010 – Clustered Standard Errors
Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Aggravated						
	Murder	Rape	Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	4.77 (4.68)	-1.53 (3.45)	2.03 (4.49)	2.91 (4.57)	5.18 (4.32)	6.29** (3.09)	2.26 (2.77)
Spline Model:	1.25** (0.51)	0.28 (0.55)	1.37** (0.60)	1.28** (0.62)	0.61 (0.87)	0.68 (0.57)	0.16 (0.43)
Hybrid Post-Passage Dummy:	4.15 (4.94)	-1.68 (3.55)	1.34 (4.58)	2.27 (4.74)	4.89 (4.11)	5.96* (3.23)	2.19 (2.77)
Trend Effect:	1.22** (0.52)	0.29 (0.54)	1.36** (0.61)	1.26** (0.63)	0.58 (0.86)	0.65 (0.57)	0.15 (0.43)

Table 13b

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1993-2010 – Clustered Standard Errors and State Trends
Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Aggravated						
	Murder	Rape	Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	6.30* (3.38)	0.94 (3.29)	1.85 (3.27)	4.38 (3.26)	4.22 (4.25)	1.12 (2.54)	-0.94 (2.30)
Spline Model:	-0.26 (1.40)	0.43 (0.87)	1.66 (1.24)	-0.21 (0.93)	-3.87** (1.50)	-1.14 (0.73)	-1.61** (0.65)
Hybrid Post-Passage Dummy:	6.62* (3.46)	0.74 (3.23)	1.03 (3.01)	4.61 (3.54)	6.38 (4.07)	1.76 (2.47)	-0.12 (2.13)
Trend Effect:	-0.62 (1.32)	0.39 (0.86)	1.61 (1.24)	-0.46 (1.03)	-4.22** (1.61)	-1.23 (0.77)	-1.60** (0.70)

⁴⁷ Estimations include year and state fixed effects and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and six demographic composition measures. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

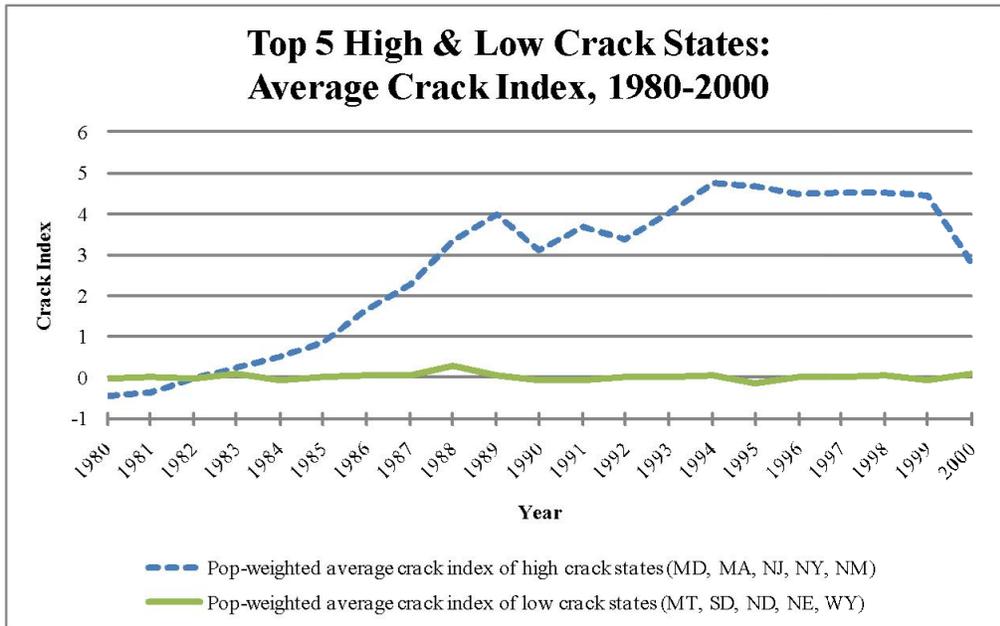
Figure 8 depicts a measure of crack prevalence for the period 1980-2000 in the five states with the greatest crack problem, as well as the five states with the least crack, according to Fryer et al. (2005). Figure 9 shows the murder rates over time for these two sets of states. We see that crime rose in the high crack states when the crack index rises in the mid-to-late 1980s, but that the crack index does not turn down in those states at the time crime started to fall. Apparently, the rise of the crack market triggered a great deal of violence, but once the market stabilized, the same level of crack consumption could be maintained while the violence ebbed.

Of course, omitting an appropriate control for the criminogenic influence of crack is problematic if the high-crack states tend not to adopt RTC laws and the low-crack states tend to adopt. This is in fact the case: all of the five “high-crack” states are non-RTC states during the time period of Figure 9, whereas four of the five “low-crack” states are RTC states (all four adopted an RTC law by 1994).⁴⁸ The only exception is Nebraska, a state that did not adopt an RTC law until 2007.⁴⁹

⁴⁸ New Mexico, one of the five highest crack states, became an RTC state in 2004. Wyoming and Montana adopted RTC laws in 1994 and 1991, respectively. North Dakota and South Dakota both adopted their laws by 1985.

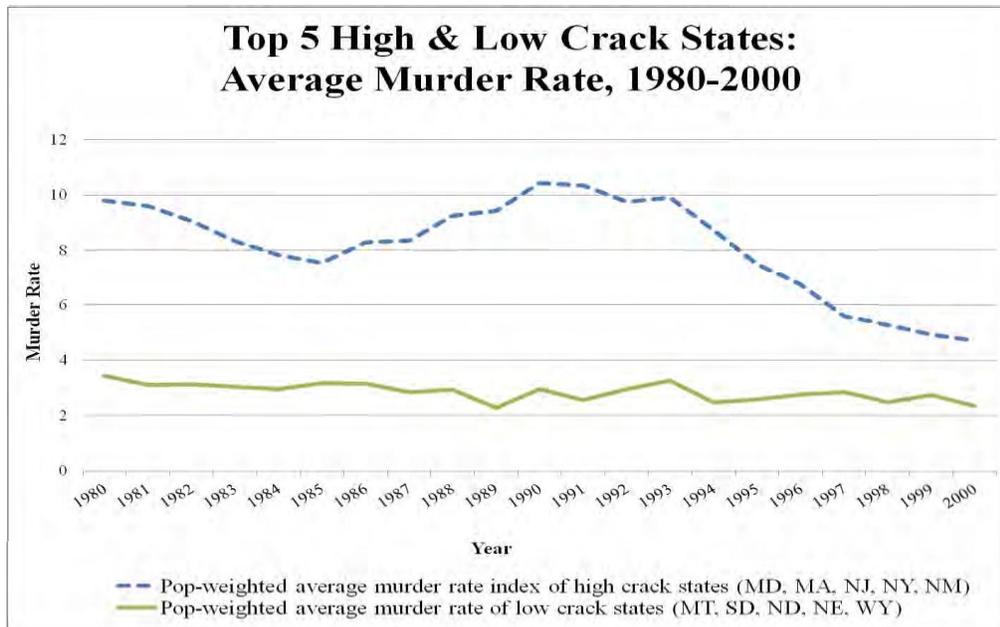
⁴⁹ Out of the ten states with the lowest crack cocaine index, seven adopted an RTC law by 1994. The exceptions are Nebraska (2007), Minnesota (2003), and Iowa (2011).

Figure 8: Prevalence of Crack in the 5 Most and 5 Least Crack-affected States



Source: Authors' calculations based on the crack index of Fryer et al (2005).

Figure 9: Murder Rates in the 5 Most and 5 Least Crack-affected States



Source: FBI UCR Data.

Moreover, as Table 14 reveals, the 13 states that adopted RTC laws during the initial

Lott-Mustard period (1977-1992) had crack levels substantially below the level of the five high-crack states shown in Figures 8 and 9. Of the RTC adopters shown in Table 14, the largest has an average crack index of 1.46 (Georgia), while the high-crack states had an average population weighted crack level of 1.76.

Table 14: Population-weighted Statistics of RTC-Adopting States between 1977 and 1992⁵⁰

State	Year of RTC Law Adoption	Murder Rate	Crack Index
Indiana	1980	6.56	0.30
Maine	1985	2.34	0.09
North Dakota	1985	1.32	0.04
South Dakota	1985	1.96	-0.04
Virginia	1986	7.97	1.13
Florida	1987	11.53	1.24
Georgia	1989	12.89	1.46
Pennsylvania	1989	5.75	1.13
West Virginia	1989	5.53	0.42
Idaho	1990	3.04	0.34
Mississippi	1990	11.50	0.44
Oregon	1990	4.85	1.14
Montana	1991	3.69	0.07
<i>Top Five Crack States⁵¹</i>		10.64	1.76
RTC Adopters		8.04	0.96

In other words, over the initial Lott-Mustard period of analysis (ending in 1992), the criminogenic influence of crack made RTC laws look beneficial since crack was raising crime in non-RTC states. In the later period, crime fell sharply in the high-crack states, making RTC states look bad in comparison. Therefore, the effects estimated over this entire period will necessarily water down the initial Lott-Mustard results. The hope is that estimating the effect

⁵⁰ The crack index data comes from Fryer et al (2005), which constructs the index (beginning in 1980) based on several indirect proxies for crack use, including cocaine arrests, cocaine-related emergency room visits, cocaine-induced drug deaths, crack mentions in newspapers, and DEA drug busts. The paper does suggest that these values can be negative. The state with the lowest mean value of the crack index over the data period from 1980 to 1990 is South Dakota (-0.03), and the state with the highest mean value is New York (1.58).

⁵¹ The top five states with the highest population weighted average crack index in the period 1980-1992 were California, Maryland, Massachusetts, New York, and Rhode Island. None of these states adopted RTC laws during this period.

over the entire period will wash out the impact of the omitted variable bias generated by the lack of an adequate control for the effect of crack.

As an additional test for potential omitted variable bias in both the NRC and our own preferred model specification, we perform an analysis inspired by Altonji et al. (2005). In their influential paper, the authors provide a practical method to test the extent to which potential omitted variable bias drives the results of a multivariate analysis. This test assumes that the selected, observable variables are chosen from a broader set of possible controls, and then explores how strong selection on unobserved variables would have to be relative to selection on observed variables to produce an OLS estimate if the true effect (in our case the effect of RTC laws on crime trends) were zero. We provide further details on this test procedure in Appendix F.

Using the Altonji et al (2005) test procedure, we analyzed the relative strength of the Table 1b estimate from the NRC Report that RTC laws were associated with an 8.33% reduction in murder rates (using the Lott-Mustard county data estimate for 1977-2000). The Altonji test procedure suggests that this Lott-Mustard estimate has a potential bias of -1.03, which implies that the ostensible finding of a crime-reducing estimate would be entirely driven by selection bias if selection on unobservables were only 8 percent as strong as selection on observables. This is strong evidence that the NRC/Lott model suffers fatally from omitted variable bias. In comparison, an analogous test of our preferred specification using state data from 1979 to 2010 (Table 8a) – which showed an estimated *increase* in murder of 3.31% (albeit not statistically significant) – shows that the potential bias in the murder effect was -0.35. In other words, in our case, the implied bias is negative, which means that the positive and statistically insignificant effect of RTC laws on murder that we found is a likely a *lower* bound for the true effect.

B. Endogeneity and Misspecification Concerns

To this point, our analysis has remained within the estimation framework common to the NRC/Lott-Mustard analyses, which implicitly assumes that passage of right-to-carry legislation in a given state is an exogenous factor influencing crime levels. Under this assumption, one can interpret the estimated coefficient as an unbiased measure of RTC laws' collective impact.

We probe the validity of this strong claim by estimating a more flexible year-by-year specification, adding pre- and post-passage dummy variables to the analysis.⁵² Pre-passage dummies can allow us to assess whether crime trends shift in unexpected ways prior to the passage of a state's RTC law. Figures 10 through 13 present the results from this exercise in graphical form. Using our preferred model as the base specification, we introduce dummies for the eight years preceding and the first eight years following adoption. We first estimate this regression for each violent crime category over the full sample of 50 states plus the District of Columbia. However, because of the presence of five states that adopted their RTC law within eight years of 1979, and seven states that adopted laws within the eight years before our dataset ends, we have twelve states that cannot enter into the full set of pre- and post-adoption dummy variables.⁵³ Because Ayres and Donohue (2003) showed that the year-by-year estimates can jump wildly when states drop in or out of the individual year estimates, we also estimate the year-by-year model after dropping out the earliest (pre-1987) and latest (post-2002) law-adopting states. In this separate series of regressions, our estimates of the full set of lead and lag variables for the 22 states that adopted RTC laws between 1987 and 2002 are based on a trimmed data set

⁵² In Appendix C, we further analyze the issue of misspecification and model fit by analyzing residuals from the regression analysis.

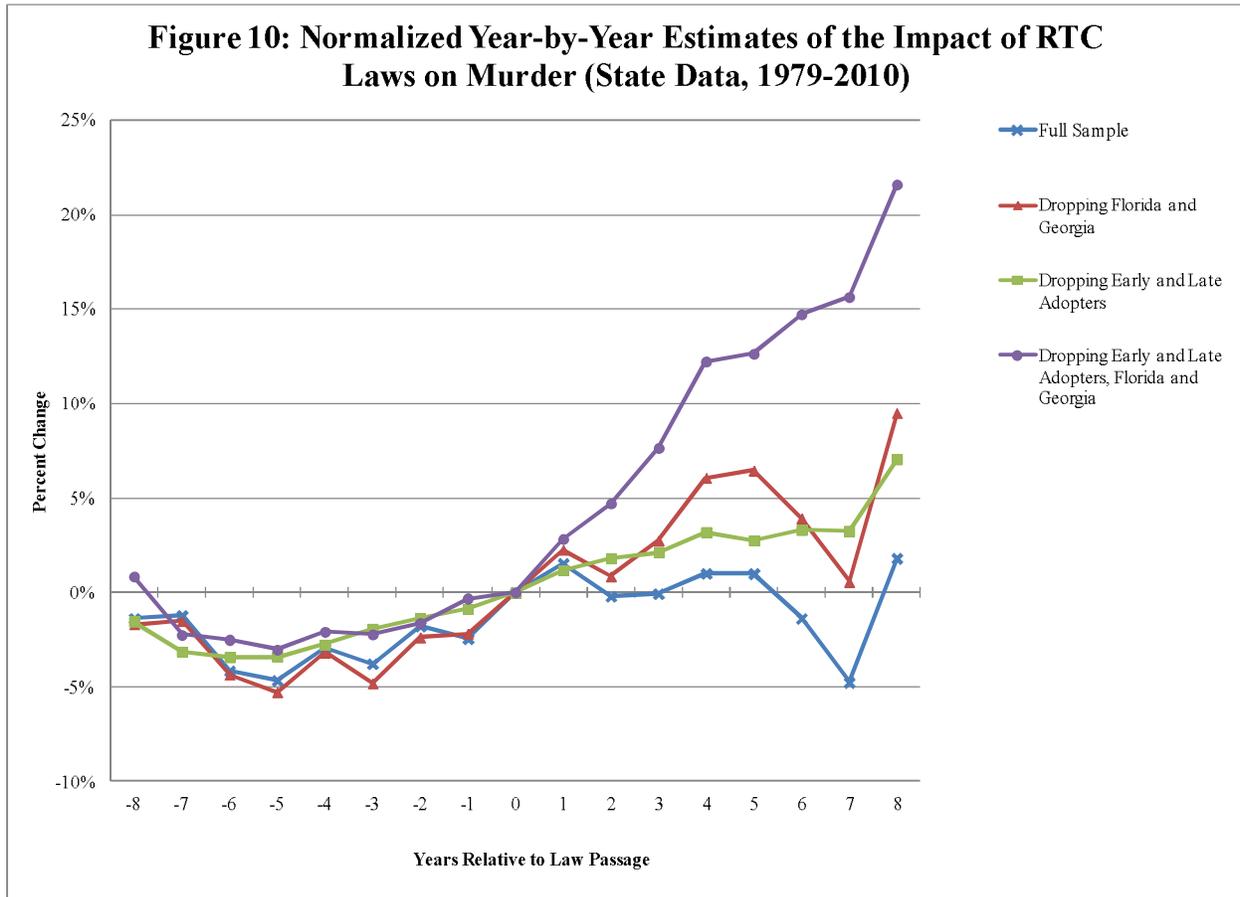
⁵³ We also include a control for more than 8 years before the passage of RTC laws, although these are not shown in the following charts.

that omits the 12 early and late adopters.⁵⁴

Autor, Donohue, and Schwab (2006) point out that when analyzing the impact of state-level policies using panel data, one would ideally see lead dummies that are near zero. For the crime of aggravated assault (Figure 12), this desirable pattern is roughly approximated. Therefore, we would expect these estimates to perhaps be the most reliable among the four violent crime categories. The graphs for murder, rape, and robbery, though, suggest the possible presence of systematic differences between RTC law adopters that can complicate or thwart the endeavor of obtaining clean estimates of the impact of right-to-carry laws. Rather than being close to zero in the pre-passage period, the levels of murder, rape, and robbery seemed to be lower in the pre-passage period and rising rapidly. Such a pattern raises concerns about the presence of endogenous adoption that complicate our thinking about the influence of right-to-carry laws on violent crime.

⁵⁴ The states that drop out (with dates of RTC law passage in parentheses) include: Indiana (1980), Maine (1985), North Dakota (1985), South Dakota (1985), Virginia (1986), Colorado (2003), Minnesota (2003), Missouri (2004), New Mexico (2004), Ohio (2004), Kansas (2007), and Nebraska (2007).

Figure 10⁵⁵



If one looks at the four lines in Figure 10, one sees four different sets of year-by-year estimates of the impact of RTC laws on murder. The lines have been normalized to show a zero value in the year of adoption of a RTC law. Let's begin with the bottom line (looking at the right hand side of the figure) and the line just above it. The lower line represents the naive year-by-year estimates from the preferred model estimated on the 1979-2010 period, while the line just above it drops out the early and late adopters, so that the estimated year-by-year estimates are based on the "clean" sample of all non-adopting states (over the sample period) plus the 22 RTC adopters for which complete data is available from 8 years prior to adoption through 8 years after

⁵⁵ Estimations include year and state fixed effects and are weighted by county population. The control variables include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and six demographic composition measures.

adoption. One sees that the trimmed estimates are different and less favorable to the “More Guns, Less Crime” hypothesis, as evidenced by the higher values in the post-passage period.

How should we interpret these trimmed sample estimates? One possibility is to conclude that on average the pre-passage estimates are reasonably close to zero and then take the post-passage figures as reasonable estimates of the true effect. If we do this, none of the estimates would be statistically significant, so one could not reject the null hypothesis of no effect.

Perhaps, though, what is most important is the trend just prior to passage. This might suggest that rising crime in fact increases the likelihood that a state would adopt a RTC law. In particular, since murder is typically the crime most salient in the media, we suspect it has the greatest effect on the implementation of purported crime control measures such as RTC legislation. Of course, this would suggest an endogeneity problem that would also likely lead to a bias in favor of finding a deterrent effect. The mechanism driving this bias would presumably be that rising crime strengthens the NRA push for the law, and the mean reversion in crime would then falsely be attributed to the law by the naive panel data analysis (incorrectly premised on exogenous RTC law adoption). But in the trimmed model, there is no sign of mean reversion. Murder rates keep increasing after RTC adoption. There is certainly no evidence of a beneficial impact from RTC laws, but conclusions about causation are difficult given the strong pre-passage crime trends.

Another striking feature we note is the strong influence of Florida and Georgia on our estimates of the impact of RTC laws on murder (Figure 10). When we remove these two states, the post-adoption trend lines for murder clearly shift upwards. Moreover, when dropping them from the set of RTC states that already excludes the early and late adopters—still leaving us with 20 RTC states to analyze—we see that murder increases in each post-adoption year. As previous

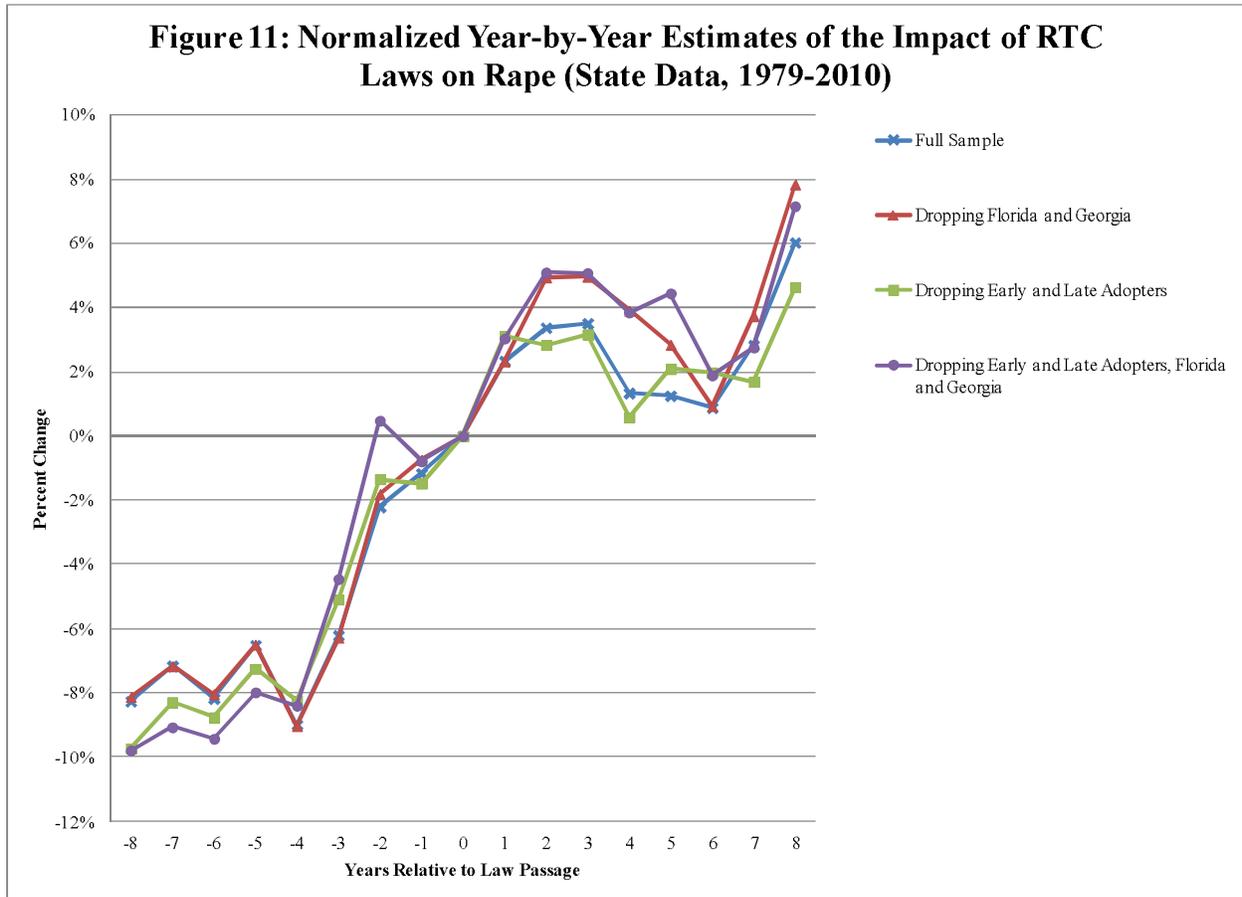
papers have noted, Florida experienced enormous drops in murder during the 1990s that may have been completely unrelated to the passage of its right-to-carry policy. Donohue (2003) points out that the 1980 Mariel boat lift temporarily added many individuals prone to committing crimes to Florida's population, causing a massive increase in crime in Florida during the 1980s. Thus, it is plausible that the massive 1990s crime reductions in Florida were not driven by the adoption of the state's RTC law but rather a return to traditional population dynamics that were less prone to violent crime (again, a reversion to the mean). This is important to consider given the strong downward pull of Florida on aggregate murder rates.

The line based on dropping Florida and Georgia from the trimmed sample would suggest that for the 20 other states, the impact of RTC laws on murder was highly pernicious. Again a number of interpretations are possible: 1) Florida and Georgia are unusual and the best estimate of the impact of RTC laws comes from the trimmed sample that excludes them (and the early and late adopters); 2) there is heterogeneity in the impact of RTC laws, so we should conclude that the laws help in Florida and Georgia, and tend to be harmful in the other 21 states; and 3) omitted variables mar the state-by-state estimates but the aggregate estimates that include Florida and Georgia may be reasonable if the state-by-state biases on average cancel out.

Note that Figure 11, which presents the comparable year-by-year estimates of the impact of RTC laws on rape, shows a similar yet even more extreme pattern of apparent spikes in crime leading to the adoption of RTC laws. The rape estimates are less sensitive than the murder estimates to the dropping of the early and late adopters (or Georgia and Florida). Clearly, the rate of rape is higher in the post-passage period but Figure 11 shows why the controls for state trends can be influential for this crime. If one believes that the pre-passage trend of increasing rapes would have continued without the adoption of RTC laws then you might conclude that the

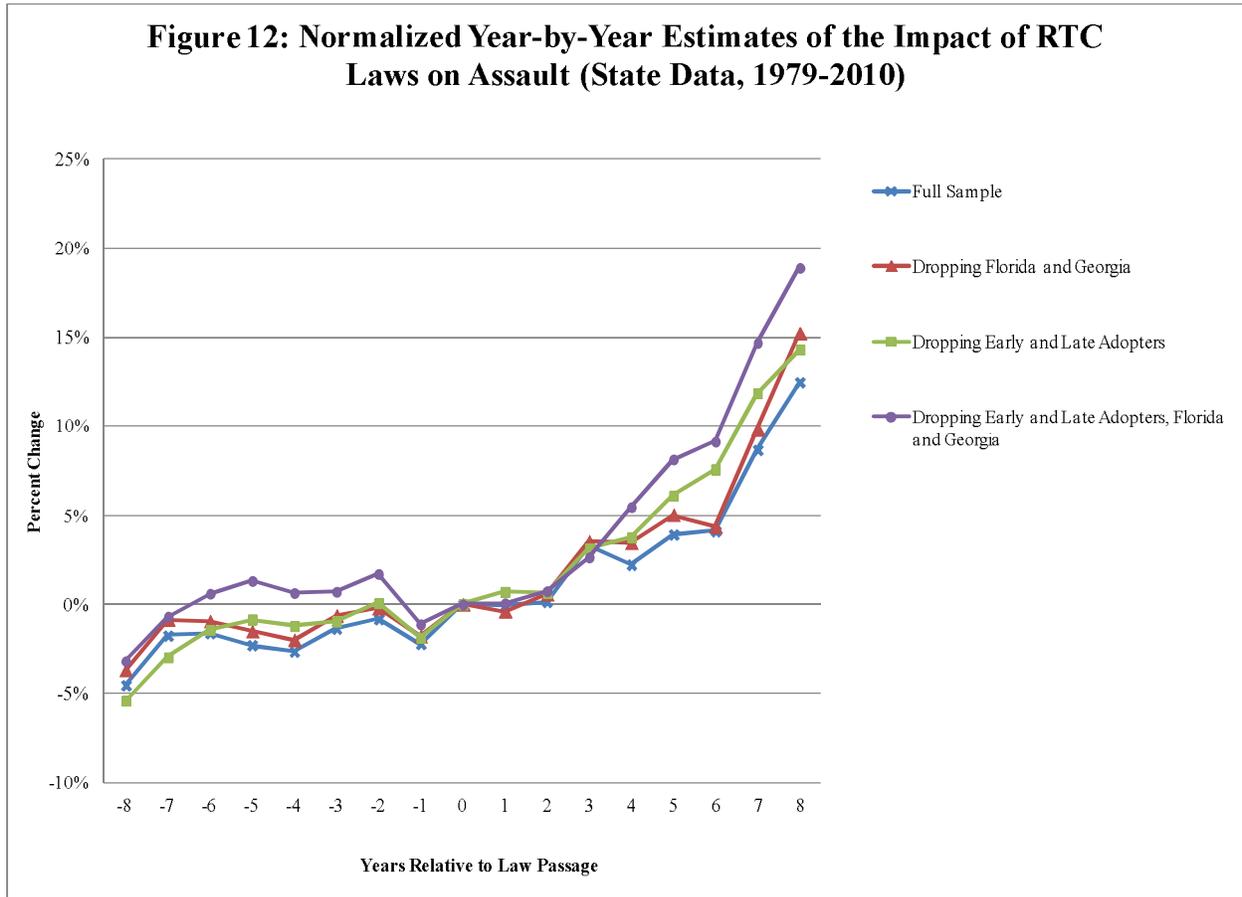
RTC laws moderated that upward trend. Alternatively, a dummy variable model that just compared pre- and post-passage would show greater evidence of RTC laws increasing the rate of rape.

Figure 11⁵⁶



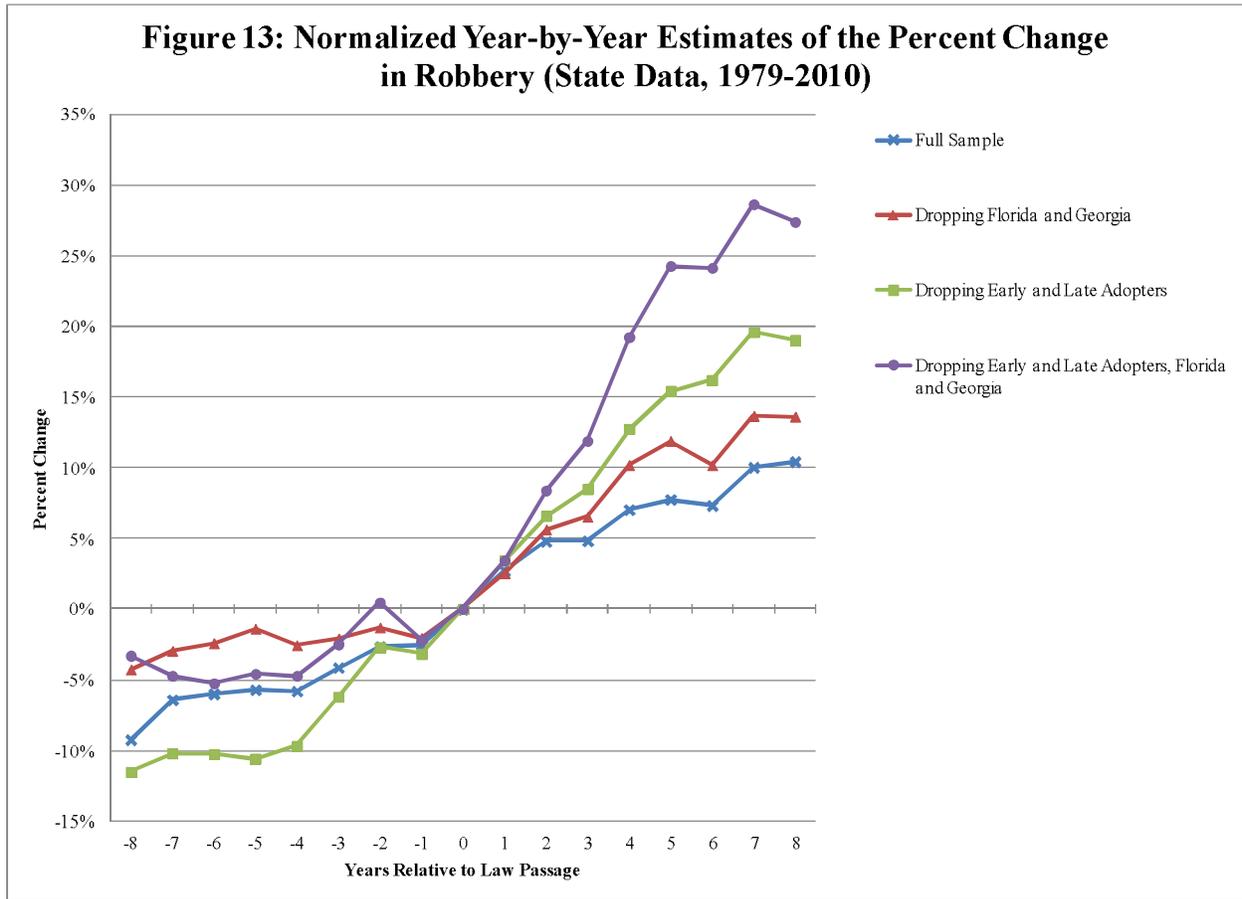
⁵⁶ Estimations include year and state fixed effects, state trends, and are weighted by state population. The control variables include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, state population, population density, per capita income, and six demographic composition measures.

Figure 12⁵⁷



⁵⁷ Estimations include year and state fixed effects, state trends, and are weighted by state population. The control variables include: incarceration and police rates, unemployment rate, poverty rate, state population, population density, per capita income, and six demographic composition measures.

Figure 13⁵⁸



As noted, the pattern of near-zero pre-passage estimates for the crime of assaults gives us greater confidence that we are able to estimate the impact of RTC laws on this crime. The general story here seems to be that assault increases markedly over the time period after law passage, which squares with our results discussed in previous sections. One observes positive coefficient changes that are initially modest, but that increase dramatically and uniformly over the second half of the post-passage period. Moreover, in contrast to the year-by-year murder estimate, assault trends are not demonstrably different when we alter the sample to exclude early

⁵⁸ Estimations include year and state fixed effects, state trends, and are weighted by state population. The control variables include: incarceration and police rates, unemployment rate, poverty rate, state population, population density, per capita income, and six demographic composition measures.

and late adopters, as well as Florida and Georgia. The pattern is generally unaffected by sample, giving us some confidence that RTC laws may be having an adverse impact on the rate of assault. Robbery rates similarly increase over time after the passage of RTC laws.

If the near uniform increases in assault coefficients means that aggravated assault did actually increase over time with the passage of right-to-carry legislation, this would strongly undercut the "More Guns, Less Crime" thesis. Interestingly, the robbery data (Figure 13) either suggests a pernicious effect similar to that on aggravated assault (particularly for the trimmed estimates dropping only early and late adopters) or a strong upward trend in crime, starting well before passage, that might be taken as a sign of the absence of any impact of RTC laws on robbery.

C. Effects of RTC Laws on Gun-related Assaults

A general concern in evaluating the impact of generic law X is that there is not some other law or policy Y that is generating the observed effect. In this case, the apparent finding that RTC laws increase aggravated assaults raises the question of whether changes in reporting or documenting aggravated assaults might be a possible confounding factor. Specifically, over the last two decades a number of states and municipalities have launched programs designed to combat domestic violence by increasing the arrests of likely perpetrators. These programs could influence the count of aggravated assaults appearing in the FBI crime data we employ. If such programs are more likely to be adopted in either RTC or non-RTC states than the potential for bias must be considered.

One way to address this problem would be to collect data on the various state or municipal initiatives that lead to higher rates of arrest of those committing acts of domestic violence. However, collecting uniform panel data along these lines that also fully captures the

nature and intensity of the police initiatives is extremely difficult. An alternative approach is to look at assaults that we think are less likely to be influenced by these domestic violence initiatives (or by other shifts in the likelihood of arrest for potentially assaultive conduct), but which are most likely to be influenced by RTC laws (if there is in fact such an influence).

Counts of gun assaults would seem to meet these two criteria, because assaults with a gun tend to be serious enough that the level of discretion as to whether to arrest is reduced, and because gun assaults are precisely the types of crimes that we might expect would be influenced if more guns are on the street because of the passage of RTC laws. For this reason, we may get more reliable estimates of the impact of RTC laws by looking at gun-related aggravated assaults than at overall aggravated assaults.

To test this possibility, we estimate our preferred regression using gun-related aggravated assaults as the dependent variable (both with and without state-specific trends) in Table 15 below. Unfortunately, our confidence in these results is undermined by data quality issues similar to those described in section IX. Since agencies report gun assault data to the FBI on a voluntary basis, there are significant gaps in which areas are reporting their gun assault totals in a given year. In addition, if reporting bias were correlated with either the gun assault rate or a state's adoption of an RTC statute, our coefficient estimates of the effect of RTC laws on the gun assault rate would be biased (although the direction of this bias would depend on the nature of this correlation). Nevertheless, we report our results for these regressions to examine whether they are consistent with our other evidence that right-to-carry laws increase aggravated assault rates.

Comparing these new results with the assault estimates in Tables 8a and 8b and Figure 12 above, our bottom-line story of how RTC laws increase rates of aggravated assault is further

strengthened when limiting our analysis to assaults involving a gun. Without state trends, we uniformly see very large, positive estimates, some of which are significant at the 5% and 10% level. With state trends, we again see some evidence that gun-related aggravated assault rates are increased by RTC legislation, although none of the resulting coefficients are statistically significant. These results again suggest that RTC laws may be generating higher levels of assaultive conduct, although more refined tools (or cleaner data) will be needed before confident predictions can be made.

Table 15⁵⁹

Estimated Impact of RTC Laws on Gun-Related Aggravated Assaults –
ADZ Preferred Controls, 1979-2010 – Clustered Standard Errors
Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Gun-Related Aggravated Assault (No State Trends)	Gun-Related Aggravated Assault (With State Trends)
Dummy Variable Model:	32.96** (13.24)	4.36 (8.19)
Spline Model:	2.86* (1.47)	3.07 (2.13)
Hybrid Post-Passage Dummy:	23.49** (9.77)	2.08 (8.01)
Trend Effect:	2.08 (1.30)	3.00 (2.11)

⁵⁹ Estimations include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and six demographic composition measures. * Significant at 10%; ** Significant at 5%; *** Significant at 1%. The gun assault data comes from the FBI master file, available upon request from the agency. The data is provided at the local level; thus for state values we sum the reported gun assaults over all of the reporting agencies by year. However, not all agencies report their estimates during each reporting period, leaving our gun assault figures likely to be undervalued.

XI. Conclusion

In this paper, we have explored the question of the impact of RTC laws on crime and the NRC panel's 2004 report concluding that the then-current literature was too fractured to reach a conclusion on what that impact is. We agree with the conclusion that the NRC panel reached at that time, as well as with the pointed rebuke the panel gave to James Q. Wilson who argued -- without scientific merit according to the NRC majority -- that RTC laws reduce murder. We do take issue, though, with the NRC majority report in a few respects.

First, as we show in this paper, there is a clear need to employ the cluster correction to the standard errors when estimating panel data models of crime, and the NRC majority erred when it concluded otherwise. As our placebo tests show, the standard errors that the NRC presented in their panel data models were far too low and greatly exaggerated the statistical significance of their results. Indeed, the clustering gaffe was on top of the NRC failure to use the robust correction for heteroskedasticity, which created additional downward bias in the standard errors (although less dramatically than the failure to cluster). Both corrections are needed, and this error alone set the stage for Wilson's dissent. With correct standard errors, none of the estimates that Wilson thought established a benign effect of RTC laws on murder would have been statistically significant. Thus, getting the standard errors right might have kept Wilson from writing his misguided dissent -- to the benefit of Wilson, the NRC majority, and the public.

Second, beyond getting the standard errors correct and therefore undermining the ostensible statistical significance of their presented murder regression, the NRC majority could have said much more than they did to refute Wilson's reliance on extremely limited statistical evidence to endorse the view that RTC laws reduce murder. Wilson's conclusion essentially rested on the NRC report's presentation of two Lott and Mustard models (the dummy and the

spline) based on county data from 1977-2000. The NRC majority did point out that the estimates for six out of 7 crimes were contradictory (some suggesting crime increases and some suggesting crime decreases), so the fact that for the seventh crime -- murder -- both models suggested RTC laws reduced crime might well be a spurious result. But the NRC majority could have given many more reasons to be cautious about relying on the two Lott and Mustard regressions.

Specifically, the NRC response to Wilson could easily have noted that Wilson had previously written that incarceration was perhaps the most important factor explaining the drop in crime in the United States in the 1990s, and he had also written on the importance of police (Wilson, 2008). Yet the Lott and Mustard model that the NRC presented (and that Wilson relied on) did not control for either of these factors.⁶⁰ Thus, on these grounds alone, one would have thought Wilson would have been particularly wary not to rely on a regression which was potentially subject to a charge of omitted variable bias. Neither the NRC majority nor Wilson ever noted this omission.

Moreover, we note in this paper some of the data problems with the Lott data set that the NRC panel used and then address an array of issues about data and model specification that Wilson ideally should have explored before he uncritically accepted the ostensible finding of a RTC impact on murder. These issues included the danger of omitted variable bias concerning the crack epidemic, the choice of county over state-level data, the inclusion of state-specific linear trends, and the over-use of highly collinear demographic variables, all of which have enough impact on the panel data estimates to influence one's perception of the "More Guns, Less Crime" theory and thus warrant closer examination than they received from Wilson.

⁶⁰ The Lott and Mustard model omitted a control for the incarceration and police rates (which is indicated implicitly —though not explicitly highlighted — in the notes to each table of the NRC report, which listed the controls included in each specification).

Perhaps Wilson was so wedded to his position that nothing could have persuaded him not to write his ill-conceived dissent, but the NRC majority could have done more to buttress their entirely correct assessment that “the scientific evidence does not support [Wilson's] position” (pg. 275). As a result, Lott now claims that Wilson, one of the most eminent criminologists of our time, supports his position (Lott, 2008). If one of the goals of the NRC report was to shield the public and policymakers from claims based on inadequate empirical evidence, the Wilson dissent represents a considerable failure.

A number of important lessons emerge from this story for both producers and consumers of econometric evaluations of law and policy. The first and most obvious is that a single statistical study cannot resolve an important question. Instead, one must wait until a literature has developed. But even then, the conclusion that emerges may be one of uncertainty as the NRC report showed.

A second lesson is how easy it is for mistakes to creep into these empirical studies. The pure data errors that entered into the NRC data set when Lott transmitted an imperfect data set or the error in the 1993 Uniform Crime Reports data (or the errors that entered into our own work in Aneja et al (2011), which are described in greater detail in Footnote 18) were not major enough to have an impact, but at times the errors will be decisive (and the process of peer review is not well-equipped to detect such errors). This episode underscores the value of making publicly available data and replication files that can reproduce published econometric results. This exercise can both help to uncover errors prior to publication and then assist researchers in the process of replication, thereby aiding the process of ensuring accurate econometric estimates that later inform policy debates.

A third lesson is that the "best practices" in econometrics are evolving. Researchers and

policymakers should keep an open mind about controversial policy topics in light of new and better empirical evidence or methodologies. Prior to the important work of Bertrand, Duflo, and Mullainathan (2004) on difference-in-differences estimation, few researchers understood that clustering standard errors on the state-level in order to account for serial correlation in panel data was necessary. The results in many pre-2004 published papers would be wiped out with this single adjustment. Despite its impressive array of talent, the NRC report in 2004 got this important issue wrong, even though most applied econometricians today would make this cluster adjustment to avoid greatly increasing the level of Type I error.

While the NRC majority decision of uncertainty was clearly influenced by the sensitivity of the estimates to various modeling choices, the separate statement by Horowitz was even more categorical in its nihilism, essentially rejecting all applied econometric work on RTC legislation, as indicated by his independent statement in an appendix to the NRC's (2004) report:

“It is unlikely that there can be an empirically based resolution of the question of whether Lott has reached the correct conclusions about the effects of right-to-carry laws on crime.” (p. 304, NRC Report.)

Of course, if there can be no empirically based resolution of this question, it means that short of doing an experiment in which laws are randomly assigned to states, there will be no way to assess the impact of these laws. But there is nothing particularly special about the RTC issue, as the recent National Research Council report on the deterrence of the death penalty shows (essentially adopting the Horowitz position on the question of whether the death penalty deters murders). The econometrics community needs to think deeply about what these NRC reports and the Horowitz appendix imply more broadly for the study of legislation using panel data econometrics and observational data.

Finally, despite our belief that the NRC's analysis was imperfect in certain ways, we agree with the committee's cautious final judgment on the effects of RTC laws: “with the current

evidence it is not possible to determine that there is a causal link between the passage of right-to-carry laws and crime rates.” Our results here further underscore the sensitivity of guns-crime estimates to modeling decisions.⁶¹ But not being able to “determine” with the level of certainty one strives for in academic work does not mean that one cannot offer conclusions at some lower level of certainty such as “more probable than not.” Since policymakers need to act, it is more useful to offer guidance as to which evidence is likely to be most reliable than to simply reject all evidence until the highest level of certainty has been attained.

Clearly, we now have more believable panel data models of the type used in the NRC report estimated on more complete state and county data, coupled with the additional evidence presented in this article examining gun assaults (Table 15) and estimating year by year effects on crime (Figures 10-13). Can a consistent story be distilled from this evidence?

We would consider our preferred regression models run on either the most complete data (state data from 1979-2010) or the data likely to be free of the confounding effect of the crack cocaine epidemic (state data from 1999-2010) as likely to yield more reliable estimates of the effect of RTC laws on crime than the Lott-Mustard specification. If we estimate both the dummy and spline models using our preferred specification without state trends for each of these two time periods (overall or after 1999), then we have 4 estimates of the impact of RTC laws for each of seven crime categories (Tables 8a and 11a). In each of the seven crime categories, at least one of these four estimates suggests that RTC laws increase crime at the .10 level of significance, with murder, rape, and larceny estimates reaching significance at the .05 level. These crime increases are substantial, with the dummy variable model for the complete period (Table 8a) suggesting that RTC laws increased every crime category by at least 8 percent, except

⁶¹ For a quick and clear sense of how sensitive estimates of the impact of right-to-carry laws are, see Appendix E, where we visually demonstrate the range of point estimates we obtain throughout our analysis.

murder (in that model, murder rose 3 percent but it is not statistically significant). For the post-1999 regressions, spline estimate (Table 11a) suggests that RTC laws increased the rate of murder by 1.5 percentage points each year (significant at the .05 level). In none of those 28 regressions was there any statistically significant estimate suggesting that RTC laws decreased crime.

Thus, the evidence that RTC laws increase crime is strongest if one accepts the dummy variable model with our preferred specification on state data (the Table 8a and 11a results) and accepts the Wolfers (2006) critique that one should avoid controlling for state trends.⁶² But even here questions remain. First, one might argue that the fact that estimates suggest that RTC laws increase property crime is an indication that these models are not giving credible causal estimates since this link is not based on a strong theoretical foundation.⁶³ Second, for all but aggravated assault, the state year by year estimates of Figures 10-13 raise endogeneity concerns that may undermine the state panel data results.

But the fact that Figure 12 shows a more ideal pattern of no pre-RTC adoption effects followed by sharp rises in aggravated assault and that the data on gun aggravated assaults also

⁶² If one were to reject the Wolfers proposition and conclude that one *must* control for state trends in estimating the impact of RTC laws, the story becomes even more complicated. Exhibit E shows (using the .10 level or better for significance) that there are two estimates with state trends suggestive of crime *decreases* in rape, six suggestive of crime *increases* in aggravated assault and one suggesting a decrease in this crime, four suggestive of *decreases* in auto theft and one suggesting an increase in this crime, and one suggestive of *decreases* in larceny.

⁶³ It is not clear why the property crimes of burglary, auto theft, and larceny would rise as a result of RTC passage. Three possible explanations for this finding come to mind. First, the results are correctly capturing the impact of RTC laws and perhaps the indirect effect of increasing the weapons available to criminals (through loss or theft) facilitates all criminal activity (perhaps by emboldening newly armed criminals) or the increase in violent crime diverts police resources so that property crime is stimulated. Second, it is possible that states adopting RTC laws were less successful in fighting crime than non-adopting states, so the RTC law was not itself increasing crime but was simply a proxy for states that on the whole adopted less successful crime-fighting strategies over the last quarter century. Third, it is possible that states chose to adopt RTC laws at a time when crime was on the rise, so their post-passage crime experience reflects an adverse crime shock that is incorrectly causally attributed to RTC laws. If this endogenous timing argument is correct, then it might suggest that post-1999 estimates of Table 11a are preferable, since that has been a period of greater crime stability (as opposed to the dramatic crime swings of the late 1980s and 1990s). The Table 11a estimates show that RTC laws only affected one crime category – with the laws causing a substantial *increase* in murder.

provides evidence that RTC laws increase these crimes may provide the strongest conclusion of a causal impact of RTC laws on crime. The evidence that RTC laws increase aggravated assault is not overwhelming but it does find support in different models and different time periods using both state and county data sets in different panel data regressions both for all assaults and gun assaults (Table 15), and in models estimating year-by-year effects. As Tables E5 and E6 reveal, eleven of the 28 estimates of the impact of RTC laws on aggravated assault meet at least the minimal standard of significance at the .10 level and show evidence of crime increases (against only one model showing a significant decline – the Lott/Mustard county data model with year fixed effects). Moreover, the omitted variable bias test suggests that if anything our 8 percent estimate of the increase in aggravated assault from RTC laws (at the .10 level, see Table 8a) is likely to understate the true increases in aggravated assault caused by RTC law.⁶⁴

Further research will hopefully further refine our conclusions as more data and better methodologies are employed to estimate the impact of RTC laws on crime.

⁶⁴ Note that the assaults can be committed either by RTC permit holders or those who have acquired their guns -- either via theft or appropriation of lost guns.

References

- Altonji, Joseph G., Todd E. Elder, and Christopher R. Taber.** 2005. "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools." *Journal of Political Economy* 113(1): 151-184.
- Angrist, Joshua and Jorn-Steffen Pischke.** 2009. *Mostly Harmless Econometrics*. Princeton: Princeton University Press.
- Autor, David, John J. Donohue, and Stewart Schwab.** 2006. "The Costs of Wrongful-Discharge Laws." *Review of Economics and Statistics* 88(2): 211-231.
- Ayres, Ian and John J. Donohue.** 2003a. "Shooting Down the More Guns, Less Crime Hypothesis." *Stanford Law Review*, 55(4): 1193-1312.
- Ayres, Ian and John J. Donohue.** 2003b. "The Latest Misfires in Support of the More Guns, Less Crime Hypothesis." *Stanford Law Review*, 55(4): 1371-1398.
- Ayres, Ian and John J. Donohue.** 2009. "More Guns Less Crime Fails Again: The Latest Evidence from 1977-2006." *Econ Journal Watch*, 6(2): 218-238.
http://www.aier.org/aier/publications/ejw_com_may09_ayresdonohue.pdf
- Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan.** 2004. "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics*, 119(1): 249-275.
- Black, Dan A., and Daniel S. Nagin.** 1998. "Do Right-to-Carry Laws Deter Violent Crime?" *Journal of Legal Studies*, 27: 209-219.
- Cramer, Clayton E., and David B. Kopel.** 1995. "'Shall Issue': The New Wave of Concealed Handgun Permit Laws." *Tennessee Law Review*, 62 (3): 679-757.
- Collins, Gail.** 2009. "Have Gun, Will Travel." *The New York Times*. 31 July 2009.

Donohue, John J. 2003. "The Impact of Concealed-carry Laws." *Evaluating Gun Policy*. J. Ludwig & P. J. Cook (Eds.). Washington, DC: Brookings Institution Press. 287–324.

Donohue, John J. 2004. "Guns, Crime, and the Impact of State Right-to-Carry Laws." *Fordham Law Review*, 73: 623-652.

Donohue, John J. and Justin Wolfers. 2009. "Estimating the Impact of the Death Penalty on Murder." *American Law and Economics Review*, 11 (2): 249-309

Elder, Todd and Christopher Jepsen. 2013. "Are Catholic Primary Schools More Effective Than Public Primary Schools?" *Journal of Urban Economics*, forthcoming.

Fryer, Roland, Paul Heaton, Steven Levitt, and Kevin Murphy. 2005. "Measuring the Impact of Crack Cocaine." NBER Working Paper Series No. W11318. National Bureau of Economic Research, Cambridge, MA.

Horowitz, Joel L. "Should the DEA's STRIDE Data Be Used for Economic Analyses of Markets for Illegal Drugs?" *Journal of the American Statistical Association*, 96(465): 1254-1271.

Kovandzic, T. V., Vieraitis, L. M. and Boots, D. P. (2009), Does the death penalty save lives? *Criminology & Public Policy*, 8: 803–843.

Levitt, Steven D. 2004. "Understanding Why Crime Fell in the 1990's: Four Factors that Explain the Decline and Six that Do Not," *Journal of Economic Perspectives*, 17: 163-190.

Lott, John R. 2000. *More Guns, Less Crime*. Chicago: University of Chicago Press.

Lott, John R. 2004. "Right-to-Carry Laws and Violent Crime Revisited: Clustering, Measurement Error, and State-by-State Breakdowns." <http://ssrn.com/abstract=523002> or doi:10.2139/ssrn.523002.

- Lott, John R.** 2008. "Do Guns Reduce Crime?" *Intelligence Squared Debate Series*.
<http://intelligencesquaredus.org/wp-content/uploads/Guns-Reduce-Crime-102808.pdf>
- Lott, John R. and David Mustard.** 1997. "Crime, Deterrence and Right-to-Carry Concealed Handguns." *Journal of Legal Studies*, 26(1): 1-68.
- Ludwig, J.** 1998. "Concealed Gun-carrying Laws and Violent Crime: Evidence from State Panel Data." *International Review of Law and Economics*, 18: 239-254.
- Maltz, Michael D.** 2006. *Analysis of Missingness in UCR Crime Data*. NCJ 215343
Washington: U.S. Department of Justice.
- Maltz, Michael D., and J. Targonski.** 2002. "A note on the use of county-level crime data." *Journal of Quantitative Criminology*, 18(3): 297-318.
- Maltz, Michael D., & J. Targonski.** 2003. "Measurement and other errors in county-level UCR data: A reply to Lott and Whitley." *Journal of Quantitative Criminology*, 19: 199-206.
- Moody, Carlisle E. and Thomas B. Marvell.** 2008. "The Debate on Shall-Issue Laws." *Econ Journal Watch*, 5(3): 269-293. http://www.aier.org/ejw/archive/doc_view/3610-ejw-200809?tmpl=component&format=raw.
- Moody, Carlisle E. John R Lott, Jr., Thomas B. Marvell, and Paul R. Zimmerman.** 2012. "Trust but Verify: Lessons for the Empirical Evaluation of Law and Policy."
- Moulton, Brent.** 1990. "An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units." *Review of Economics and Statistics*, 72: 334-338.
- Nagin, Daniel S. and John V. Pepper,** editors, 2012. *Deterrence and the Death Penalty*.
Washington: The National Academies Press.
- National Research Council.** 2004. *Firearms and Violence: A Critical Review*. Washington: The National Academies Press.

Plassman, Florenz and John Whitley. 2003. "Confirming More Guns, Less Crime." *Stanford Law Review*, 2003: 1313-1369.

Studenmund, AH. 1997. *Using Econometrics: A Practical Guide*. Reading, MA: Addison-Wesley.

Wilson, James Q. 2000. "Guns and Bush." *Slate Politics*. <http://slate.msn.com/?id=91132>. (accessed on November 29 2009).

Wilson, James Q. 2008. "What Do We Get From Prison?" *The Volokh Conspiracy*. http://volokh.com/posts/chain_1213046814.shtml. (accessed on 20 November 2009).

Wooldridge, Jeffrey M. 2003. "Cluster-sample Methods in Applied Econometrics" *American Economic Review*, 93: 133-138.

Wooldridge, Jeffrey M. 2006. "Cluster-Sample Methods in Applied Econometrics: An Extended Analysis." Unpublished manuscript. Michigan State University.

Wolfers, Justin. 2006. "Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results." *American Economic Review*, 96(5): 1802-1820.

Zimring, Franklin and Gordon Hawkins. 1997. "Concealed handguns: The counterfeit deterrent." *The Responsive Community*, 7:46-60.

Appendix A: Using Placebo Laws to Test the Impact of Clustering in the State Data

Table 3 reports the results of our placebo tests using county data. In this appendix, we use state-level data to again conduct our experiment with placebo laws to examine the effects of clustering the standard errors. As seen in Tables 1-4 of Appendix A, we find results similar to those generated with our county data: without clustering, the Type 1 error rates are often an order of magnitude too high or worse for our murder and robbery regressions (see Tables A1 and A3). In fact, even *with* clustered standard errors (Tables A2 and A4), the rejection of the null hypothesis (that RTC laws have no significant impact on crime) occurs at a relatively high rate. This finding suggests that, at the very least, we should include clustered standard errors to avoid unreasonably high numbers of significant estimates.

Appendix A⁶⁵**Table A1**

Percentage of Significant Estimates (5% Level) – Lott-Mustard Controls, 1979-2010 – Hybrid Model

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>		Dummy Variable	Trend Variable
1. All 50 States + DC:	Murder	47.6	63.9
	Robbery	46.5	63.7
2. Exact 34 States:	Murder	46.9	61.6
	Robbery	51.5	64.4
3. Random 34 States:	Murder	52.4	68.0
	Robbery	53.0	67.1
4. All 17 States:	Murder	36.4	58.5
	Robbery	45.4	72.5
5. Random 11 States:	Murder	35.4	64.4
	Robbery	43.4	73.0

Table A2Percentage of Significant Estimates (5% Level) – Lott-Mustard Controls, 1979-2010 – Hybrid Model and **Clustered Standard Errors**

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>		Dummy Variable	Trend Variable
1. All 50 States + DC:	Murder	16.1	28.5
	Robbery	13.4	18.3
2. Exact 34 States:	Murder	15.8	23.0
	Robbery	14.6	15.3
3. Random 34 States:	Murder	21.5	35.1
	Robbery	17.1	25.8
4. All 17 States:	Murder	23.9	45.5
	Robbery	24.2	53.0
5. Random 11 States:	Murder	23.7	48.7
	Robbery	23.0	53.7

⁶⁵ Simulation based on NRC with-controls model, includes year fixed effects, state fixed effects, and weighting by state population. The control variables (adopted from the Lott-Mustard model) include: lagged arrest rate, state population, population density, per capita income measures, and 36 demographic composition measures indicating the percentage of the population belonging to a race-age-gender group.

Appendix A (Cont.)

Table A3

Percentage of Significant Estimates (5% Level) – Lott-Mustard Controls, 1979-2010 – Dummy Model
 Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>		Dummy Variable
1. All 50 States + DC:	Murder	47.1
	Robbery	46.9
2. Exact 34 States:	Murder	46.3
	Robbery	50.6
3. Random 34 States:	Murder	61.6
	Robbery	56.8
4. All 17 States:	Murder	35.9
	Robbery	45.4
5. Random 11 States:	Murder	37.5
	Robbery	49.8

Table A4

Percentage of Significant Estimates (5% Level) – Lott-Mustard Controls, 1979-2010 – Dummy Model and **Clustered Standard Errors**

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>		Dummy Variable
1. All 50 States + DC:	Murder	16.3
	Robbery	13.2
2. Exact 34 States:	Murder	13.7
	Robbery	13.1
3. Random 34 States:	Murder	29.6
	Robbery	21.4
4. All 17 States:	Murder	22.2
	Robbery	24.4
5. Random 11 States:	Murder	25.2
	Robbery	28.0

Appendix B – Panel Data Models over the Full Period with No Covariates

The NRC panel sought to underscore the importance of finding the correct set of covariates by presenting county panel data estimates (on data through 2000) of the impact of RTC without covariates but including county and year fixed effects. For completeness, this Appendix presents these same no controls estimates for models (with and without state trends) estimated on both county and state data for the periods from 1977-2006 and 1977-2010 (respectively).

If one compares the results from these four tables with no controls with the analogous tables using the preferred model for the same time period, one sees some interesting patterns. For example, if we compare the county results without state trends from both our preferred specification (Table 6a) and the no-controls specification (Table B1), we see that both sets of results are always positive (suggesting crime increases) but rarely statistically significant when covariates are added (although quite frequently for the no-controls model). The basic story in these two different county data regressions seems to be that there is no evidence of an effect of RTC laws on murder, while if there is *any* RTC effect on other crimes generally, it is a crime-*increasing* effect. When we compare those from the county models that include state trends (Tables 6b and B2), some negative point estimates emerge, although there is no sign of any statistically significant results at even the .10 level in either Table.

When we shift to a comparison of the state-level results, we again see similarities between the preferred and no-controls specifications. When looking at the results without state trends (Tables 8a and B3), we see that the estimates are fairly similar in terms of direction, although the no-controls estimates are often larger in magnitude and more statistically significant (with Table B3 showing statistically significant increases at the .05 level in all crime categories other than murder and rape). When doing a similar comparison of the specifications that now

add in state trends (Tables 8b and B4), we also see similar results. In both tables, the only statistically significant effect on violent crime at the .05 level is that RTC laws increase aggravated assaults.

Appendix B⁶⁶

Table B1

Estimated Impact of RTC Laws – No Controls, 1977-2006 – Clustered Standard Errors

Dataset: ADZ Updated 2013 County Data (without 1993 data)

All figures reported in %

	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	0.53 (8.91)	35.43 (23.88)	28.59 (19.84)	28.64* (15.18)	36.66 (22.40)	39.79* (22.93)	41.22 (26.50)
Spline Model:	0.35 (0.73)	3.25* (1.92)	2.96* (1.61)	2.75** (1.32)	3.30* (1.96)	3.68* (1.95)	4.08* (2.23)
Hybrid Post-Passage Dummy:	-2.02 (9.13)	24.26 (20.04)	16.86 (18.53)	18.64 (13.86)	25.58 (19.05)	27.02 (20.58)	25.84 (23.32)
Trend Effect:	0.45 (0.71)	1.99 (1.24)	2.08 (1.29)	1.78 (1.07)	1.97 (1.47)	2.27 (1.54)	2.73 (1.70)

Table B2

Estimated Impact of RTC Laws – No Controls, 1977-2006 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 County Data (without 1993 data)

All figures reported in %

	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-1.93 (6.33)	-13.42 (12.08)	3.00 (11.00)	4.37 (8.89)	5.28 (10.58)	-0.25 (12.16)	-0.04 (13.23)
Spline Model:	0.04 (1.26)	-5.77 (4.40)	2.50 (2.36)	0.29 (2.41)	0.51 (2.59)	-0.43 (2.44)	-0.39 (2.59)
Hybrid Post-Passage Dummy:	-1.98 (6.45)	-9.90 (11.32)	1.43 (11.62)	4.24 (9.40)	5.03 (11.19)	0.03 (12.99)	0.21 (14.14)
Trend Effect:	0.09 (1.28)	-5.55 (4.40)	2.47 (2.46)	0.19 (2.49)	0.40 (2.69)	-0.43 (2.59)	-0.40 (2.76)

⁶⁶ Estimations include year and county fixed effects, and are weighted by county population. Robust standard errors are provided beneath point estimates in parentheses. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Appendix B (Cont.)

Table B3

Estimated Impact of RTC Laws – No Controls, 1977-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	1.07 (8.23)	13.83 (8.98)	13.38** (5.51)	21.63** (8.99)	26.88** (12.81)	23.32*** (8.00)	17.63*** (5.73)
Spline Model:	0.37 (0.72)	1.10 (0.84)	1.33** (0.61)	1.86** (0.85)	1.79 (1.16)	1.70** (0.73)	1.32** (0.52)
Hybrid Post-Passage Dummy:	-1.62 (6.86)	9.48 (6.26)	6.96 (4.36)	13.62* (7.59)	21.32** (9.10)	17.27** (6.52)	12.75** (4.98)
Trend Effect:	0.44 (0.66)	0.70 (0.70)	1.04* (0.61)	1.29 (0.80)	0.90 (0.93)	0.98 (0.63)	0.79 (0.47)

Table B4

Estimated Impact of RTC Laws – No Controls, 1977-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-0.83 (4.57)	-4.56* (2.67)	0.57 (3.64)	4.45 (4.59)	9.59 (5.92)	3.10 (3.60)	1.98 (2.50)
Spline Model:	1.09 (0.73)	-0.53 (0.88)	2.03** (0.86)	0.13 (1.03)	-0.27 (1.12)	-0.41 (0.62)	-1.03** (0.48)
Hybrid Post-Passage Dummy:	-1.36 (4.43)	-4.34 (2.70)	-0.40 (3.39)	4.42 (4.76)	9.78 (5.94)	3.32 (3.76)	2.48 (2.54)
Trend Effect:	1.10 (0.73)	-0.47 (0.88)	2.04** (0.86)	0.07 (1.05)	-0.41 (1.13)	-0.46 (0.65)	-1.07** (0.51)

Note: In earlier tables, our data period begins in 1979 for models that include the poverty rate as a control since that is when that information becomes available.

Appendix C – Trimming the Sample to Address Questions of Model Fit

Given our concerns about how well the guns-crime econometric models fit all 50 US states (plus D.C.), we decided to examine the residuals from various regressions models. For example, one potentially important issue is whether one should include linear state trends in our models. To further explore this issue, we examined the variance of the residuals for the aggravated assault regression estimates using our preferred models on state data for the period through 2010—both with and without state trends.⁶⁷ In particular, we found that the residual variance was high for smaller states, even when we do not weight our regressions by population.⁶⁸

We explored how these “high residual-variance” states (defined from the aggravated assault regressions on our preferred model through 2010) might be influencing the results. We estimated our preferred model (both with and without state trends) after removing the 10 percent of states with the highest residual variance. This step is also repeated after removing the highest 20 percent of states in terms of residual variance. Our results for our preferred specification (which includes clustered standard errors and is run over the 1979-2010 time period) are shown in Table 8a and 8b (without and with state trends, respectively). The results from our two trimmed set of states are presented below. Tables C1 and C2 should be compared to Table 8a (no state trends), and Tables C3 and C4 should be compared to Table 8b (adding in state trends).

Removing high residual-variance states (based on the aggravated assault regressions)

⁶⁷ Since evidence that RTC laws increased aggravated assault appeared in a number of different models and with different data sets, we focused specifically on the residuals obtained using assault rate as the dependent variable.

⁶⁸ We removed the population weight for this exercise because it is likely that when regressions are weighted by population, the regression model will naturally make high-population states fit the data better. As a result, we expect that residuals for smaller states will be higher. We find, however, that the results are qualitatively similar even when we obtain the residuals from regressions that include the population-weighting scheme (although the patterns of statistical significance sometimes change significantly when dropping the highest variance 20% of states from the sample).

does not alter the story told in Table 8a (no state trends) that there is no hint that RTC laws reduce crime and this message comes through again in Tables C1 and C2. Indeed, removing the high variance states has increased the statistical significance of the finding that RTC laws *increase* aggravated assault from the .10 level in Table 8a to the .05 level in both Tables C1 and C2. Removing the high residual-variance states from the models with state trends again reveals the same Table 8b estimates of a statistically significant increase in aggravated assault at the .05 level (Table C3), but reduces this level of significance to the .10 level in Table C4.

Of the states dropped from Tables C1 because of their high residual variance, all adopted RTC laws during the 1977-2010 period (with date of adoption in parentheses): Montana (1991), Maine (1985), West Virginia (1989), North Dakota (1985), and Tennessee (1996). Of the *additional* states dropped from Table C2, the following two states adopted RTC laws during the 1977-2010 period (with date of adoption in parentheses): Nebraska (2007) and Oregon (1990). Results from Table C3 come from dropping Montana, North Dakota, New Hampshire, Nebraska, and Vermont.⁶⁹ Finally, in addition to the five RTC states that were dropped in Table C3, Table C4 dropped the following five RTC states: West Virginia (1989), Nevada (1995), Kentucky (1996), Indiana (1980), and South Dakota (1985).

⁶⁹The dropped states are slightly different between Tables C1 and C3, as well as between Tables C2 and C4, because the state ranks based on residual variances differed when the models were run with and without state trends.

Appendix C⁷⁰

Table C1

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1979-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

Dropping States with Highest Residual Variance (Top 10%: ND, MT, WV, TN, ME)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	3.54 (6.66)	11.70** (5.74)	8.48** (3.93)	14.12* (8.13)	19.32** (9.15)	12.40* (6.26)	10.43** (4.76)
Spline Model:	0.61 (0.65)	0.65 (0.64)	1.03* (0.59)	1.21 (0.84)	1.31 (0.80)	0.79 (0.61)	0.87* (0.50)
Hybrid Post-Passage Dummy:	0.95 (5.60)	10.35** (4.96)	4.51 (3.39)	10.22 (7.13)	15.82** (7.83)	10.44* (5.40)	7.66* (4.06)
Trend Effect:	0.57 (0.60)	0.30 (0.60)	0.88 (0.60)	0.87 (0.80)	0.78 (0.67)	0.44 (0.55)	0.61 (0.48)

Table C2

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1979-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

Dropping States with Highest Residual Variance (Top 20%: ND, MT, WV, TN, ME, NE, NH, HI, OR, VT)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	3.93 (7.01)	12.52** (5.91)	10.21** (3.92)	15.19* (8.48)	20.26** (9.54)	13.11* (6.56)	10.85** (4.97)
Spline Model:	0.80 (0.65)	0.78 (0.65)	1.30** (0.58)	1.49* (0.83)	1.43* (0.83)	0.91 (0.62)	0.91* (0.53)
Hybrid Post-Passage Dummy:	0.47 (5.83)	10.62** (5.20)	5.23 (3.58)	10.06 (7.35)	16.33* (8.17)	10.64* (5.64)	8.01* (4.26)
Trend Effect:	0.78 (0.59)	0.43 (0.60)	1.13* (0.59)	1.16 (0.78)	0.89 (0.70)	0.56 (0.55)	0.64 (0.50)

⁷⁰ Estimations include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and six demographic composition measures. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Appendix C (Cont.)

Table C3

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1979-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

Dropping States with Highest Residual Variance (Top 10%: MT, ND, NH, NE, VT)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-0.13 (4.02)	-3.20 (2.34)	-0.33 (3.62)	1.86 (3.21)	9.64** (4.52)	1.12 (2.24)	1.11 (1.88)
Spline Model:	0.86 (0.76)	-0.23 (0.65)	1.71** (0.79)	-0.26 (0.83)	-1.41* (0.76)	-0.10 (0.65)	-0.57 (0.53)
Hybrid Post-Passage Dummy:	-0.78 (3.93)	-3.10 (2.38)	-1.63 (3.51)	2.10 (3.40)	10.95** (4.43)	1.23 (2.37)	1.57 (2.06)
Trend Effect:	0.89 (0.74)	-0.13 (0.65)	1.76** (0.79)	-0.33 (0.86)	-1.76** (0.73)	-0.14 (0.67)	-0.62 (0.56)

Table C4

Estimated Impact of RTC Laws – ADZ Preferred Controls, 1979-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

Dropping States with Highest Residual Variance (Top 20%: MT, ND, NH, NE, VT, WV, NV, KY, IN, SD)

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	-0.30 (4.26)	-3.11 (2.47)	1.36 (3.44)	2.56 (3.25)	10.91** (4.38)	0.89 (2.36)	1.24 (1.97)
Spline Model:	0.94 (0.83)	-0.15 (0.71)	1.38* (0.78)	-0.11 (0.89)	-1.39 (0.84)	-0.13 (0.73)	-0.55 (0.57)
Hybrid Post-Passage Dummy:	-0.98 (4.16)	-3.07 (2.51)	0.40 (3.38)	2.70 (3.49)	12.16*** (4.30)	1.01 (2.50)	1.67 (2.18)
Trend Effect:	0.97 (0.81)	-0.06 (0.71)	1.37* (0.79)	-0.20 (0.94)	-1.78** (0.80)	-0.17 (0.76)	-0.60 (0.61)

Appendix D – Alternative Demographic Variable Specification

A fairly standard set of demographics that can be seen in the crime literature includes controls for a few age categories across all races combined with a single identifier of the percentage of blacks in the state. Table D1 and D2 in Appendix D provide yet another robustness check to the ADZ model by putting in four such demographic variables – the percent of the population falling into the three age categories of 10-19, 20-29, and 30-39 plus the percent black -- in place of the ADZ six demographic variables. The results are not dramatically different from the main ADZ models of Tables 8a and 8b, and they essentially show only evidence of RTC laws increasing crime. Table D1's and Table 8a's estimated violent crime increases for rape, aggravated assault, and robbery are substantial in both sets of dummy variable estimates and significant at the .10 level or better, only Table 8a has one of these estimates rise to the level of significance at the .05 level (for rape).

Appendix D

Table D1⁷¹

Estimated Impact of RTC Laws – ADZ Preferred Controls (with four demographic variables), 1979-2010 – Clustered Standard Errors

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	2.25 (5.75)	9.45* (5.43)	8.15* (4.27)	12.06* (6.51)	15.06* (8.15)	11.33** (4.88)	11.06** (4.29)
Spline Model:	0.47 (0.63)	0.97 (0.64)	1.07 (0.64)	1.27 (0.76)	1.12 (0.76)	0.83 (0.58)	0.93* (0.49)
Hybrid Post-Passage Dummy:	0.08 (4.69)	5.90 (4.21)	3.81 (3.77)	7.31 (5.52)	11.73 (7.12)	8.90** (4.00)	8.02** (3.49)
Trend Effect:	0.47 (0.60)	0.77 (0.60)	0.94 (0.66)	1.03 (0.75)	0.72 (0.70)	0.52 (0.55)	0.66 (0.47)

Table D2

Estimated Impact of RTC Laws – ADZ Preferred Controls (with four demographic variables), 1979-2010 – Clustered Standard Errors and State Trends

Dataset: ADZ Updated 2013 State Data

<i>All figures reported in %</i>	Murder	Rape	Aggravated Assault	Robbery	Auto Theft	Burglary	Larceny
Dummy Variable Model:	0.60 (3.99)	-2.86 (2.57)	-0.73 (3.97)	3.25 (3.17)	9.47** (4.34)	1.74 (2.13)	1.52 (1.72)
Spline Model:	0.59 (0.70)	-0.28 (0.63)	1.53* (0.78)	-0.70 (0.94)	-1.06 (0.79)	-0.42 (0.61)	-0.71 (0.48)
Hybrid Post-Passage Dummy:	0.15 (3.89)	-2.71 (2.63)	-1.95 (3.90)	3.88 (3.41)	10.54** (4.23)	2.11 (2.29)	2.12 (1.86)
Trend Effect:	0.59 (0.68)	-0.19 (0.64)	1.59** (0.78)	-0.82 (0.97)	-1.39* (0.75)	-0.49 (0.63)	-0.78 (0.52)

⁷¹ These regressions include year and state fixed effects, and are weighted by state population. Robust standard errors are provided beneath point estimates in parentheses. The control variables for this “preferred” specification include: incarceration and police rates (lagged one year to avoid potential endogeneity issues), unemployment rate, poverty rate, population density, per capita income measures, and four demographic variables (percent of the population that is between 10 and 19, 20 and 29, and 30 and 39 as well as percent black in the state).

* Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Appendix E – Summarizing Estimated Effects of RTC Laws Using Different Models, State v. County Data, and Different Time Periods

This appendix provides graphical depictions of 14 different estimates of the impact of RTC laws for both the dummy and spline models for specific crimes using different data sets (state and county), time periods (through 2000, 2006, or 2010), and models (Lott and Mustard versus our preferred model and with and without state trends). For example, Figure E1 shows estimates of the impact on murder using the dummy model, designed to capture the average effect of RTC laws during the post-passage period. The first bar in each of the first six groupings corresponds to county-level estimates; the second bar corresponds to state-level estimates, for a total of 14 estimates per figure. Since our county model estimates are generally run through 2006 and our state model estimates are run through 2010, we generally paired state and county model results that were otherwise identical and which were run through 2010 and 2006 (respectively). Additionally, the last two estimates only contain one bar corresponding to state models run between 1999 and 2010. The value of the figures is that they permit quick visual observation of the size and statistical significance of an array of estimates. Note, for example, that only one of the estimates of RTC laws on murder in either Figure E1 or Figure E2 is significant at even the .10 threshold. This is the estimate for the 1999-2010 period on state data, which shows a statistically significant *increase* in murder (at the .05 level) in the spline model. This sharp contrast to the conclusion drawn by James Q. Wilson on the NRC panel is in part driven by the fact that all of the estimates in this appendix come from regressions in which we adjusted the standard errors by clustering.

In contrast to the solitary statistically significant estimate for murder (suggesting an increase), the estimates of the impact of RTC laws on aggravated assault in Figures E5 and E6

are significant at at least the .10 level suggesting crime increases in 11 of the 28 estimates depicted, as indicated by the shading of the columns.⁷² Note that the overall impression from Figure E6 is suggestive that RTC laws *increase* aggravated assault, although the evidence is not uniformly strong in the more preferred models. No other crime category has as strong evidence of an impact of RTC laws as the findings on aggravated assault.

Figure E1. Various Murder Estimates (Dummy Model)

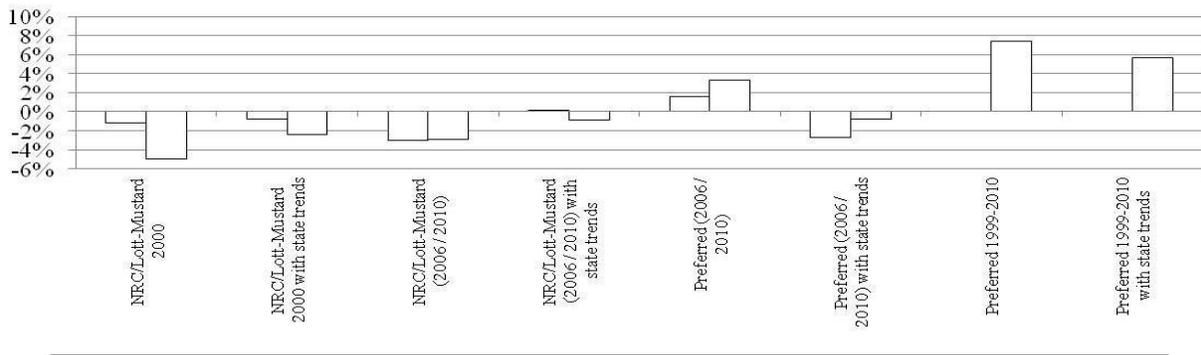
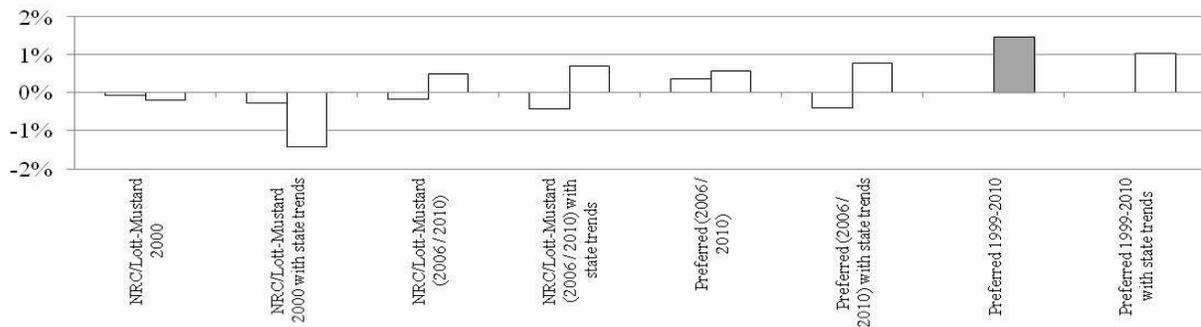


Figure E2. Various Murder Estimates (Spline Model)



⁷² No shading indicates insignificance, and the shading darkens as significance increases (from a light grey indicating significance at the .10 level, slightly darker indicating significance at the .05 level, and black indicating significance at the .01 level).

Figure E3. Various Rape Estimates (Dummy Model)

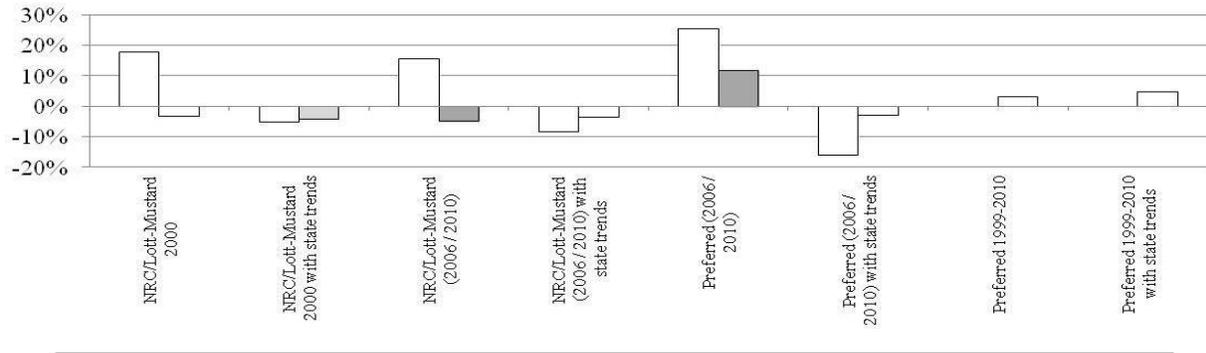


Figure E4. Various Rape Estimates (Spline Model)

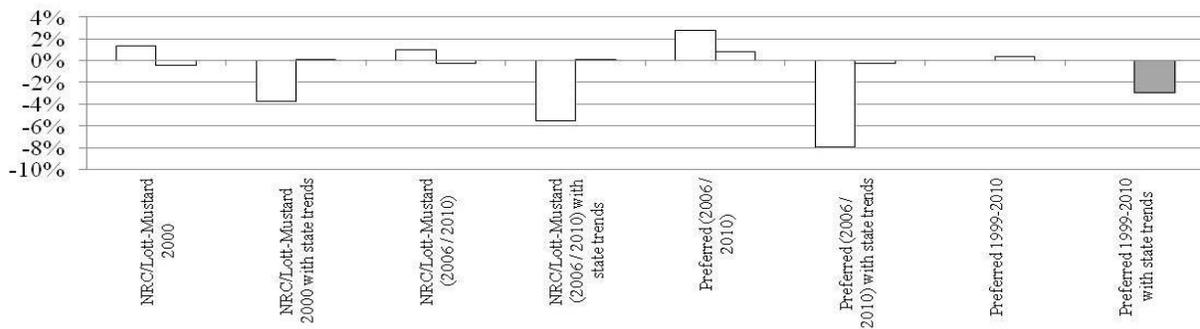


Figure E5. Various Aggravated Assault Estimates (Dummy Model)

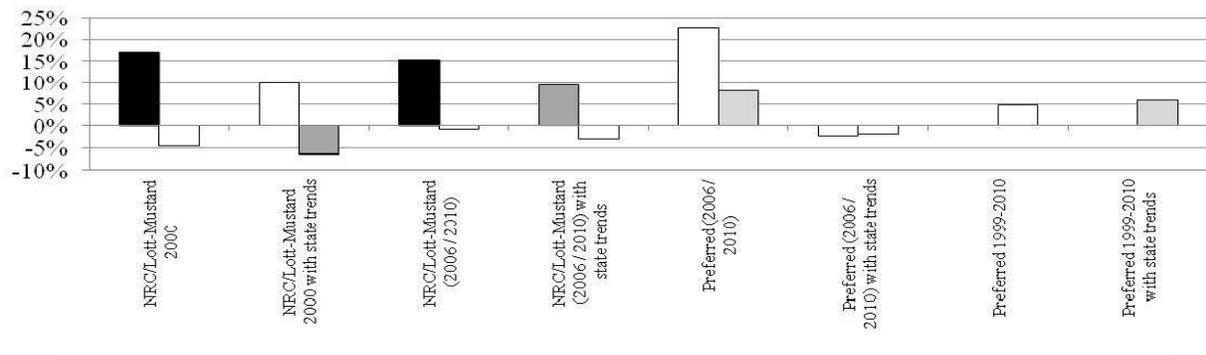


Figure E6. Various Aggravated Assault Estimates (Spline Model)

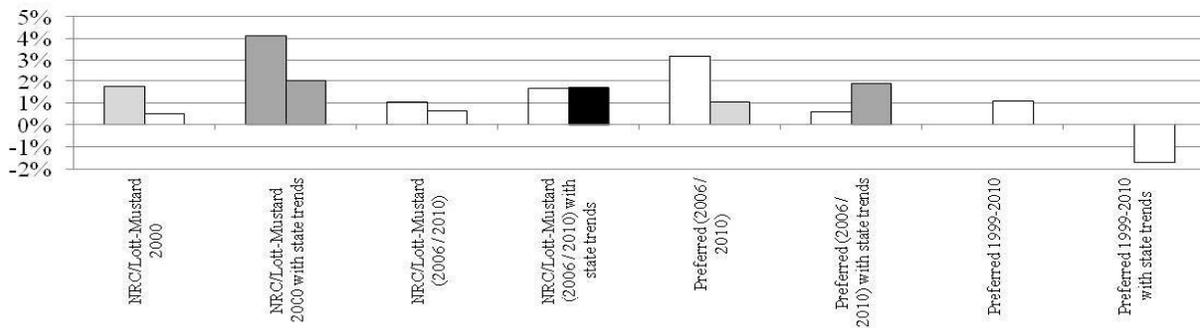


Figure E7. Various Robbery Estimates (Dummy Model)

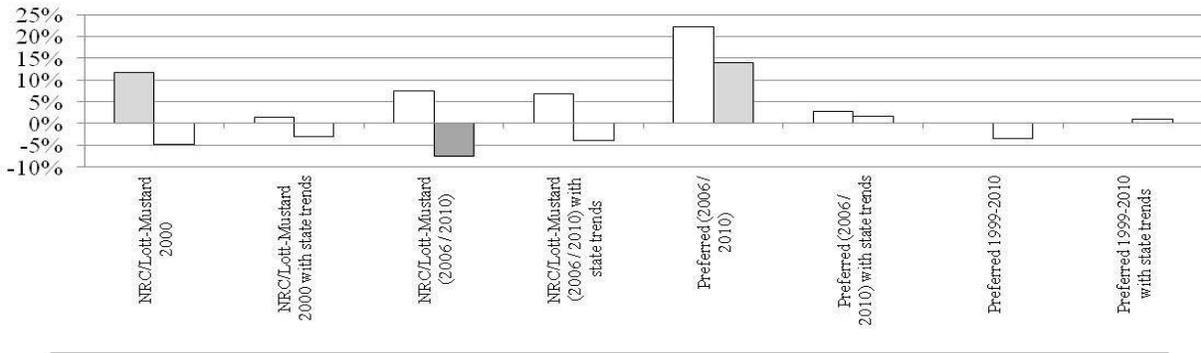


Figure E8. Various Robbery Estimates (Spline Model)

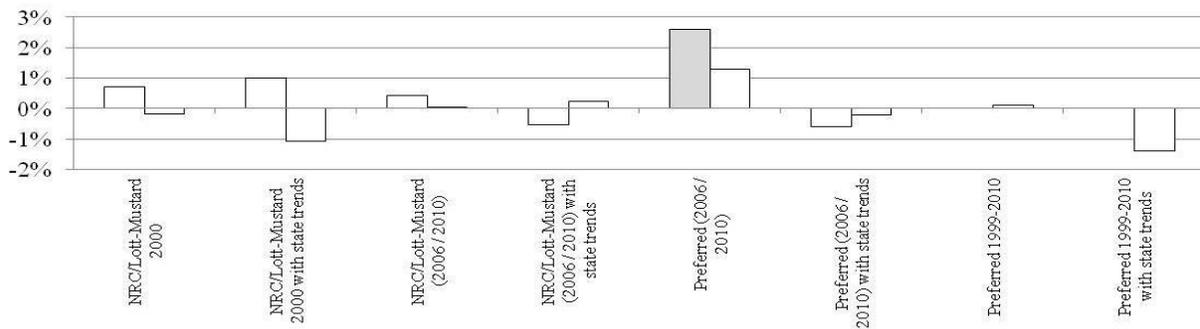


Figure E9. Various Auto Theft Estimates (Dummy Model)

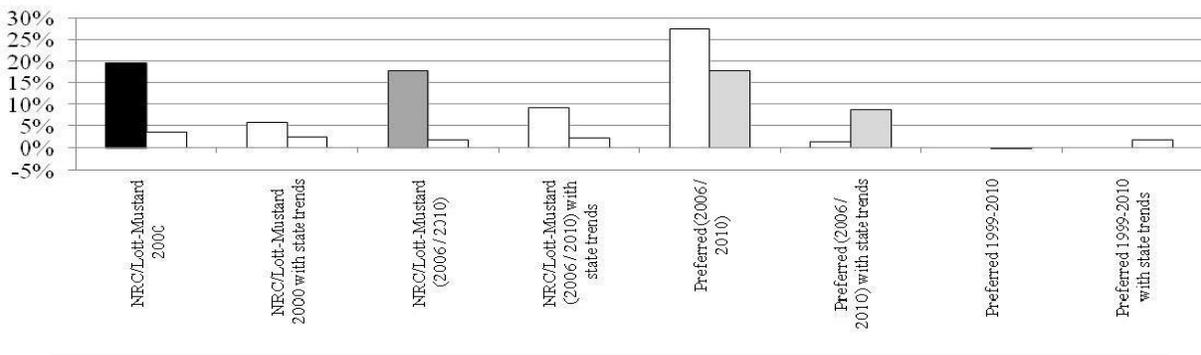


Figure E10. Various Auto Theft Estimates (Spline Model)

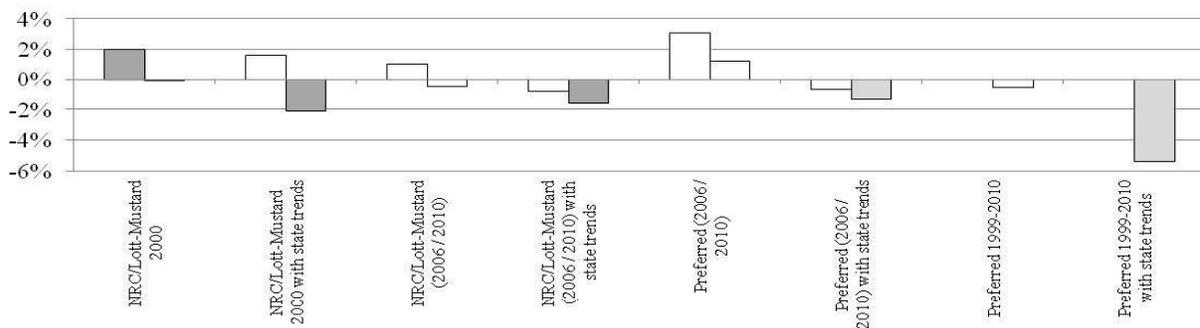


Figure E11. Various Burglary Estimates (Dummy Model)

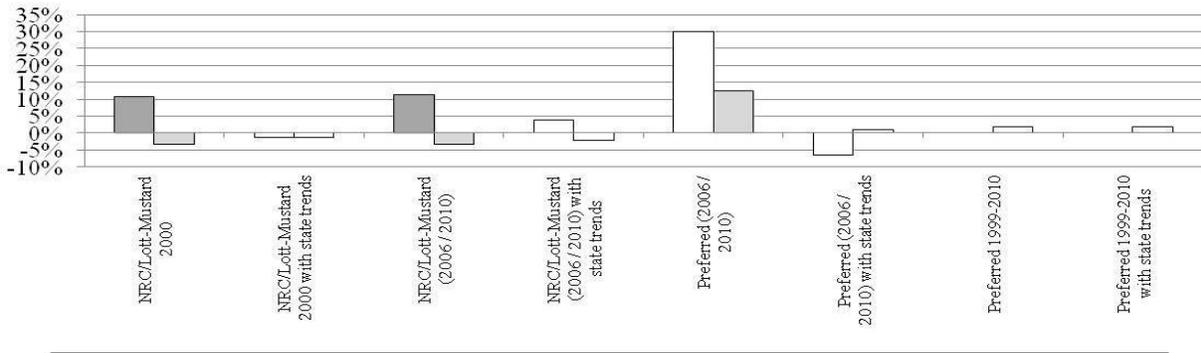


Figure E12. Various Burglary Estimates (Spline Model)

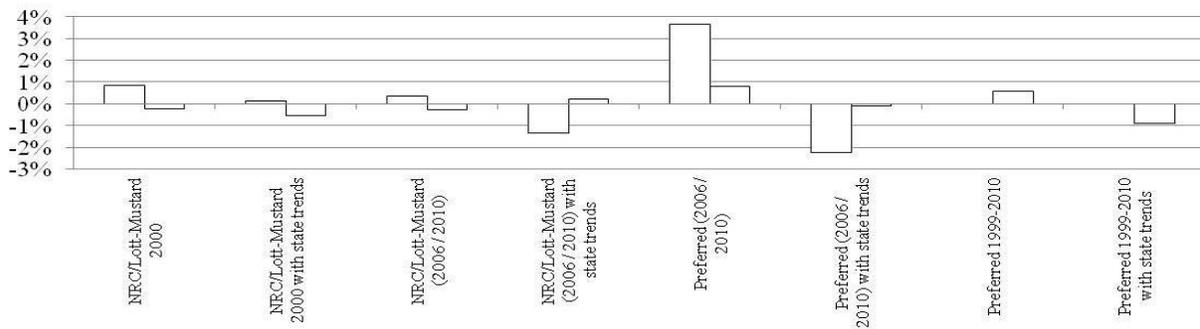


Figure E13. Various Larceny Estimates (Dummy Model)

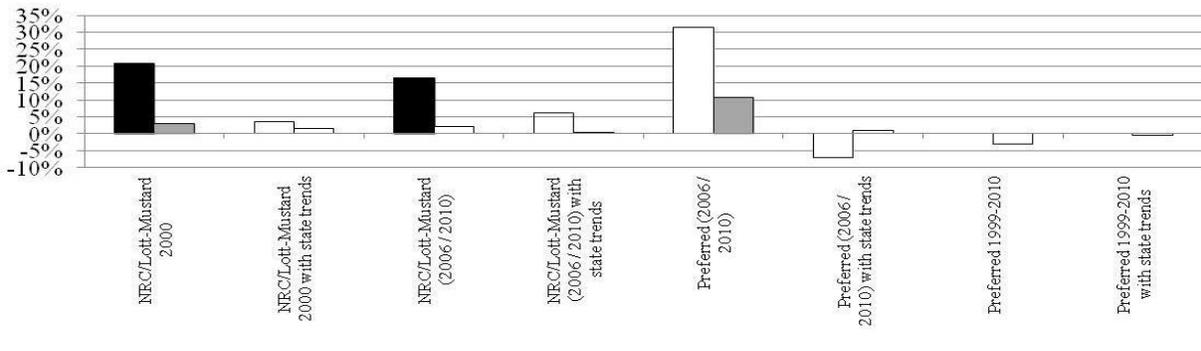
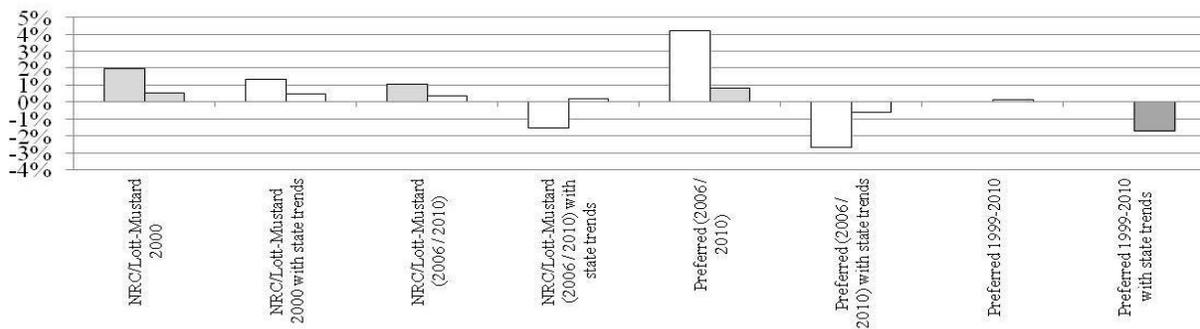


Figure E14. Various Larceny Estimates (Spline Model)



Appendix F – Methodological Description of Using Selection on the Observables to Assess Selection Bias

Altonji et al. (2005) provides a test for whether there is omitted variable bias in a regression that attempts to quantify whether selection bias drives the OLS estimate. An underlying assumption of this approach is that the observable controls are selected independently from the larger set of possible controls. Elder and Jepsen (2013) provides a useful description of the methodological features of the test, and footnote 6 of that paper states that potential bias can be calculated with the given equation $\frac{cov(CS, \varepsilon_i)}{var(\widehat{CS}_i)} = \frac{cov(\widehat{CS}_i, \varepsilon_i)}{var(\widehat{CS}_i)}$, where CS corresponds to our right-to-carry dummy variable.⁷³

Drawing on this equation and equation (3) of the Elder and Jepsen paper, one can generate an expression for the potential bias: $\frac{cov(CS_i, X_i\gamma) \cdot var(\varepsilon_i)}{var(\widehat{CS}_i) \cdot var(X_i\gamma)}$. Here \widehat{CS}_i is given by the formula $CS_i = X_i\beta + \widehat{CS}_i$ (that is, \widehat{CS}_i is simply the residual from the regression of CS_i on $X_i\beta$). Putting this formula in terms of our RTC dummy variable gives the expression $\frac{cov(Shall_i, X_i\gamma) \cdot var(\varepsilon_i)}{var(\widehat{Shall}_i) \cdot var(X_i\gamma)}$. Because the beta coefficient of the bivariate regression of the RTC dummy on the fitted values of the regression of Y_i (murder rate) on our full set of controls (less the RTC dummy variable) amounts to $\frac{cov(Shall_i, X_i\gamma)}{var(X_i\gamma)}$, the only remaining variables needed are $var(\varepsilon_i)$ and $var(\widehat{Shall}_i)$. With this information one can calculate the “potential bias,” which then can be compared to the beta coefficients we estimate in this paper.

The ratio of this implied bias to the estimate of the beta coefficient represents how strong selection on unobserved variables would have to be relative to selection on observed variables to

⁷³ In Elder and Jepsen’s (2013) paper, CS refers to the effect of Catholic schools on educational achievement.

attribute the entire estimated effect to selection bias. For the ADZ preferred specification (Table 8a), we find a beta coefficient of 0.0331, with a potential bias of -0.3549. This implied ratio is negative, implying that selection on observables and unobservables would have to be of opposite signs to be consistent with a true effect of zero. This finding implies that our slightly positive coefficient is a lower bound of the true effect of RTC laws on murder.

In contrast, the Altonji test applied to the NRC regression (Table 1b) finding of a statistically significant beta coefficient on murder of -0.0833 indicates strong evidence of omitted variable bias. The test reveals an estimate of potential bias of -1.0304, which implies that the -0.0833 OLS estimate would be solely driven by selection bias if selection on unobservables were only 8 percent as strong as selection on observables.

Finally, owing to the frequency with which RTC laws are associated with statistically significant increases in aggravated assault rates, we analyze the results of the Altonji test when using the ADZ preferred specification (Table 8a) and aggravated assaults as the relevant dependent variables. The coefficient associated with this model is .080334, with a potential bias of -.07211. Thus, our results again suggest that selection on observables and unobservables would have to be biased in opposite directions to eliminate our estimated effect of RTC laws on aggravated assault. This strongly suggests that our finding that RTC laws increase aggravated assaults is, if anything, biased toward zero.

Appendix G – Summarizing Changes to Our RTC Dates

In this appendix, we detail all of the changes that we have made to the years when RTC laws took effect. As noted in Footnote 3 and Footnote 17, the most recent version of our analysis includes a change in how the RTC dummy was defined. Whereas in earlier work, we modeled RTC laws on the assumption that their impact would take effect only during the first full year after they were passed, we now assume that they take effect immediately after they are actually implemented.

Missouri: While the state’s right-to-carry law was originally intended to take effect in 2003 (the date that we used in earlier versions of this paper), a legal challenge based on the state’s constitution prevented the law from taking effect until February 26, 2004. For this reason, we use the date that the law’s legal challenges were dismissed rather than the statutory date that the law was originally intended to take effect as its effective date.

New Mexico & Oklahoma: This law passed in 2003 but took effect January 1st, 2004. For this reason, while the initial year of the law switches from 2003 to 2004 in our most recent version of the paper, New Mexico’s RTC dummy does not change after this revision. Similarly, Oklahoma’s RTC law passed in 1995 (our passage year) but took effect January 1st, 1996 (our new effective date).

South Dakota: Earlier versions of this paper inaccurately identified the state’s 1986 legislation modifying its concealed carry laws as making the state “shall issue,” but a careful re-examination of the details of this statute reveals that the state’s 1985 legislation is a more appropriate candidate.

Tennessee: While we earlier identified the state's 1994 law as making the state's concealed carry permitting system "shall issue," this law continued to allow sheriffs to deny permits "for good cause and in the exercise of reasonable discretion" without precisely defining what "good cause" entails. For this reason, we now use the state's 1996 law (which took effect the same year) as the basis for determining the effective date of the state's RTC status.

Texas: Texas's RTC law passed in 1995 and took effect that same year, but the state's statute specifies that permits (even those issued in 1995) are not supposed to have legal backing before January 1st, 1996. For this reason, while our original passage year for RTC legislation was 1995, our new effective date for this legislation is actually in 1996.

Virginia: Virginia's RTC law has undergone so many changes that it is difficult to say which one eliminated discretion in the issuance of permits. While our earlier analysis used the state's 1988 revisions as the proper year for this transition, our decision to use this date was based on the date used in Lott (2000), which was based on research by Cramer and Kopel (1995). Surprisingly, the language that he identified as coming from the state's 1988 law was actually introduced in earlier legislation passed in 1986, so we accordingly changed our chosen effective date from 1988 to the effective date of this 1986 law.

EXHIBIT 58

1

Firearms and Violent Death in the United States

Matthew Miller, Deborah Azrael,
and David Hemenway

Firearm-Related Deaths in the United States

In 2010, there were more than 31,000 firearm deaths in the United States: 62% were suicides, 36% were homicides, and 2% were unintentional (2%) (CDC 2012a). Almost as many Americans die from gunfire as die from motor vehicle crashes (almost 34,000 in 2010). Americans under age 40 are more likely to die from gunfire than from any specific disease (CDC 2012a).

Homicide

The United States is not a more violent country than other high-income nations. Our rates of car theft, burglary, robbery, sexual assault, and aggravated assault are similar to those of other high-income countries (van Kesteren, Mayhew, and Nieuwebeerta 2001); our adolescent fighting rates are also similar (Pickett

Matthew Miller, MD, ScD, MPH, is deputy director of the Harvard Injury Control Research Center and associate professor of Injury Prevention and Health Policy at the Harvard School of Public Health. Deborah Azrael, PhD, has been a member of the firearms research group at the Harvard School of Public Health for more than 20 years. David Hemenway, PhD, is an economist and professor at the Harvard School of Public Health and director of the Harvard Injury Control Research Center.

4 *Matthew Miller, Deborah Azrael, and David Hemenway*

Table 1.1 Homicide, suicide, and unintentional gun deaths among 5–14 year olds: The United States versus 25 other high-income populous countries (early 2003)

	Mortality rate ratio
Homicides	
Gun homicides	13.2
Non-gun homicides	1.7
Total	3.4
Suicides	
Gun suicides	7.8
Non-gun suicides	1.3
Total	1.7
Unintentional firearm deaths	10.3

Source: Richardson and Hemenway 2011

et al. 2013). However, when Americans are violent, the injuries that result are more likely to prove fatal. For example, the U.S. rate of firearm homicide for children 5 to 14 years of age is thirteen times higher than the firearms homicide rate of other developed nations, and the rate of homicide overall is more than three times higher (Table 1.1).

U.S. homicide rates vary cyclically over time. Current rates are at a 30-year low, but as recently as 1991 rates were nearly twice as high (CDC 2012a). Changes in homicide rates over the past several decades are largely attributable to changes in firearm homicide rates, mostly driven by changes in firearm homicide rates among adolescent and young men in large cities (Hepburn and Hemenway 2004, Blumstein and Wallman 2000, Cork 1999, Cook and John 2002).¹

The U.S. homicide rate is much higher in urban than in rural areas, as are rates of all violent crime. Nine out of ten homicide offenders are male, and 75% of victims are male. African Americans are disproportionately represented among both perpetrators and victims.²

Suicide

Compared with other high-income countries, the U.S. adult suicide rate falls roughly in the middle. Among younger persons, however, our suicide mortality is relatively high: for children under 15 years of age, the overall suicide

1

Firearms and Violent Death in the United States

Matthew Miller, Deborah Azrael,
and David Hemenway

Firearm-Related Deaths in the United States

In 2010, there were more than 31,000 firearm deaths in the United States: 62% were suicides, 36% were homicides, and 2% were unintentional (2%) (CDC 2012a). Almost as many Americans die from gunfire as die from motor vehicle crashes (almost 34,000 in 2010). Americans under age 40 are more likely to die from gunfire than from any specific disease (CDC 2012a).

Homicide

The United States is not a more violent country than other high-income nations. Our rates of car theft, burglary, robbery, sexual assault, and aggravated assault are similar to those of other high-income countries (van Kesteren, Mayhew, and Nieuwebeerta 2001); our adolescent fighting rates are also similar (Pickett

Matthew Miller, MD, ScD, MPH, is deputy director of the Harvard Injury Control Research Center and associate professor of Injury Prevention and Health Policy at the Harvard School of Public Health. Deborah Azrael, PhD, has been a member of the firearms research group at the Harvard School of Public Health for more than 20 years. David Hemenway, PhD, is an economist and professor at the Harvard School of Public Health and director of the Harvard Injury Control Research Center.

Table 1.1 Homicide, suicide, and unintentional gun deaths among 5–14 year olds: The United States versus 25 other high-income populous countries (early 2003)

	Mortality rate ratio
Homicides	
Gun homicides	13.2
Non-gun homicides	1.7
Total	3.4
Suicides	
Gun suicides	7.8
Non-gun suicides	1.3
Total	1.7
Unintentional firearm deaths	10.3

Source: Richardson and Hemenway 2011

et al. 2013). However, when Americans are violent, the injuries that result are more likely to prove fatal. For example, the U.S. rate of firearm homicide for children 5 to 14 years of age is thirteen times higher than the firearms homicide rate of other developed nations, and the rate of homicide overall is more than three times higher (Table 1.1).

U.S. homicide rates vary cyclically over time. Current rates are at a 30-year low, but as recently as 1991 rates were nearly twice as high (CDC 2012a). Changes in homicide rates over the past several decades are largely attributable to changes in firearm homicide rates, mostly driven by changes in firearm homicide rates among adolescent and young men in large cities (Hepburn and Hemenway 2004, Blumstein and Wallman 2000, Cork 1999, Cook and John 2002).¹

The U.S. homicide rate is much higher in urban than in rural areas, as are rates of all violent crime. Nine out of ten homicide offenders are male, and 75% of victims are male. African Americans are disproportionately represented among both perpetrators and victims.²

Suicide

Compared with other high-income countries, the U.S. adult suicide rate falls roughly in the middle. Among younger persons, however, our suicide mortality is relatively high: for children under 15 years of age, the overall suicide

rate in the United States is 1.6 times that of the average of other high-income countries, largely accounted for by a firearm suicide rate eight times that of the average of these countries (Richardson and Hemenway 2011).

Over the past several decades, suicide rates have been more stable than have rates of homicide (Miller, Azrael, and Barber 2012). Nevertheless, after declining from a peak of 12.9/100,000 in 1986 to 10.4 in 2000, driven largely by a decline in the rate of firearm suicide, the suicide rate has increased over the past decade to 12.4/100,000 in 2010, mostly due to an increase in suicide by hanging (Miller, Azrael, and Barber 2012, CDC 2012a).

Age, sex, race, and other demographic characteristics—including marital status, income, educational attainment, and employment status—all influence suicide mortality (Nock et al. 2008). Suicide rates are higher, for example, for white and Native Americans than for black, Hispanic, and Asian Americans (CDC 2007). A consistent finding across numerous studies is that the strongest individual-level risk factor for a fatal suicidal act is having previously attempted suicide; other strong risk factors include psychiatric and substance abuse disorders (Shaffer et al. 1996).

In contrast to homicide rates, suicide rates are higher in rural than in urban areas almost entirely due to higher rates of firearm suicide in rural areas.

Unintentional Firearm Deaths

Approximately 675 Americans per year were killed unintentionally with firearms between 2001 and 2010 (CDC 2007). Data from the National Violent Death Reporting System show that two-thirds of the accidental shooting deaths occurred in someone's home, about half of the victims were younger than 25 years, and half of all deaths were other-inflicted. In other-inflicted shootings, the victim was typically shot accidentally by a friend or family member—often an older brother (Hemenway, Barber, and Miller 2010).

Firearm Ownership in the United States

The United States has more private guns per capita (particularly more handguns) and higher levels of household gun ownership than other developed countries (Killias 1993, SAS 2007).

Most of what we know about gun ownership levels in the United States over the past several decades comes from the General Social Survey (GSS 2010),

6 *Matthew Miller, Deborah Azrael, and David Hemenway*

a relatively small biannual survey of U.S. adults. Data from the GSS show that the percentage of households with firearms has fallen from approximately 50% in the late 1970s to 33% today. Changing household demographics are believed to explain the decline in the household ownership of guns chiefly due to a fall in the number of households with an adult male (Smith 2000). Notably, however, the percentage of individuals owning firearms has remained relatively constant over the past several decades (GSS 2010).

The GSS does not speak to the number of guns in civilian hands or the distribution of guns within households. For this information, researchers have turned to data from two medium-sized national surveys conducted a decade apart. These surveys suggest that the number of guns in civilian hands grew from approximately 200 million in 1994 to 300 million in 2004—and that the average gun owner now owns more guns than previously (Hepburn et al. 2007, Cook and Ludwig 1997).

Compared with other Americans, gun owners are disproportionately male, married, older than 40, and more likely to live in nonurban areas. Their long guns (rifles, shotguns) are owned mainly for sport (hunting and target shooting). People who own only handguns typically own the guns for protection against crime (Hepburn et al. 2007, Cook 1979).

In 2001, 2002, and 2004, but not before or since, information on household gun ownership from the General Social Survey was supplemented by information from the National Behavioral Risk Factor Surveillance System (CDC 1997). The BRFSS is of sufficient size (more than 200,000 respondents annually) that household gun ownership could, for the first time, be determined at the state level for all 50 states and for some Metropolitan Statistical Areas.

Prior to these three iterations of the BRFSS, researchers generally used proxies to measure firearm ownership rates at the state and sub-state level. A validation study by Azrael, Philip, and Miller (2004) found that from among all proxies, the fraction of suicides that are committed with firearms (FS/S) correlates most strongly and consistently with cross-sectional survey-based measures of household firearm ownership at the county, state, and regional levels.

Household firearm ownership is probably a good measure of the accessibility of guns used in suicides, since most suicides involving firearms occur in the home (Kellermann et al. 1992, CDC 2012b) and involve a firearm owned by a member of the household (Kellermann et al. 1992). Household gun owner-

ship levels seem also to be the key exposure variable for firearm homicides that take place in the home, where women, children and older adults are particularly likely to be killed. The most common perpetrator in such instances is a family member (CDC 2012b). By contrast, older adolescent and young adult males are more often killed outside the home by guns owned by a non-family member.³

In this essay, we focus on studies that assess the relationship between gun prevalence and violent death. As such, the essay does not examine studies of gun carrying nor any literature on illegal gun markets. It also does not address research that investigates the relationship between firearm regulations and violent death. Note, however, that firearm prevalence and firearm regulation are highly collinear. Strong regulations may limit firearm ownership, and low levels of firearm ownership make it easier to pass stronger regulations.

This essay is also not an exhaustive review of the literature examining the association of firearm availability and violent death. (For more comprehensive reviews, see Hepburn and Hemenway 2004, Miller and Hemenway 1999, and Brent 2001.) Rather, it briefly summarizes (a) international ecologic studies comparing the United States to other countries, (b) ecologic studies of U.S. regions, states, and metropolitan areas, and (c) individual case-control and cohort studies.

Studies included in this brief review met a minimal threshold of attempting to control for important confounders: studies had to compare likes to likes. For case-control studies of homicide, that means—at a minimum—controlling for age, gender, and neighborhood; in suicide studies, for age, sex, and psychiatric risk factors for suicidal behavior. For international studies of homicide, it means comparing high-income countries to high-income countries. International comparisons of adult suicide rates are confounded by large differences in religion, culture and recording practices (i.e., the social meaning and cultural acceptance of adult suicide), as evidenced by tenfold differences in suicide rates across high-income nations. Thus, the only international studies of suicide included focus on the suicides of children—which all countries hold to be tragedies. For ecologic studies in the United States, making “like to like” comparisons means comparing states to states with similar levels of urbanization (or, for homicide, similar crime rates), cities to cities, and rural areas to rural areas.⁴

Firearms and Homicide

Ecologic Studies

Killias (1993) evaluated rates of violence in 14 developed countries: 11 in Europe, along with the United States, Canada, and Australia. He used data from the 1989 International Crime Survey, a telephone survey of 14 countries and 28,000 respondents, to measure firearm prevalence. Respondents were asked whether there were any firearms in their household and, if so, whether any were a handgun or a long gun. Military firearms were excluded. In this study, which did not include control variables, rates of firearm ownership and homicide were positively correlated, while rates of firearm ownership and non-firearm homicide were not.

A study by Hemenway and Miller (2000) included 26 high-income nations with populations greater than one million. To measure gun availability, the authors used two proxies, including FS/S. No control variables were included in the analysis. Firearm availability was strongly and significantly associated with homicide across the 26 countries.

A follow-up study (Hemenway, Shinoda-Tagawa, and Miller 2002) examined homicide rates among women across high-income countries. The validated proxy (FS/S, or the percentage of suicides committed with a firearm) was used to estimate firearm ownership in each country. Urbanization and income inequality were included as control variables. The United States accounted for 70% of all female homicide victims in the study and had the highest firearm ownership rates. The U.S. homicide rate for women was five times higher than that of all of the other countries combined; its female firearm homicide rate was eleven times higher.

U.S. Studies

Cook (1979) conducted a cross-sectional analysis of 50 large cities in the United States to explore the relationship between gun availability and robbery, including robbery-murder. Using data on the number of robberies in 1975, Cook examined how firearm availability (as proxied by Cook's index) was related to robbery and robbery-murder rates, controlling for measures of the effectiveness of the criminal justice system, population density, and other regional and state differences. Increased gun availability was not associated with overall robbery rates, but it was positively associated with the proportion of robber-

ies that involved a gun—and with the per capita robbery-murder rate, through an increased rate of gun robbery.

Miller et al. (2002) evaluated the relationship between levels of firearm ownership at the state and regional level and the incidence of homicide from 1988 to 1997 for 50 states and 9 regions. At the state level, they used the percentage of suicides with a firearm as a proxy for ownership and they measured gun availability at the regional level with data from the GSS. Five potential confounders were included: poverty, urbanization, unemployment, alcohol consumption, and (non-homicide) violent crime rates. In the multivariate analyses, a positive and significant association between gun ownership and homicide rates was found for the entire population and for every age group (except ages 0–4), primarily due to higher firearm homicide rates.

A similar study (Miller et al. 2007) used survey estimates of household gun ownership for each state from the Behavioral Risk Factor Surveillance System. It examined data from 2001 to 2003 and controlled for state-level rates of aggravated assault, robbery, unemployment, urbanization, alcohol consumption, poverty, income inequality, the percentage of the population that was black, and the percentage of families headed by a single female parent. Again, states with higher rates of household firearm ownership had significantly higher homicide victimization rates for men, for women, and for children. The association was driven by gun-related homicide victimization rates; non-gun-related victimization rates were not significantly associated with rates of firearm ownership.

Individual Level Studies

Ecologic studies provide evidence about whether more guns in the community are associated with more homicides in the community. Case-control and cohort studies provide data more germane to the question of whether a gun in the home increases or reduces the risk of homicide victimization for members of the household.

Kellermann et al. examined approximately 400 homicide victims from three metropolitan areas who were killed in their homes (Kellermann et al. 1993). All died from gunshot wounds. In 83% of the homicides, the perpetrator was identified; among these cases, 95% of the time, the perpetrator was not a stranger. In only 14% of all the cases was there evidence of forced entry. After controlling for illicit drug use, fights, arrests, living alone, and whether the home was rented,

10 *Matthew Miller, Deborah Azrael, and David Hemenway*

Table 12 NVDRS 2005–2010

	Firearm			Non-firearm		
	<i>N</i>	Occurred in a house/apt	Occurred at victim's residence	<i>N</i>	Occurred in a house/apt	Occurred at victim's residence
Homicides by age group						
0–4 yrs	81	75%	67%	1,025	90%	77%
5–14 yrs	257	72%	51%	205	78%	67%
15–24 yrs	5,679	37%	16%	1,385	47%	27%
25–34 yrs	4,906	44%	24%	1,479	56%	39%
35–64 yrs	5,003	56%	41%	3,716	62%	50%
65+ yrs	470	74%	69%	719	79%	76%
Suicides by age group						
0–4 yrs	—			—		
5–14 yrs	105	97%	88%	301	91%	88%
15–24 yrs	3,332	75%	64%	3,769	69%	65%
25–34 yrs	4,034	76%	67%	4,743	70%	65%
35–64 yrs	15,634	78%	74%	16,568	72%	70%
65+ yrs	6,019	89%	88%	2,168	80%	83%

Note: Unknowns for age (0.7%), house/apt (1.4%), home (3.6%) were set aside.

the presence of a gun in the home remained strongly associated with an increased risk for homicide in the home. Gun ownership was most strongly associated with an increased risk of homicide by a family member or intimate acquaintance.⁵

Whereas most men are murdered away from home, most children, older adults, and women are murdered at home (Table 1.2). A gun in the home is a particularly strong risk factor for female homicide victimization—with the greatest danger for women coming from their intimate partners.

The heightened risk of femicide is illustrated in a subgroup analysis of female homicide victimization from Kellermann's 1993 case-control study of homicide in the home. A spouse, a lover, or a close relative murdered most of the women decedents, and the increased risk for homicide from having a gun in the home was attributable to these homicides (Bailey, Flewelling, and Rosenbaum 1997). A case-control study by Wiebe et al. (2003) also found that the risk of homicide associated with living in a home with guns was particularly high for women (who were almost three times more likely to become homicide victims compared with women living in homes without guns). Here too, a gun in the home was a risk factor for homicide by firearm but not for homicide by other means.

Other case-control studies have also found that a gun in the home is a risk for homicide in the home, with especially heightened risk for women (Cummings et al. 1997, Dahlberg, Ikeda, and Kresnow 2004). Results from perpetrator-based case-control homicide studies also find that gun ownership is a risk for homicide perpetration. For example, a study of women murdered by intimate partners found that compared with a control group of living battered women, a gun in the house was present for 65% of perpetrators of murder versus 24% of perpetrators of nonfatal abuse. Access to a firearm by the battered woman had no protective effect (Campbell et al. 2003).

Cohort Studies

There are no studies that follow a large cohort of individuals with known characteristics, comparing homicide victimization rates of those with a gun in the home and those without.

Firearm Prevalence and Suicide

Firearm suicide rates and overall suicide rates in the United States are higher where guns are more prevalent (Miller, Hemenway, and Azrael 2007, Kubrin and Wadsworth 2009). By contrast, rates of suicide by methods other than firearms are not significantly correlated with rates of household firearm ownership (Miller, Hemenway, and Azrael 2007). This pattern has been reported in ecologic studies that have adjusted for several potential confounders, including measures of psychological distress, alcohol and illicit drug use and abuse, poverty, education, and unemployment (Miller, Azrael, and Barber 2012, Miller, Hemenway, and Azrael 2007).

Household firearm ownership has also been consistently found to be a strong predictor of suicide risk in studies that examined individual-level data. U.S. case-control studies find that the presence of a gun in the home or purchase from a licensed dealer is a risk factor for suicide (Bailey et al. 1997, Brent et al. 1993, Brent et al. 1994, Brent et al. 1991, Brent et al. 1988, Conwell et al. 2002, Cummings et al. 1997, Kellermann et al. 1992, Grassel et al. 2003, Kung, Pearson, and Lui 2003, Wiebe 2003). The relative risk is large (two- to tenfold), depending on the age group and, for younger persons, how firearms in the home are stored (Miller and Hemenway 1999, Brent et al. 1991, Kellermann et al. 1992).

The only large U.S. cohort study to examine the firearm–suicide connection found that suicide rates among California residents who purchased handguns

12 *Matthew Miller, Deborah Azrael, and David Hemenway*

from licensed dealers were more than twice as likely to die by suicide as were age/sex matched members of the general population, not only immediately after the purchase but throughout the six-year study period (Wintemute et al. 1999). Here, too, the increase in suicide risk was attributable entirely to an excess risk of suicide with a firearm (Wintemute et al. 1999).

Drawing causal inferences about the relation between firearm availability and the risk of suicide from existing case-control and ecologic studies has been questioned on the grounds that these studies may not adequately control for the possibility that members of households with firearms are inherently more suicidal than members of households without firearms (NRC 2005). Additional cited limitations include the possibility of differential recall (by cases compared with controls) of firearm ownership and comorbid conditions, and reverse causation (whereby suicidal persons purchase firearms with the idea of committing suicide).

It is very unlikely, however, that the strong association between firearms and suicide reported consistently in U.S. studies is either spurious or substantially overstated. First, individual-level studies have often controlled for measures of psychopathology (Bailey et al. 1997, Brent et al. 1994, Brent et al. 1993, Brent et al. 1988, Conwell et al. 2002, Cummings et al. 1997, Kellermann et al. 1992, Wiebe 2003).

Second, directly answering the reverse causation critique, the risk of suicide associated with a household firearm pertains not only to gun owners but to *all* household members (Cummings et al. 1997, Kellermann et al. 1992, Wintemute et al. 1999); the relative risk is larger for adolescents than for the gun owner; and for the gun owner the risk persists for years after firearms are purchased (Cummings et al. 1997, Kellermann et al. 1992, Wintemute et al. 1999).

Third, studies that have examined whether people who live in homes with guns have higher rates of psychiatric illness, substance abuse, or other known suicide risk factors generally fail to find any indication of heightened risk (Oslin et al. 2004, Kolla, O' Connor, and Lineberry 2011). For example, four case-control studies found comparable rates of psychiatric illness and psychosocial distress among households with versus without firearms (Kellermann et al. 1992, Ilgen et al. 2008, Miller et al. 2009, Sorenson and Vittes 2008, Betz, Barber, and Miller 2011).

Fourth, there appears to be a hierarchy of suicide risk among children and young adults, depending on how securely household firearms are stored, suggesting a dose-response relationship (Grossman et al. 2005).

Finally, the consistency in magnitude, direction, and specificity of method-related risk observed in both the many individual-level and ecologic studies (the latter not being subject to recall bias or the reverse causation criticism) leads to only one conclusion: a gun in the home increases the likelihood that a family member will die from suicide.

Unintentional Firearm Deaths

Not surprisingly, ecologic and case-control studies find that where there are more guns and more guns poorly stored, there are more unintentional firearm deaths (Miller, Azrael, and Hemenway 2001, Wiebe 2003, Grossman et al. 2005). U.S. children aged 5 to 14 have eleven times the likelihood of being killed accidentally with a gun compared with similarly aged children in other developed countries (Table 1.2) (Richardson and Hemenway 2011).

Conclusion

The United States, with its many guns and highly permissive gun laws, faces a far more serious problem of lethal firearms violence than other high-income nations. The relative magnitude of our problem is illustrated in Table 1.1. This table, which compares U.S. children aged 5–14 with children of other developed countries, illustrates the stark fact that U.S. children are *thirteen* times more likely to die from a firearm homicide and *eight* times more likely to die of a firearm suicide than children in comparable developed nations. There is no evidence that U.S. children are more careless, suicidal, or violent than children in other high-income nations. Rather, what distinguishes children in the United States from children in the rest of the developed world is the simple, devastating fact that they die—mostly by firearms—at far higher rates.

Within the United States itself, the evidence is similarly compelling: where there are more guns, there are more violent deaths—indeed, many more. The magnitude of this relationship is illustrated in Table 1.3, which compares the number of lives lost between 2001 and 2007 to homicide, suicide, and unintentional firearm accidents by sex and age groups in states with the highest compared with the lowest gun ownership rates. The consistency of findings across different populations, using different study designs, and by different researchers is striking. No credible evidence suggests otherwise.

Table 13 Violent deaths in states with the highest versus lowest gun ownership levels
(BRFSS 2004); Mortality Data WISQARS 1999–2007

	High-gun states ^a	Low-gun states ^b	Ratio
Aggregate population of adults, 2001–2007	356 million	358 million	1.0
Proportion of households with firearms	50%	15%	3.3
Percentage of adult population reporting depression, past 12 months (NSDUH 2008–2009)	3.7%	3.7%	1.0
Percentage of adult population reporting suicidal ideation, past 12 months (NSDUH 2008–2009)	6.6%	6.5%	1.0
Number of nonlethal violent crimes in 2010 (UCR 2010)	165,739	148,287	1.1
Suicide			
Women			
Firearm suicide	4,148	563	7.4
Non-firearm suicide	4,633	4,575	1.0
Total suicide	8,781	5,138	1.7
Men			
Firearm suicide	26,314	7,163	3.7
Non-firearm suicide	11,592	12,377	0.9
Total suicide	37,906	19,540	1.9
Men ages 15–29			
Firearm suicide	5,803	1,308	4.4
Non-firearm suicide	3,192	2,671	1.2
Total suicide	8,995	3,979	2.2
5–14 year olds			
Firearm suicide	166	15	11.1
Non-firearm suicide	225	154	1.5
Total suicide	391	169	2.3
Adults 65+ years old			
Firearm suicide	6,374	1,714	3.7
Non-firearm suicide	1,182	2,270	0.5
Total suicide	7,556	3,984	1.9
Homicide			
Men			
Firearm homicide	13,755	7,799	1.8
Non-firearm homicide	5,031	3,963	1.3
Total homicide	18,786	11,762	1.6
Women			
Firearm homicide	3,165	998	3.2
Non-firearm homicide	2,855	2,132	1.3
Total homicide	6,020	3,130	1.9

Table 13 (Continued)

	High-gun states ^a	Low-gun states ^b	Ratio
5–14 year olds			
Firearm homicide	259	100	2.6
Non-firearm homicide	212	169	1.3
Total homicide	471	269	1.8
Men 15–29			
Firearm homicide	6,971	4,900	1.4
Non-firearm homicide	1,187	1,334	0.9
Total homicide	8,158	6,234	1.3
Adults 65+ years old			
Firearm homicide	620	139	4.5
Non-firearm homicide	794	534	1.5
Total homicide	1,414	673	2.1
Unintentional firearm deaths	109	677	6.2

Note: All data are from 1999–2007 because cell counts were suppressed beginning in 2008; terrorism-related homicides are not counted.

^aLouisiana, Utah, Oklahoma, Iowa, Tennessee, Kentucky, Alabama, Mississippi, Idaho, North Dakota, West Virginia, Arkansas, Alaska, South Dakota, Montana, Wyoming

^bHawaii, New Jersey, Massachusetts, Rhode Island, Connecticut, New York

Firearm policy is often focused on guns used in crime. What is notable about the studies reviewed here, however, is the consistency of the story they tell about *all* firearms—not just those used in crime. In the United States, there are more firearm suicides than firearm homicides, and women, children, and older adults are more likely to die by gunfire from a household gun (typically, legally acquired and possessed) than from illegal guns.

The first step in ameliorating a public health problem is to identify what the problem is. For the purposes of this essay, the problem is that, year after year, many more Americans are dying by gunfire than people in any other high-income nation. Good firearm policy has the potential to reduce the toll of lethal firearm violence in the United States. Efforts to reduce this uniquely American problem will, however, be less effective than they could be if good policy is not accompanied by a shift in the kind of discussions politicians, academicians, and citizens engage in about firearms. Science can provide the content—and better science based on better data, better content. The best chance for durable and large-scale reductions in lethal violence in the United States is for all of us to commit to keeping the conversation about the costs and benefits of guns in American society civil, ongoing, and factually grounded.

Acknowledgments

The text, but not the figures reported, in this essay draw in part on prior reviews written previously by the authors, often supported by the Joyce Foundation.

Notes

1. Researchers attribute the decline in the 1990s to different causes, including reduced unemployment, increased policing, and a decline in and stabilization of illegal drug markets (Wintemute 2000). Declines in the last decade have not yet been well explained.

2. Homicide rates have been consistently higher in the southern and western regions of the United States. This is especially true for firearm homicides (CDC 2012a).

3. Measuring the availability of guns in the context of these homicides is more problematic, not least because researchers (Webster, Vernick, and Hepburn 2001, MAIG 2008) have shown that guns involved in these deaths often move across state lines from states with permissive gun laws to states with fewer guns and stronger laws.

4. Studies included in this review were those previously included in review articles by two of the authors, updated to include new articles meeting the criteria specified in these reviews which have appeared in the research literature since the time those review papers were published.

5. The study did not provide evidence about whether a gun from the home was used in any of the homicides. However, the idea that a gun in the home increased the risk of death was supported by several observations. First, the link between gun ownership and homicide was due entirely to a strong association between gun ownership and homicide by firearm; homicide by other means was not significantly linked to having a gun in the home. Second, gun ownership was most strongly associated with homicide at the hands of a family member or intimate acquaintance (i.e., guns were not significantly linked to an increased risk of homicide by non-intimate friends, unidentified persons, or strangers). Third, there was no evidence of a protective effect of keeping a gun in the home—even in the small subgroup of cases that involved forced entry.

References

- Azrael, D., J. C. Philip, and M. Miller. 2004. "State and local prevalence of firearms ownership measurement, structure, and trends." *Journal of Quantitative Criminology* 20 (1):43–62.
- Bailey, S., R. Flewelling, and D. Rosenbaum. 1997. "Characteristics of students who bring weapons to school." *Journal of Adolescent Health* 20 (4):261–270.
- Bailey, J. E., A. L. Kellerman, G. Somes, J. G. Banton, F. Rivara, and N. B. Rushforth. 1997. "Risk factors for violent death of women in the home." *Archives of Internal Medicine* 157 (7):777–782.

- Betz, M. E., C. Barber, and M. Miller. 2011. "Suicidal behavior and firearm access: Results from the second injury control and risk survey." *Suicide and Life-Threatening Behavior* 41 (4):384–391.
- Blumstein, A., and J. Wallman. 2000. *The crime drop in America*. New York: Cambridge University Press.
- Brent D. A. 2001. "Firearms and suicide." *Ann. N. Y. Acad. Sci.* 932:225–39.
- Brent, D. A., et al. 1988. "Risk factors for adolescent suicide: A comparison of adolescent suicide victims with suicidal inpatients." *Archives of General Psychiatry* 45 (6):581–588.
- Brent, D. A., J. A. Perper, C. J. Allman, G. Moritz, M. E. Wartella, and J. P. Zelenak. 1991. "The presence and accessibility of firearms in the homes of adolescent suicides: A case-control study." *JAMA* 266 (21):2989–2995.
- Brent, D. A., J. A. Perper, G. Moritz, M. Baugher, J. Schweers, and C. Roth. 1994. "Suicide in affectively ill adolescents: A case-control study." *Journal of Effective Disorders* 31 (3):193–202.
- Brent, D. A., J. A. Perper, G. Moritz, M. Baugher, J. Schweers, and C. Roth. 1993. "Firearms and adolescent suicide: A community case-control study." *American Journal of Diseases of Children* 147 (10):1066–1071.
- Campbell, J. C., D. Webster, J. Koziol-McLain, C. Block, D. Campbell, et al. 2003. "Risk factors for femicide in abusive relationships: Results from a multisite case control study." *American Journal of Public Health* 93 (7):1089–1097.
- CDC. 1997. Rates of homicide, suicide, and firearm-related death among children—26 industrialized countries. In *Morbidity and Mortality Weekly Report*. Centers for Disease Control and Prevention.
- CDC. 2007. Centers for Disease Control WISQARS injury mortality report. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.
- CDC. 2012a. Centers for Disease Control and Prevention, National Center for Health Statistics: Compressed Mortality File 1999–2009. Edited by CDC. CDC WONDER Online Database, compiled from Compressed Mortality File 1999–2009.
- CDC. 2012b. Surveillance for violent deaths—National Violent Death Reporting System, 18 states, 2012. Centers for Disease Control and Prevention.
- Conwell, Y., P. R. Duberstein, K. Connor, S. Eberly, C. Cox, and E. D. Caine. 2002. "Access to firearms and risk for suicide in middle-aged and older adults." *American Journal of Geriatric Psychiatry* 10 (4):407–416.
- Cook, P. J. 1979. "The effect of gun availability on robbery and robbery murder." In *Policy studies review annual*, edited by R. H. Haveman and B. B. Zellner, 743–781. Beverly Hills, CA: Sage.
- Cook, P. J., and H. L. John. 2002. "After the epidemic: Recent trends in youth violence in the United States" In *Crime and justice: A review of research*, ed. Michael Tonry, 117–153. Chicago: University of Chicago Press.
- Cook, P. J., and J. Ludwig. 1997. *Guns in America: National survey on private ownership and use of firearms* (NCJ 1654476). Washington, DC: U.S. Department of Justice.
- Cork, D. 1999. "Examining time-space interaction in city-level homicide data: Crack markets and the diffusion of guns among youth." *Journal of Quantitative Criminology* 15 (4):379–406.

18 Matthew Miller, Deborah Azrael, and David Hemenway

- Cummings, P., T. D. Koepsell, D. C. Grossman, J. Savarino, and R. S. Thompson. 1997. "The association between the purchase of a handgun and homicide or suicide." *American Journal of Public Health* 87 (6):974–978.
- Dahlberg, L. L., R. M. Ikeda, and M. J. Kresnow. 2004. "Guns in the home and risk of a violent death in the home: Findings from a national study." *American Journal of Epidemiology* 160 (10):974–978.
- Grassel, K. M., G. J. Wintemute, M. A. Wright, and M. P. Romero. 2003. "Association between handgun purchase and mortality from firearm injury." *Injury Prevention* 9:48–52.
- Grossman, D. C., B. A. Mueller, C. Riedy, M. D. Dowd, A. Villaveces, J. Prodzinski, J. Nakagawara, J. Howard, N. Thiersch, and R. Harruff. 2005. "Gun storage practices and rise of youth suicide and unintentional firearm Injuries." *JAMA* 293 (6):707–714.
- GSS. 2010. "General Social Survey."
- Hemenway, D., C. Barber, and M. Miller. 2010. "Unintentional firearm deaths: A comparison of other-inflicted and self-inflicted shootings." *Accident Analysis and Prevention* 42 (2):1184–1188.
- Hemenway, D., & Miller, M. (2000). "Firearm availability and homicide rates across 26 high-income countries." *Journal of Trauma, Injury, Infection, and Critical Care*, 49(6), 985–988.
- Hemenway, D., T. Shinoda-Tagawa, and M. Miller. 2002. "Firearm availability and female homicide victimization rates among 25 populous high-income countries." *Journal of the American Medical Women's Association* 57:1–5.
- Hepburn, M., M. Miller, D. Azrael, and D. Hemenway. 2007. "The US gun stock: results from the 2004 national firearms survey." *Injury Prevention* 13:15–19.
- Hepburn, L. M., and D. Hemenway. 2004. "Firearm availability and homicide: A review of the literature." *Aggression and Violent Behavior* 9:417–440.
- Ilgen, M. A., K. Zivin, R. J. McCammon, and M. Valenstein. 2008. "Mental illness, previous suicidality, and access to guns in the United States." *Psychiatric Services* no. 59 (2):198–200.
- Kellermann, A. L., and F. P. Rivara. 2012. "Silencing the Science on Gun Research." *JAMA* ():1–2. doi: 10.1001/jama.2012.208207.
- Kellermann, A. L., F. Rivara, N. B. Rushforth, J. Banton, D. T. Reav, J. Francisco, A. B. Locci, J. Prodzinski, B. B. Hackman, and G. Somes. 1993. "Gun ownership as a risk factor for homicide in the home." *New England Journal of Medicine* 329 (15):1084–1091.
- Kellermann, A. L., F. P. Rivara, G. Somes, D. T. Reay, J. Francisco, J. Banton, J. Prodzinski, C. Fligner, and B. B. Hackman. 1992. "Suicide in the home in relation to gun ownership." *New England Journal of Medicine* 327 (7):467–472.
- Killias, M. 1993. "International correlations between gun ownership and rates of homicide and suicide." *Canadian Medical Association Journal* 148 (10):1721–1725.
- Kolla, B. P., S. S. O' Connor, and T.W. Lineberry. 2011. "The base rates and factors associated with reported access to firearms in psychiatric inpatients." *General Hospital Psychiatry* 33 (2):191–196.
- Kubrin, C. E., and T. Wadsworth. 2009. "Explaining suicide among blacks and whites: How socio-economic factors and gun availability affect race-specific suicide rates." *Social Science Quarterly* (90):1203–1227.

- Kung, H. C., J. L. Pearson, and X. Lui. 2003. "Risk factors for male and female suicide decedents ages 15–64 in the United States: Results from the 1993 National Mortality Followback Survey." *Social Psychiatry and Psychiatric Epidemiology* 39 (8):419–426.
- MAIG (Mayors Against Illegal Guns). 2008. The movement against illegal guns in America.
- Miller, M., D. Azrael, and C. Barber. 2012. "Suicide mortality in the United States: the importance of attending to method in understanding population-level disparities in the burden of suicide." *Annual Review of Public Health* 33:393–408.
- Miller, M., D. Azrael, and D. Hemenway. 2001. "Firearm availability and unintentional firearm deaths." *Accident Analysis and Prevention* 33 (4):447–484.
- Miller, M., C. Barber, D. Azrael, D. Hemenway, and B. E. Molnar. 2009. "Recent psychopathology, suicidal thoughts and suicide attempts in households with and without firearms: Findings from the National Comorbidity Study Replication." *Injury Prevention* 15 (3):183–187.
- Miller, M., and D. Hemenway. 1999. "The relationship between firearms and suicide: A review of the literature." *Aggression and Violent Behavior* 4 (1):59–75.
- Miller, M., D. Hemenway, and D. Azrael. 2007. "State-level homicide victimization rates in the US in relation to survey measures of household firearm ownership, 2001–2003." *Social Science & Medicine* 64 (3):656–664.
- Miller, M., S. J. Lippmann, D. Azrael, and D. Hemenway. 2007. "Household firearm ownership and rates of suicide across the 50 states." *Journal of Trauma Injury, Infection and Critical Care* 62 (4):1029–1035.
- Nock, M. K., G. Borges, E. J. Bromet, C. B. Cha, R. C. Kessler, and S. Lee. 2008. "Suicide and suicidal behavior." *Epidemiology Reviews* 30 (1):133–154.
- NRC. 2005. National Research Council: Firearms and violence: A critical review. Washington, DC: National Academies Press.
- Oslin, D.W., C. Zubritsky, G. Brown, M. Mullahy, and A. Puliafico. 2004. "Managing suicide in late life: Access to firearms as a public health risk." *American Journal of Geriatric Psychiatry* 12 (1):30–36.
- Pickett, W., F. J. Elgar, F. Brooks, M. de Looze, and K. Rathman. 2013. "Trends and socioeconomic correlates of adolescent physical fighting in 30 Countries." *Pediatrics* 131 (1):18–26.
- Richardson, E. G., and D. Hemenway. 2011. "Homicide, suicide, and unintentional firearm fatality: Comparing the United States with other high-income countries, 2003." *Journal of Trauma Injury, Infection and Critical Care* 70 (1):238–243.
- SAS. 2007. "Completing the count: Civilian firearms: Annexe 1: Seventy-nine countries with comprehensive civilian ownership data." In *The small arms survey: Guns in the city*, ed. Small Arms Survey Geneva. Cambridge, UK: Cambridge University Press.
- Shaffer, D., M. S. Gould, P. Fisher, P. Trautman, and D. Moreau. 1996. "Psychiatric diagnosis in child and adolescent suicide." *Archives of General Psychiatry* 53(4):339–348.
- Smith, T. W. 2000. 1999 National gun policy survey of the National Opinion Research Center: Research findings. Chicago, IL: National Opinion Research Center, University of Chicago.
- Sorenson, S. B., and K. A. Vittes. 2008. "Mental health and firearms in community-based surveys: Implications for suicide prevention." *Evaluation Review* 32 (3):239–256.

20 *Matthew Miller, Deborah Azrael, and David Hemenway*

- van Kesteren, J., P. Mayhew, and P. Nieuwbeerta. 2001. Criminal victimization in seventeen industrialized countries: Key findings from the 2000 international crime victims survey. In *Netherlands Ministry of Justice: Research and Documentation Centre Netherlands*.
- Webster, D., J. Vernick, and L. Hepburn. 2001. "Relationship between licensing, registration, and other gun sales laws and the source state of crime guns." *Injury Prevention* 7 (3):184–189. doi: 10.1136/ip.7.3.184.
- Wiebe, D. J. 2003. "Homicide and suicide risks associated with firearms in the home: A national case-control study." *Annals of Emergency Medicine* 41(6):771–782.
- Wintemute, G. J. 2000. "Guns and gun violence." In *The crime drop in America*, ed. A. Blumstein and J. Wallman. Cambridge: Cambridge University Press.
- Wintemute, G. J., C. A. Parham, J. J. Beaumont, M. Wright, and C. Drake. 1999. "Mortality among recent purchasers of handguns." *New England Journal of Medicine* 341 (21):1583–1589.

EXHIBIT 59

Journal of Empirical Legal Studies

Volume 16, Issue 2, 198–247, April 2019

Right-to-Carry Laws and Violent Crime: A Comprehensive Assessment Using Panel Data and a State-Level Synthetic Control Analysis

*John J. Donohue, Abhay Aneja, and Kyle D. Weber**

This article uses more complete state panel data (through 2014) and new statistical techniques to estimate the impact on violent crime when states adopt right-to-carry (RTC) concealed handgun laws. Our preferred panel data regression specification, unlike the statistical model of Lott and Mustard that had previously been offered as evidence of crime-reducing RTC laws, both satisfies the parallel trends assumption and generates statistically significant estimates showing RTC laws *increase* overall violent crime. Our synthetic control approach also finds that RTC laws are associated with 13–15 percent *higher* aggregate violent crime rates 10 years after adoption. Using a consensus estimate of the elasticity of crime with respect to incarceration of 0.15, the average RTC state would need to roughly double its prison population to offset the increase in violent crime caused by RTC adoption.

I. INTRODUCTION

For two decades, there has been a spirited academic debate over whether “shall-issue” concealed carry laws (also known as right-to-carry or RTC laws) have an important impact on crime. The “More Guns, Less Crime” hypothesis originally articulated by John Lott and David Mustard (1997) claimed that RTC laws decreased violent

*Address correspondence to John J. Donohue, Stanford Law School, 559 Nathan Abbott Way, Stanford, CA 94305; email: donohue@law.stanford.edu. Abhay Aneja, Haas School of Business, 2220 Piedmont Avenue, Berkeley, CA 94720; email: aaneja@law.stanford.edu; Kyle D. Weber, Columbia University, 420 W. 118th Street, New York, NY 10027; email: kdw2126@columbia.edu.

We thank Phil Cook, Dan Ho, Stefano DellaVigna, Rob Tibshirani, Trevor Hastie, Stefan Wager, Jeff Strnad, and participants at the 2011 Conference of Empirical Legal Studies (CELS), 2012 American Law and Economics Association (ALEA) Annual Meeting, 2013 Canadian Law and Economics Association (CLEA) Annual Meeting, 2015 NBER Summer Institute (Crime), and the Stanford Law School faculty workshop for their comments and helpful suggestions. Financial support was provided by Stanford Law School. We are indebted to Alberto Abadie, Alexis Diamond, and Jens Hainmueller for their work developing the synthetic control algorithm and programming the Stata module used in this paper and for their helpful comments. The authors would also like to thank Alex Albright, Andrew Baker, Jacob Dorn, Bhargav Gopal, Crystal Huang, Mira Korb, Haksoo Lee, Isaac Rabbani, Akshay Rao, Vikram Rao, Henrik Sachs and Sidharth Sah who provided excellent research assistance, as well as Addis O’Connor and Alex Chekholko at the Research Computing division of Stanford’s Information Technology Services for their technical support.

crime (possibly shifting criminals in the direction of committing more property crime to avoid armed citizens). This research may well have encouraged state legislatures to adopt RTC laws, arguably making the pair's 1997 paper in the *Journal of Legal Studies* one of the most consequential criminological articles published in the last 25 years.

The original Lott and Mustard paper as well as subsequent work by John Lott in his 1998 book *More Guns, Less Crime* used a panel data analysis to support the theory that RTC laws reduce violent crime. A large number of papers examined the Lott thesis, with decidedly mixed results. An array of studies, primarily those using the limited data initially employed by Lott and Mustard for the period 1977–1992 and those failing to adjust their standard errors by clustering, supported the Lott and Mustard thesis, while a host of other papers were skeptical of the Lott findings.¹

It was hoped that the 2005 National Research Council report *Firearms and Violence: A Critical Review* (hereafter the NRC Report) would resolve the controversy over the impact of RTC laws, but this was not to be. While one member of the committee—James Q. Wilson—did partially endorse the Lott thesis by saying there was evidence that murders fell when RTC laws were adopted, the other 15 members of the panel pointedly criticized Wilson's claim, saying that “the scientific evidence does not support his position.” The majority emphasized that the estimated effects of RTC laws were highly sensitive to the particular choice of explanatory variables and thus concluded that the panel data evidence through 2000 was too fragile to support any conclusion about the true effects of these laws.

This article answers the call of the NRC Report for more and better data and new statistical techniques to be brought to bear on the issue of the impact of RTC laws on crime. First, we revisit the state panel data evidence to see if extending the data for an additional 14 years, thereby providing additional crime data for prior RTC states as well as on 11 newly adopting RTC states, offers any clearer picture of the causal impact of allowing citizens to carry concealed weapons. We distill from an array of different panel data regressions for various crime categories for two time periods using two major sets of explanatory variables—including our preferred specification (DAW) and that of Lott and Mustard (LM)—a subset of regressions that satisfy the critical parallel trends assumption. All the statistically significant results from these regressions show RTC laws are associated with *higher* rates of overall violent crime, property crime, or murder.

Second, to address some of the weaknesses of panel data models, we undertake an extensive synthetic control analysis in order to present the most complete and robust

¹In support of Lott and Mustard (1997), see Lott's 1998 book *More Guns, Less Crime* (and the 2000 and 2010 editions). Ayres and Donohue (2003) and the 2005 National Research Council report *Firearms and Violence: A Critical Review* dismissed the Lott/Mustard hypothesis as lacking credible statistical support, as did Aneja et al. (2011) (and Aneja et al. (2014) further expanding the latter). Moody and Marvell (2008) and Moody et al. (2014) continued to argue in favor of a crime-reducing effect of RTC laws, although Zimmerman (2014) and McElroy and Wang (2017) find that RTC laws *increase* violent crime and Siegel et al. (2017) find RTC laws increase murders, as discussed in Section III.B.

results to guide policy in this area.² This synthetic control methodology—first introduced in Abadie and Gardeazabal (2003) and expanded in Abadie et al. (2010, 2014)—uses a matching methodology to create a credible “synthetic control” based on a weighted average of other states that best matches the prepassage pattern of crime for each “treated” state, which can then be used to estimate the likely path of crime if RTC-adopting states had not adopted an RTC law. By comparing the actual crime pattern for RTC-adopting states with the estimated synthetic controls in the postpassage period, we derive year-by-year estimates for the impact of RTC laws in the 10 years following adoption.³

To preview our major findings, the synthetic control estimate of the average impact of RTC laws across the 33 states that adopt between 1981 and 2007⁴ indicates that violent crime is substantially higher after 10 years than would have been the case had the RTC law not been adopted. Essentially, for violent crime, the synthetic control approach provides a similar portrayal of RTC laws as that provided by the DAW panel data model and undermines the results of the LM panel data model. According to the aggregate synthetic control models—regardless of whether one uses the DAW or LM covariates—RTC laws led to increases in violent crime of 13–15 percent after 10 years, with positive but not statistically significant effects on property crime and murder. The median effect of RTC adoption after 10 years is 12.3 percent if one considers all 31 states with 10 years worth of data and 11.1 percent if one limits the analysis to the 26 states with the most compelling prepassage fit between the adopting states and their synthetic controls. Comparing our DAW specification findings with the results generated using placebo treatments, we are able to reject the null hypothesis that RTC laws have no impact on aggregate violent crime.

The structure of the article proceeds as follows. Section II begins with a discussion of the ways in which increased carrying of guns could either dampen crime (by thwarting or deterring criminals) or increase crime by directly facilitating violence or aggression by permit holders (or others), greatly expanding the loss and theft of guns, and burdening the functioning of the police in ways that diminish their effectiveness in controlling crime. We then show that a simple comparison of the drop in violent crime from

²Abadie et al. (2014) identify a number of possible problems with panel regression techniques, including the danger of extrapolation when the observable characteristics of the treated area are outside the range of the corresponding characteristics for the other observations in the sample.

³The accuracy of this matching can be qualitatively assessed by examining the root mean square prediction error (RMSPE) of the synthetic control in the pretreatment period (or a variation on this RMSPE implemented in this article), and the statistical significance of the estimated treatment effect can be approximated by running a series of placebo estimates and examining the size of the estimated treatment effect in comparison to the distribution of placebo treatment effects.

⁴Note that we do not supply a synthetic control estimate for Indiana, even though it passed its RTC law in 1980, owing to the fact that we do not have enough pretreatment years to accurately match the state with an appropriate synthetic control. Including Indiana as a treatment state, though, would not meaningfully change our results. Similarly, we do not generate synthetic control estimates for Iowa and Wisconsin (whose RTC laws went into effect in 2011) or for Illinois (2014 RTC law), because of the limited postpassage data.

1977–2014 in the states that have resisted the adoption of RTC laws is almost an order of magnitude greater than in RTC-adopting states (a 42.3 percent drop vs. a 4.3 percent drop), although a spartan panel data model with only state and year effects reduces the differential to 20.2 percent. Section III discusses the panel data results, showing that the DAW model indicates that RTC laws have increased violent and property crime, with weaker evidence that RTC laws increased homicide (but not non-gun homicide) over our entire data period, while both the DAW and the LM model provide statistically significant evidence that RTC laws have increased murder in the postcrack period.

The remainder of the article shows that, using either the DAW or LM explanatory variables, the synthetic control approach uniformly supports the conclusion that RTC laws lead to substantial increases in violent crime. Section IV describes the details of our implementation of the synthetic control approach and shows that the mean and median estimates of the impact of RTC laws show greater than double-digit increases by the 10th year after adoption. Section V provides aggregate synthetic control estimates of the impact of RTC laws, and Section VI concludes.

II. THE IMPACT OF RTC LAWS: THEORETICAL CONSIDERATIONS AND SIMPLE COMPARISONS

A. Gun Carrying and Crime

1. Mechanisms of Crime Reduction

Allowing citizens to carry concealed handguns can influence violent crime in a number of ways, some benign and some invidious. Violent crime can fall if criminals are deterred by the prospect of meeting armed resistance, and potential victims or armed bystanders may thwart or terminate attacks by either brandishing weapons or actually firing on the potential assailants. For example, in 2012, a Pennsylvania concealed carry permit holder became angry when he was asked to leave a bar because he was carrying a weapon and, in the ensuing argument, he shot two men, killing one, before another permit holder shot him (Kalinowski 2012). Two years later, a psychiatric patient in Pennsylvania killed his caseworker, and grazed his psychiatrist before the doctor shot back with his own gun, ending the assault by wounding the assailant (Associated Press 2014).

The impact of the Pennsylvania RTC law is somewhat ambiguous in both these cases. In the bar shooting, it was a permit holder who started the killing and another who ended it, so the RTC law may actually have increased crime. The case of the doctor's use of force is more clearly benign, although the RTC law may have made no difference: a doctor who routinely deals with violent and deranged patients would typically be able to secure a permit to carry a gun even under a may-issue regime. Only a statistical analysis can reveal whether in aggregate extending gun carrying beyond those with a demonstrated need and good character, as shall-issue laws do, imposes or reduces overall costs.

Some defensive gun uses can be socially costly and contentious even if they do avoid a robbery or an assault. For example, in 1984, when four teens accosted Bernie Goetz on a New York City subway, he prevented an anticipated robbery by shooting all four,

permanently paralyzing one.⁵ In 2010, a Pennsylvania concealed carry holder argued that he used a gun to thwart a beating. After a night out drinking, Gerald Ung, a 28-year-old Temple University law student, shot a 23-year-old former star lacrosse player from Villanova, Eddie DiDonato, when DiDonato rushed Ung angrily and aggressively after an altercation that began when DiDonato was bumped while doing chin ups on scaffolding on the street in Philadelphia. When prosecuted, Ung testified that he always carried his loaded gun when he went out drinking. A video of the incident shows that Ung was belligerent and had to be restrained by his friends before the dispute became more physical, which raises the question of whether his gun carrying contributed to his belligerence, and hence was a factor that precipitated the confrontation. Ung, who shot DiDonato six times, leaving DiDonato partially paralyzed with a bullet lodged in his spine, was acquitted of attempted murder, aggravated assault, and possessing an instrument of crime (Slobodzian 2011). While Ung avoided criminal liability and a possible beating, he was still prosecuted and then hit with a major civil action, and the incident did impose significant social costs, as shootings frequently do.⁶

In any event, the use of a gun by a concealed carry permit holder to thwart a crime is a statistically rare phenomenon. Even with the enormous stock of guns in the United States, the vast majority of the time that someone is threatened with violent crime no gun will be wielded defensively. A five-year study of such violent victimizations in the United States found that victims reported failing to defend or to threaten the criminal with a gun 99.2 percent of the time—this in a country with 300 million guns in civilian hands (Planty & Truman 2013). Adding 16 million permit holders who often dwell in low-crime areas may not yield many opportunities for effective defensive use for the roughly 1 percent of Americans who experience a violent crime in a given year, especially since criminals can attack in ways that preempt defensive measures.⁷

2. Mechanisms of Increasing Crime

Since the statistical evidence presented in this article suggests that the benign effects of RTC laws are outweighed by the harmful effects, we consider five ways in which RTC laws could increase crime: (a) elevated crime by RTC permit holders or by others, which can be induced by the greater belligerence of permit holders that can attend gun carrying or even through counterproductive attempts by permit holders to intervene protectively; (b) increased crime by those who acquire the guns of permit holders via loss or theft; (c) a change in culture induced by the hyper-vigilance about one's rights and the need

⁵The injury to Darrell Cabey was so damaging that he remains confined to a wheelchair and functions with the intellect of an eight-year-old, for which he received a judgment of \$43 million against Goetz, albeit without satisfaction (Biography.com 2016).

⁶According to the civil lawsuit brought by DiDonato, his injuries included “severe neurological impairment, inability to control his bowels, depression and severe neurologic injuries” (Lat 2012).

⁷Even big city police officers rarely need to fire a weapon despite their far greater exposure to criminals. According to a 2016 Pew Research Center survey of 7,917 sworn officers working in departments with 100 or more officers, “only about a quarter (27%) of all officers say they have ever fired their service weapon while on the job” (Morin & Mercer 2017).

to avenge wrongs that the gun culture can nurture; (d) elevated harm as criminals respond to the possibility of armed resistance by increasing their gun carrying and escalating their level of violence; and (e) all of the above factors will either take up police time or increase the risks the police face, thereby impairing the crime-fighting ability of police in ways that can increase crime.

a. Crime committed or induced by permit holders: RTC laws can lead to an increase in violent crime by increasing the likelihood a generally law-abiding citizen will commit a crime or increasing the criminal behavior of others. Moreover, RTC laws may facilitate the criminal conduct of those who generally have a criminal intent. We consider these two avenues below.

i. The pathway from the law-abiding citizen

Evidence from a nationally representative sample of 4,947 individuals indicates that Americans tend to overestimate their gun-related abilities. For example, 82.6 percent believed they were less likely than the average person to use a gun in anger. When asked about their “ability to responsibly own a handgun,” 50 percent of the respondents deemed themselves to be in the top 10 percent and 23 percent placed their ability within the top 1 percent of the U.S. population. Such overconfidence has been found to increase risk taking and could well lead to an array of socially harmful consequences ranging from criminal misconduct and gun accidents to lost or stolen guns (Stark & Sachau 2016).

In a number of well-publicized cases, concealed carry permit holders have increased the homicide toll by killing someone with whom they became angry over an insignificant issue, ranging from merging on a highway and talking on a phone in a theater to playing loud music at a gas station (Lozano 2017; Levenson 2017; Scherer 2016). In one particularly tragic example in January 2019 at a bar in State College, Pennsylvania, a lawful permit holder, Jordan Witmer, got into a fight with his girlfriend. When a father and son sitting at the bar tried to intervene, Witmer killed both of them, shot his girlfriend in the chest, and fled. When his car crashed, Witmer broke into a nearby house, killed the 82-year-old homeowner, who was with his wife on their 60th wedding anniversary, and then killed himself (Sauro 2019). Another such example occurred in July 2018 when Michael Drejka started to hassle a woman sitting in a car in a disabled parking spot while her husband and five-year-old son ran into a store. When the husband emerged, he pushed Drejka to the ground, who then killed him with a shot to the chest. The killing is caught on video and Drejka is being prosecuted for manslaughter in Clearwater, Florida (Simon 2018).

When Philadelphia permit holder Louis Mockewich shot and killed a popular youth football coach (another permit holder carrying his gun) over a dispute concerning snow shoveling in January 2000, Mockewich’s car had an NRA bumper sticker reading “Armed with Pride” (Gibbons & Moran 2000). An angry young man, with somewhat of a paranoid streak, who has not yet been convicted of a crime or adjudicated as a “mental defective,” may be encouraged to carry a gun if he resides in an RTC state.⁸ That such

⁸The Gun Control Act of 1968 prohibits gun possession by felons and adjudicated “mental defectives” (18 U.S.C. 922(d)(4), 2016).

individuals will be more likely to be aggressive once armed and hence more likely to stimulate violence by others should not be surprising.

Recent evidence suggests that as gun carrying is increasing with the proliferation of RTC laws, road rage incidents involving guns are rising (Biette-Timmons 2017; Plumlee 2012). Incidents in which “someone in a car brandished a gun in a threatening manner or fired a gun at another driver or passenger have more than doubled in the last three years, from 247 in 2014 to 620 in 2016 The highest-profile recent road rage incidents involved two NFL players, Joe McKnight and Will Smith, killed ... in separate road rage shootings in New Orleans” (Shen 2017).⁹ In the nightmare case for RTC, two Michigan permit-holding drivers pulled over to battle over a tailgating dispute in September 2013 and each shot and killed the other (Stuart 2013). Without Michigan’s RTC law, this would likely have not been a double homicide. Indeed, two studies—one for Arizona and one for the nation as a whole—found that “the evidence indicates that those with guns in the vehicle are more likely to engage in ‘road rage’” (Hemenway et al. 2006; Miller et al. 2002).¹⁰ These studies may suggest either that gun carrying emboldens more aggressive behavior or reflects a selection effect for more aggressive individuals.¹¹ If this is correct, then it may not be a coincidence that there are so many cases in which a concealed carry holder acts belligerently and is shot by another permit holder.¹²

⁹Joe McKnight and Ronald Gasser were arguing through their open car windows as they drove for miles. When they were both stopped at a red light, McKnight walked over to Gasser’s car, and the “two argued through the passenger-side window until Gasser pulled a gun from between his seat and the center console and shot McKnight three times.” Gasser was convicted of manslaughter and sentenced to a prison term of 30 years (Calder 2018).

¹⁰A perfect illustration was provided by 25-year-old Minnesota concealed carry permit holder Alexander Weiss, who got into an argument after a fender bender caused by a 17-year-old driver. Since the police had been called, it is hard to imagine that this event could end tragically—unless someone had a gun. Unfortunately, Weiss, who had a bumper sticker on his car saying “Gun Control Means Hitting Your Target,” killed the 17-year-old with one shot to the chest and has been charged with second-degree murder (KIMT 2018).

¹¹While concealed carry permit holders should be free of any felony conviction, and thus show a lower overall rate of violence than a group that contains felons, a study in Texas found that when permit holders do commit a crime, it tends to be a severe one: “the concentration of convictions for weapons offenses, threatening someone with a firearm, and intentionally killing a person stem from the ready availability of a handgun for CHL holders” (Phillips et al. 2013). See, for example, a Texas permit holder who told police he shot a man in the head at an IHOP restaurant in Galveston because “he was annoyed by the noise the victim and others were making just a table away” (ABC News 2018).

¹²We have just cited three of them: the 2012 Pennsylvania bar shooting, the 2000 Philadelphia snow-shoveling dispute, and the 2013 Michigan road-rage incident. Here are two more. Former NFL player Will Smith, a concealed carry permit holder with a loaded gun in his car, was engaged in a road rage incident with another permit holder, who killed him with seven shots in the back and one into his side and shot his wife, hitting both knees. The shooter was convicted of manslaughter and sentenced to 25 years in prison (Lane 2018). In yet another recent case, two permit holders glowered at each other in a Chicago gas station, and when one drew his weapon, the second man pulled out his own gun and killed the 43-year-old instigator, who died in front of his son, daughter, and pregnant daughter-in-law (Hernandez 2017). A video of the encounter can be found at <https://www.youtube.com/watch?v=I2j9vDHIIBU>. According to the police report obtained by the *Chicago Tribune*, a bullet from the gun exchange broke the picture window of a nearby garden apartment and another shattered the window of a car with four occupants that was driving past the gas station. No charges were brought against the surviving permit holder, who shot first but in response to the threat initiated by the other permit holder.

In general, the critique that the relatively low number of permit revocations proves that permit holders do not commit enough crime to substantially elevate violent criminality is misguided for a variety of reasons. First, only a small fraction of 1 percent of Americans commits a gun crime each year, so we do not expect even a random group of Americans to commit much crime, let alone a group purged of convicted felons. Nonetheless, permit revocations clearly understate the criminal misconduct of permit holders, since not all violent criminals are caught and we have just seen five cases where six permit holders were killed, so no permit revocation or criminal prosecution would have occurred regardless of any criminality by the deceased.¹³ Second, and perhaps more importantly, RTC laws increase crime by individuals other than permit holders in a variety of ways. The messages of the gun culture, perhaps reinforced by the adoption of RTC laws, can promote fear and anger, which are emotions that can invite more hostile confrontations leading to violence. For example, if permit holder George Zimmerman hassled Trayvon Martin only because Zimmerman was armed, then the presence of Zimmerman's gun could be deemed to have encouraged a hostile confrontation, regardless of who ultimately becomes violent.¹⁴

Even well-intentioned interventions by permit holders intending to stop a crime have elevated the crime count when they ended with the permit holder either being killed by the criminal¹⁵ or shooting an innocent party by

¹³In addition, NRA-advocated state laws that ban the release of information about whether those arrested for even the most atrocious crimes are RTC permit holders make it extremely difficult to monitor their criminal conduct.

¹⁴Psychologists have found that the very act of carrying a gun tends to distort perceptions of reality in a way that exaggerates perceived threats. "We have shown here that ... the act of wielding a firearm raises the likelihood that nonthreatening objects will be perceived as threats. This bias can clearly be horrific for victims of accidental shootings" (Witt & Brockmole 2012). As one permit holder explained: "a gun causes its bearer to see the world differently. A well-lit city sidewalk full of innocent pedestrians becomes a scene—a human grouping one of whose constituents you might need to shoot. Something good in yourself is, by this means, sacrificed. And more. In a sudden, unwieldy hauling-out of your piece, or just by having your piece in your pocket, you can fumble around and shoot yourself, as often happens and isn't at all funny. Or you might shoot some little girl on a porch across the street or two streets away, or five streets away. Lots and lots of untoward things can happen when you're legally carrying a concealed firearm. One or two of them might turn out to be beneficial—to you. But a majority are beneficial to neither man nor beast. Boats are said, by less nautical types, always to be seeking a place to sink. Guns—no matter who has them—are always seeking an opportunity to go off. Anybody who says different is a fool or a liar or both" (Ford 2016).

¹⁵In 2016 in Arlington, Texas, a man in a domestic dispute shot at a woman and then tried to drive off (under Texas law it was lawful for him to be carrying his gun in his car, even though he did not have a concealed carry permit.) When he was confronted by a permit holder, the shooter slapped the permit holder's gun out of his hand and then killed him with a shot to the head. Shortly thereafter, the shooter turned himself into the police (Mettler 2016). Similarly, when armed criminals entered a Las Vegas Walmart in 2014 and told everyone to get out because "[t]his is a revolution," one permit holder told his friend he would stay to confront the threat. He was gunned down shortly before the police arrived, adding to the death toll rather than reducing it (NBC News 2014). Finally, in January 2010, Stephen Sharp arrived at work at a St. Louis power plant just as co-worker Timothy Hendron began firing at fellow workers with an AK-47. Retrieving a pistol from his truck, Sharp opened fire at Hendron, and fecklessly discharged all six rounds from across the parking lot. Unharmful, Hendron returned fire, grievously wounding Sharp and continuing his rampage unabated. When the police arrived, there was "no clear distinction between attacker and victims." In the end, Hendron killed three and wounded five before killing himself (Byers 2010).

mistake.¹⁶ Indeed, an FBI study of 160 active shooter incidents found that in almost half (21 of 45) the situations in which police engaged the shooter to end the threat, law enforcement suffered casualties, totaling nine killed and 28 wounded (Blair & Schweit 2014). One would assume the danger to an untrained permit holder trying to confront an active shooter would be greater than that of a trained professional, which may in part explain why effective intervention in such cases by permit holders to thwart crime is so rare. Although the same FBI report found that in 21 of a total of 160 active shooter incidents between 2000 and 2013, “the situation ended after unarmed citizens safely and successfully restrained the shooter,” there was only one case—in a bar in Winnemucca, Nevada in 2008—in which a private armed citizen other than an armed security guard stopped a shooter, and that individual was an active-duty Marine (Holzel 2008).

ii. The pathway from those harboring criminal intent

Over the 10-year period from May 2007 through January 2017, the Violence Policy Center (2017) lists 31 instances in which concealed carry permit holders killed three or more individuals in a single incident. Many of these episodes are disturbingly similar in that there was substantial evidence of violent tendencies and/or serious mental illness, but no effort was made to even revoke the carry permit, let alone take effective action to prevent access to guns. For example, on January 6, 2017, concealed handgun permit holder Esteban Santiago, 26, killed five and wounded six others at the Fort Lauderdale-Hollywood Airport, before sitting on the floor and waiting to be arrested as soon as he ran out of ammunition. In the year prior to the shooting, police in Anchorage, Alaska, charged Santiago with domestic violence, and visited the home five times for various other complaints (KTUU 2017). In November 2016, Santiago entered the Anchorage FBI office and spoke of “mind control” by the CIA and having “terroristic thoughts” (Hopkins 2017). Although the police took his handgun at the time, it was returned to him on December 7, 2016 after Santiago spent four days in a mental health facility because, according to federal officials, “there was no mechanism in federal law for officers to permanently seize the weapon”¹⁷ (Boots 2017). Less than a month later, Santiago flew with his gun to Florida and opened fire in the baggage claim area.¹⁸

In January 2018, the FBI charged Taylor Wilson, a 26-year-old Missouri concealed carry permit holder, with terrorism on an Amtrak train when, while carrying a loaded

¹⁶In 2012, “a customer with a concealed handgun license ... accidentally shot and killed a store clerk” during an attempted robbery in Houston (MacDonald 2012). Similarly, in 2015, also in Houston, a bystander who drew his weapon upon seeing a carjacking incident ended up shooting the victim in the head by accident (KHOU 2015). An episode in June 2017 underscored that interventions even by well-trained individuals can complicate and exacerbate unfolding crime situations. An off-duty Saint Louis police officer with 11 years of service was inside his home when he heard the police exchanging gunfire with some car thieves. Taking his police-issued weapon, he went outside to help, but as he approached he was told by two officers to get on the ground and then shot in the arm by a third officer who “feared for his safety” (Hauser 2017).

¹⁷Moreover, in 2012, Puerto Rican police confiscated Santiago’s handguns and held them for two years before returning them to him in May 2014, after which he moved to Alaska (Clary et al. 2017).

¹⁸For a similar story of repeated gun violence and signs of mental illness by a concealed carry permit holder, see the case of Aaron Alexis, who murdered 12 at the Washington Navy Yard in September 2013 (Carter et al. 2013).

weapon, he tried to interfere with the brakes and controls of the moving train. According to the FBI, Wilson had (1) previously joined an “alt-right” neo-Nazi group and traveled to the Unite the Right rally in Charlottesville, Virginia in August 2017; (2) indicated his interest in “killing black people” and was the perpetrator of a road-rage incident in which he pointed a gun at a black woman for no apparent reason while driving on an interstate highway in April 2016; and (3) possessed devices and weapons “to engage in criminal offenses against the United States.” Research is needed to analyze whether having a permit to legally carry weapons facilitates such criminal designs (Pilger 2018).

In June 2017, Milwaukee Police Chief Ed Flynn pointed out that criminal gangs have taken advantage of RTC laws by having gang members with clean criminal records obtain concealed carry permits and then hold the guns after they are used by the active criminals (Officer.com 2017). Flynn was referring to so-called human holsters who have RTC permits and hold guns for those barred from possession. For example, Wisconsin permit holder Darrail Smith was stopped three times while carrying guns away from crime scenes before police finally charged him with criminal conspiracy. In the second of these, Smith was “carrying three loaded guns, including one that had been reported stolen,” but that was an insufficient basis to charge him with a crime or revoke his RTC permit (DePrang 2015). Having a “designated permit holder” along to take possession of the guns when confronted by police may be an attractive benefit for criminal elements acting in concert (Fernandez et al. 2015; Luthern 2015).

b. Increased gun thefts: The most frequent occurrence each year involving crime and a good guy with a gun is not self-defense but rather the theft of the good guy’s gun, which occurs hundreds of thousands of times each year.¹⁹ Data from a nationally representative web-based survey conducted in April 2015 of 3,949 subjects revealed that those who carried guns outside the home had their guns stolen at a rate over 1 percent per year (Hemenway et al. 2017). Given the current level of roughly 16 million permit holders, a plausible estimate is that RTC laws result in permit holders furnishing more than 100,000 guns per year to criminals.²⁰ As Phil Cook has noted, the relationship between gun theft and crime is a complicated one for which few definitive data are currently available (Cook

¹⁹According to Larry Keane, senior vice president of the National Shooting Sports Foundation (a trade group that represents firearms manufacturers): “There are more guns stolen every year than there are violent crimes committed with firearms.” More than 237,000 guns were reported stolen in the United States in 2016, according to the FBI’s National Crime Information Center. The actual number of thefts is obviously much higher since many gun thefts are never reported to police, and “many gun owners who report thefts do not know the serial numbers on their firearms, data required to input weapons into the NCIC.” The best survey estimated 380,000 guns were stolen annually in recent years, but given the upward trend in reports to police, that figure likely understates the current level of gun thefts (Freskos 2017b). According to National Crime Information Center data, the number of guns reported stolen nationally jumped 60 percent between 2007 and 2016 (Freskos 2018a).

²⁰While the Hemenway et al. study is not large enough and detailed enough to provide precise estimates, it establishes that those who have carried guns in the last month are more likely to have them stolen. A recent Pew Research Survey found that 26 percent of American gun owners say they carry a gun outside of their home “all or most of the time” (Igielnik & Brown 2017, surveying 3,930 U.S. adults, including 1,269 gun owners). If 1 percent of 16 million permit holders have guns stolen each year, that would suggest 160,000 guns were stolen. Only guns stolen outside the home would be attributable to RTC laws, so a plausible estimate of guns stolen per year owing to gun carrying outside the home might be 100,000.

2018). But if there was any merit to the outrage over the loss of about 1,400 guns during the Fast and Furious program that began in 2009 and the contribution that these guns made to crime (primarily in Mexico), it highlights the severity of the vastly greater burdens of guns lost by and stolen from U.S. gun carriers.²¹ A 2013 report from the Bureau of Alcohol, Tobacco, Firearms, and Explosives concluded that “lost and stolen guns pose a substantial threat to public safety and to law enforcement. Those that steal firearms commit violent crimes with stolen guns, transfer stolen firearms to others who commit crimes, and create an unregulated secondary market for firearms, including a market for those who are prohibited by law from possessing a gun” (Office of the Director—Strategic Management 2013; Parsons & Vargas 2017).

For example, after Sean Penn obtained a permit to carry a gun, his car was stolen with two guns in the trunk. The car was soon recovered, but the guns were gone (Donohue 2003). In July 2015 in San Francisco, the theft of a gun from a car in San Francisco led to a killing of a tourist on a city pier that almost certainly would not have occurred if the lawful gun owner had not left it in the car (Ho 2015). Just a few months later, a gun stolen from an unlocked car was used in two separate killings in San Francisco and Marin in October 2015 (Ho & Williams 2015). According to the National Crime Victimization Survey, in 2013 there were over 660,000 auto thefts from households. More guns being carried in vehicles by permit holders means more criminals will be walking around with the guns stolen from permit holders.²²

As Michael Rallings, the top law enforcement official in Memphis, Tennessee, noted in commenting on the problem of guns being stolen from cars: “Laws have unintended consequences. We cannot ignore that as a legislature passes laws that make guns more accessible to criminals, that has a direct effect on our violent crime rate” (Freskos 2017a). An Atlanta police sergeant elaborated on this phenomenon: “Most of our criminals, they go out each and every night hunting for guns, and the easiest way to get them is out of people’s cars. We’re finding that a majority of stolen guns that are getting in the hands of criminals and being used to commit crimes were stolen out of vehicles” (Freskos 2017c). In 2015, 70 percent of guns reported stolen in Atlanta came from cars and trucks (Freskos 2016). Another Atlanta police officer stated that weapons stolen from cars “are used in crimes to shoot people, to rob people” because criminals find these guns to be easy to steal and hard to trace. “For them, it doesn’t cost them anything to break into a car and steal a gun” (Freskos 2016).²³

²¹“Of the 2,020 guns involved in the Bureau of Alcohol, Tobacco, Firearms, and Explosives probe dubbed ‘Operation Fast and Furious,’ 363 have been recovered in the United States and 227 have been recovered in Mexico. That leaves 1,430 guns unaccounted for” (Schwarzschild & Griffin 2011). Wayne LaPierre of the NRA was quoted as saying: “These guns are now, as a result of what [ATF] did, in the hands of evil people, and evil people are committing murders and crimes with these guns against innocent citizens” (Horwitz 2011).

²²In early December 2017, the sheriff in Jacksonville, Florida announced that his office knew of 521 guns that had been stolen so far in 2017—from unlocked cars alone! (Campbell 2017).

²³Examples abound: Tario Graham was shot and killed during a domestic dispute in February 2012 with a revolver stolen weeks earlier out of pickup truck six miles away in East Memphis (Perrusquia 2017). In Florida, a handgun stolen from an unlocked Honda Accord in mid-2014 helped kill a police officer a few days before Christmas that year (Sampson 2014). A gun stolen from a parked car during a Mardi Gras parade in 2017 was used a few days later to kill 15-year-old Nia Savage in Mobile, Alabama, on Valentine’s Day (Freskos 2017a).

Of course, the permit holders whose guns are stolen are not the killers, but they can be the but-for cause of the killings. Lost, forgotten, and misplaced guns are another dangerous byproduct of RTC laws.²⁴

c. Enhancing a culture of violence: The South has long had a higher rate of violent crime than the rest of the country. For example, in 2012, while the South had about one-quarter of the U.S. population, it had almost 41 percent of the violent crime reported to police (Fuchs 2013). Social psychologists have argued that part of the reason the South has a higher violent crime rate is that it has perpetuated a “subculture of violence” predicated on an aggrandized sense of one’s rights and honor that responds negatively to perceived insults. A famous experiment published in the *Journal of Personality and Social Psychology* found that southern males were more likely than northern males to respond aggressively to being bumped and insulted. This was confirmed by measurement of their stress hormones and their frequency of engaging in aggressive or dominant behavior after being insulted (Cohen et al. 1996). To the extent that RTC laws reflect and encourage this cultural response, they can promote violent crime not only by permit holders, but by all those with or without guns who are influenced by this crime-inducing worldview.

Even upstanding citizens, such as Donald Brown, a 56-year-old retired Hartford firefighter with a distinguished record of service, can fall prey to the notion that resort to a lawful concealed weapon is a good response to a heated argument. Brown was sentenced to seven years in prison in January 2018 by a Connecticut judge who cited his “poor judgment on April 24, 2015, when he drew his licensed 9mm handgun and fired a round into the abdomen of Lascelles Reid, 33.” The shooting was prompted by a dispute “over renovations Reid was performing at a house Brown owns” (Owens 2018). Once again, we see that the RTC permit was the pathway to serious violent crime by a previously law-abiding citizen.

d. Increasing violence by criminals: The argument for RTC laws is often predicated on the supposition that they will encourage good guys to have guns, leading only to benign effects on the behavior of bad guys. This is highly unlikely to be true.²⁵ Indeed, the

²⁴The growing TSA seizures in carry-on luggage are explained by the increase in the number of gun carriers who simply forget they have a gun in their luggage or briefcase (Williams & Waltrip 2004). A chemistry teacher at Marjory Stoneman Douglas High School in Parkland, Florida, who had said he would be willing to carry a weapon to protect students at the school, was criminally charged for leaving a loaded pistol in a public restroom. The teacher’s 9mm Glock was discharged by an intoxicated homeless man who found it in the restroom (Stanglin 2018).

²⁵Consider in this regard, David Friedman’s theoretical analysis of how right-to-carry laws will reduce violent crime: “Suppose one little old lady in ten carries a gun. Suppose that one in ten of those, if attacked by a mugger, will succeed in killing the mugger instead of being killed by him—or shooting herself in the foot. On average, the mugger is much more likely to win the encounter than the little old lady. But—also on average—every hundred muggings produce one dead mugger. At those odds, mugging is a very unattractive profession—not many little old ladies carry enough money in their purses to justify one chance in a hundred of being killed getting it. The number of muggers—and muggings—declines drastically, not because all of the muggers have been killed but because they have, rationally, sought safer professions” (Friedman 1990). There is certainly no empirical support for the conjecture that muggings will “decline drastically” in the wake of RTC adoption. What Friedman’s analysis overlooks is that muggers can decide not to mug (which is what Friedman posits) or they can decide to initiate their muggings by cracking the old ladies over the head or by being

evidence that gun prevalence in a state is associated with higher rates of lethal force by police (even controlling for homicide rates) suggests that police may be more fearful and shoot quicker when they are more likely to interact with an armed individual (Nagin forthcoming).²⁶ Presumably, criminals would respond in a similar fashion, leading them to arm themselves more frequently, attack more harshly, and shoot more quickly when citizens are more likely to be armed. In one study, two-thirds of prisoners incarcerated for gun offenses “reported that the chance of running into an armed victim was very or somewhat important in their own choice to use a gun” (Cook et al. 2009). Such responses by criminals will elevate the toll of the crimes that do occur.

Indeed, a panel data estimate over the years 1980 to 2016 reveals that the percentage of robberies committed with a firearm rises by 18 percent in the wake of RTC adoption ($t = 2.60$).²⁷ Our synthetic controls assessment similarly shows that the percentage of robberies committed with a firearm increases by 35 percent over 10 years ($t = 4.48$).²⁸ Moreover, there is no evidence that RTC laws are reducing the overall level of robberies: the panel data analysis associates RTC laws with a 9 percent higher level of overall robberies ($t = 1.85$) and the synthetic controls analysis suggests a 7 percent growth over 10 years ($t = 1.19$).

e. Impairing police effectiveness: According to an April 2016 report of the Council of Economic Advisers: “Expanding resources for police has consistently been shown to reduce crime; estimates from economic research suggests that a 10% increase in police size decreases crime by 3 to 10%” (CEA 2016:4). In summarizing the evidence on fighting crime in the *Journal of Economic Literature*, Aaron Chalfin and Justin McCrary note that adding police manpower is almost twice as effective in reducing violent crime as it is in reducing property crime (Chalfin & McCrary 2017). Therefore, anything that RTC laws do to occupy police time, from processing permit applications to checking for permit validity to dealing with gunshot victims, inadvertent gun discharges, and the staggering number of stolen guns is likely to have an opportunity cost expressed in higher violent crime.

The presence of more guns on the street can complicate the job of police as they confront (or shy away from) armed citizens. Daniel Nagin finds a pronounced positive association between statewide prevalence of gun ownership and police use of lethal force (Nagin forthcoming). A Minnesota police officer who stopped Philando Castile for a broken taillight shot him seven times only seconds after Castile indicated he had a permit to carry a weapon because the officer feared the permit holder might be reaching for the

prepared to shoot them if they start reaching for a gun (or even wear body armor). Depending on the response of the criminals to increased gun carrying by potential victims, the increased risk to the criminals may be small compared to the increased risk to the victims. Only an empirical evaluation can answer this question.

²⁶See footnotes 29–31 and accompanying text for examples of this pattern of police use of lethal force.

²⁷The panel data model uses the DAW explanatory variables set forth in Table 2.

²⁸The weighted average proportion of robberies committed by firearm in the year prior to RTC adoption (for states that adopted RTC between 1981 and 2014) is 36 percent while the similar proportion in 2014 for the same RTC states is 43 percent (and for non-RTC states is 29 percent).

gun. Another RTC permit holder, stranded in his disabled car early one morning on a Florida highway exit ramp, grabbed the gun he had legally purchased three days earlier when a police officer in plainclothes pulled up in a van with tinted windows and no lights. “It was not immediately clear what happened after [the officer] got out of his van, but the permit holder at some point started running ... and [the officer] fired six times,” killing the permit holder, whose body fell “about 80 to 100 feet from his vehicle,” with his undischarged handgun on the ground somewhere in between (Robles & Hauser 2015). After a similar encounter between an officer and a permit holder, the officer asked the gun owner: “Do you realize you almost died tonight?” (Kaste 2019).²⁹

A policemen trying to give a traffic ticket has more to fear if the driver is armed. When a gun is found in a car in such a situation, a greater amount of time is needed to ascertain the driver’s status as a permit holder. A lawful permit holder who happens to have forgotten his permit may end up taking up more police time through arrest and/or other processing.

Moreover, police may be less enthusiastic about investigating certain suspicious activities or engaging in effective crime-fighting actions given the greater risks that widespread gun carrying poses to them, whether from permit holders or the criminals who steal their guns.³⁰ In a speech at the University of Chicago Law School in October 2015, then-FBI Director James Comey argued that criticism of overly aggressive policing led officers to back away from more involved policing, causing violent crime to rise (Donohue 2017a). If the more serious concern of being shot by an angry gun toter impairs effective policing, the prospect of increased crime following RTC adoption could be far more substantial than the issue that Comey highlighted.³¹

²⁹A permit to carry instructor has posted a YouTube video about “How to inform an officer you are carrying a handgun and live” that is designed to “keep yourself from getting shot unintentionally” by the police. The video, which has over 4.2 million views, has generated comments from non-Americans that it “makes the US look like a war zone” and leads to such unnatural and time-consuming behavior that “an English officer ... would look at you like a complete freak” (Soderling 2016).

³⁰“Every law enforcement officer working today knows that any routine traffic stop, delivery of a warrant or court order, or response to a domestic disturbance anywhere in the country involving people of any race or age can put them face to face with a weapon. Guns are everywhere, not just in the inner city” (Wilson 2016). In offering an explanation for why the United States massively leads the developed world in police shootings, criminologist David Kennedy stated: “Police officers in the United States in reality need to be conscious of and are trained to be conscious of the fact that literally every single person they come in contact with may be carrying a concealed firearm.” For example, police in England and Wales shot and killed 55 people over the 25-year period from 1990–2014, while in just the first 24 days of 2015, the United States (with six times the population) had a higher number of fatal shootings by police (Lopez 2018).

³¹A vivid illustration of how even the erroneous perception that someone accosted by the police is armed can lead to deadly consequences is revealed in the chilling video of five Arizona police officers confronting an unarmed man they incorrectly believed had a gun. During the prolonged encounter, the officers shouted commands at an intoxicated 26-year-old father of two, who begged with his hands in the air not to be shot. The man was killed by five bullets when, following orders to crawl on the floor toward police, he paused to pull up his slipping pants. A warning against the open carry of guns issued by the San Mateo County, California, Sheriff’s Office makes the general point that law enforcement officers become hyper-vigilant when encountering an armed individual: “Should the gun carrying person fail to comply with a law enforcement instruction or move in a way that could be construed as threatening, the police are forced to respond in kind for their own protection. It’s well and good in hindsight to say the gun carrier was simply ‘exercising their rights’ but the result could be deadly” (Lunny 2010).

The presence of multiple gun carriers can also complicate police responses to mass shootings and other crimes. When police arrived at an Alabama mall in November 2018, they saw a 21-year-old concealed carry permit holder with gun drawn, and mistakenly killed him, thinking he was the shooter. In fact, the dead man had been assisting and protecting shoppers, and the real shooter escaped (McLaughlin & Holcombe 2018). Another benign intervention that ended in tragedy for the good guy with a gun occurred in July 2018 when police officers arrived as a “good Samaritan” with a concealed carry permit was trying to break up a fight in Portland, Oregon. The police saw the gun held by the permit holder—a Navy veteran, postal worker, and father of three—and in the confusion shot and killed him (Gueverra 2018).

Good guys with guns also can interfere with police anti-crime efforts. For example, police reported that when a number of Walmart customers (fecklessly) pulled out their weapons during a shooting on November 1, 2017, their “presence ‘absolutely’ slowed the process of determining who, and how many, suspects were involved in the shootings, said Thornton [Colorado] police spokesman Victor Avila” (Simpson 2017).

Similarly, in 2014, a concealed carry permit holder in Illinois fired two shots at a fleeing armed robber at a phone store, thereby interfering with a pursuing police officer. According to the police: “Since the officer did not know where the shots were fired from, he was forced to terminate his foot pursuit and take cover for his own safety” (Glanton & Sadovi 2014).

Indeed, preventive efforts to get guns off the street in high-crime neighborhoods are less feasible when carrying guns is presumptively legal. The passage of RTC laws normalizes the practice of carrying guns in a way that may enable criminals to carry guns more readily without prompting a challenge, while making it harder for the police to know who is and who is not allowed to possess guns in public.

Furthermore, negligent discharges of guns, although common, rarely lead to charges of violent crime but they can take up valuable police time for investigation and in determining whether criminal prosecution or permit withdrawal is warranted. For example, on November 16, 2017, Tennessee churchgoers were reflecting on the recent Texas church massacre in Sutherland Springs when a permit holder mentioned he always carries his gun, bragging that he would be ready to stop any mass shooter. While proudly showing his Ruger handgun, the permit holder inadvertently shot himself in the palm, causing panic in the church as the bullet “ripped through [his wife’s] lower left abdomen, out the right side of her abdomen, into her right forearm and out the backside of her forearm. The bullet then struck the wall and ricocheted, landing under the wife’s wheelchair.” The gun discharge prompted a 911 call, which in the confusion made the police think an active shooting incident was underway. The result was that the local hospital and a number of schools were placed on lockdown for 45 minutes until the police finally ascertained that the shooting was accidental (Eltagouri 2017).³²

³²Negligent discharges by permit holders have occurred in public and private settings from parks, stadiums, movie theaters, restaurants, and government buildings to private households (WFTV 2015; Heath 2015). Thirty-nine-year-old Mike Lee Dickey, who was babysitting an eight-year-old boy, was in the bathroom removing his handgun from his waistband when it discharged. The bullet passed through two doors, before striking the child in his arm while he slept in a nearby bedroom (Associated Press 2015). In April 2018, a 21-year-old pregnant mother of two in

Everything that takes up added police time or complicates the job of law enforcement will serve as a tax on police, rendering them less effective on the margin, and thereby contributing to crime. Indeed, this may in part explain why RTC states tend to increase the size of their police forces (relative to nonadopting states) after RTC laws are passed, as shown in Table 1.³³

B. A Simple Difference-in-Differences Analysis

We begin by showing how violent crime evolved over our 1977–2014 data period for RTC and non-RTC states.³⁴ Figure 1 depicts percentage changes in the violent crime rate over our entire data period for three groups of states: those that never adopted RTC laws, those that adopted RTC laws sometime between 1977 and before 2014, and those that adopted RTC laws prior to 1977. It is noteworthy that the 42.3 percent drop in violent crime in the nine states that never adopted RTC laws is almost an order of magnitude greater than the 4.3 percent reduction experienced by states that adopted RTC laws during our period of analysis.³⁵

The NRC Report presented a “no-controls” estimate, which is just the coefficient estimate on the variable indicating the date of adoption of a RTC law in a crime rate panel data model with state and year fixed effects. According to the NRC Report: “Estimating the model using data to 2000 shows that states adopting right-to-carry laws saw 12.9 percent increases in violent crime—and 21.2 percent increases in property crime—relative to national crime patterns.” Estimating this same model using 14 additional years of data (through 2014) and 11 additional adopting states (listed at the bottom of Appendix Table C1) reveals that the average postpassage increase in violent crime was

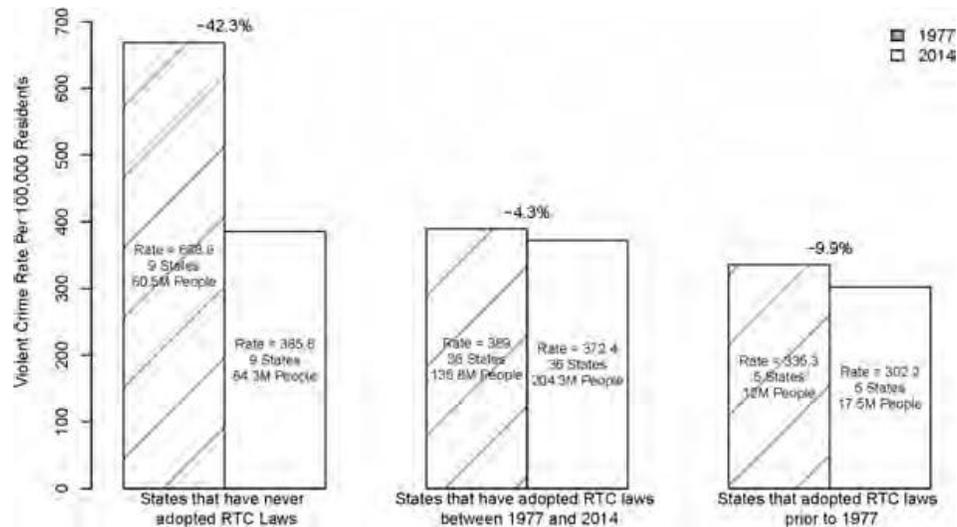
Indiana was shot by her three-year-old daughter when the toddler’s father left the legal but loaded 9mm handgun between the console and the front passenger seat after he exited the vehicle to go inside a store. The child climbed over from the backseat and accidentally fired the gun, hitting her mother though the upper right part of her torso. (Palmer 2018) See also Savitsky (2019) (country western singer Justin Carter dies when the gun in his pocket discharges and hits him in the face); Schwarz (2014) (Idaho professor shoots himself in foot during class two months after state legalizes guns on campuses); Murdock (2018) (man shoots himself in the groin with gun in his waistband in the meat section of Walmart in Buckeye, Arizona); Barbash (2018) (California teacher demonstrating gun safety accidentally discharges weapon in a high school classroom in March 2018, injuring one student); Fortin (2018) (in February 2018, a Georgia teacher fired his gun while barricaded in his classroom); US News (2018) (in April 2018, an Ohio woman with a valid concealed carry permit accidentally killed her two-year-old daughter at an Ohio hotel while trying to turn on the gun’s safety); and Fox News (2016) (“the owner of an Ohio gun shop was shot and killed when a student in a concealed carry permit class accidentally discharged a weapon,” striking the owner in the neck in a different room after the bullet passed through a wall).

³³See Adda et al. (2014), describing how local depenalization of cannabis enabled the police to reallocate resources, thereby reducing violent crime.

³⁴The FBI violent crime category includes murder, rape, robbery, and aggravated assault.

³⁵Over the same 1977–2014 period, the states that avoided adopting RTC laws had substantially smaller increases in their rates of incarceration and police employment. The nine never-adopting states increased their incarceration rate by 205 percent, while the incarceration rates in the adopting states rose by 262 and 259 percent, for those adopting RTC laws before and after 1977, respectively. Similarly, the rate of police employment rose by 16 percent in the never-adopting states and by 38 and 55 percent for those adopting before and after 1977, respectively.

Figure 1: The decline in violent crime rates has been far greater in states with no RTC laws, 1977–2014.



DATA SOURCES: UCR for crime rates; Census for state populations.

NOTE: Illinois excluded since its concealed carry law did not go into effect until 2014. From 1977–2013, the violent crime rate in Illinois fell by 36 percent, from 631 to 403 crimes per 100,000 people.

20.2 percent, while the comparable increase in property crime was 19.2 percent (both having *p* values less than 5 percent).³⁶

Of course, it does not prove that RTC laws increase crime simply because RTC states experience a worse postpassage crime pattern. For example, it might be the case that some states decided to fight crime by allowing citizens to carry concealed handguns while others decided to hire more police and incarcerate a greater number of convicted criminals. If police and prisons were more effective in stopping crime, the “no-controls” model might show that the crime experience in RTC states was worse than in other states even if this were not a true causal result of the adoption of RTC laws. As it turns out, though, RTC states not only experienced higher rates of violent crime but they also had larger increases in incarceration and police than other states. Table 1 provides panel data evidence on how incarceration and two measures of police employment changed after RTC adoption (relative to nonadopting states). All three measures rose in RTC states, and the 7–8 percent greater increases in police in RTC states are statistically significant. In other words, Table 1 confirms that RTC states did *not* have relatively declining rates of

³⁶The dummy variable model reports the coefficient associated with a RTC variable that is given a value of 0 when a RTC law is not in effect in that year, a value of 1 when a RTC law is in effect that entire year, and a value equal to the portion of the year a RTC law is in effect otherwise. The date of adoption for each RTC state is shown in Appendix Table A1. Note the fact that violent crime was noticeably higher in 1977 in the nine states that did not adopt RTC laws indicates that it will be particularly important that the parallel trends requirement of a valid panel data analysis is established, which is an issue to which we carefully attend in Section III.A.3. All our appendices are posted online at https://works.bepress.com/john_donohue/.

Table 1: Panel Data Estimates Showing Greater Increases in Incarceration and Police Following RTC Adoption: State- and Year-Fixed Effects, and No Other Regressors, 1977–2014

	<i>Incarceration</i>	<i>Police Employment per 100k</i>	<i>Police Officers per 100k</i>
	(1)	(2)	(3)
Dummy variable model	6.78 (6.22)	8.39*** (3.15)	7.08** (2.76)

NOTE: OLS estimations include state- and year-fixed effects and are weighted by population. Robust standard errors (clustered at the state level) are provided next to point estimates in parentheses. The police employment and sworn police officer data are from the Uniform Crime Reports (UCR). The source of the incarceration rate is the Bureau of Justice Statistics (2014). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All figures reported in percentage terms.

incarceration or total police employees after adopting their RTC laws that might explain their comparatively poor postpassage crime performance.

III. A PANEL DATA ANALYSIS OF RTC LAWS

A. Estimating Two Models on the Full Data Period 1977–2014

We have just seen that RTC law adoption is followed by *higher* rates of violent and property crime (relative to national trends) and that the elevated crime levels after RTC law adoption occur despite the fact that RTC states actually invested relatively more heavily in prisons and police than non-RTC states. While the theoretical predictions about the effect of RTC laws on crime are indeterminate, these two empirical facts based on the actual patterns of crime and crime-fighting measures in RTC and non-RTC states suggest that the most plausible working hypothesis is that RTC laws *increase* crime. The next step in a panel data analysis of RTC laws would be to test this hypothesis by introducing an appropriate set of explanatory variables that plausibly influence crime.

The choice of these variables is important because any variable that both influences crime and is simultaneously correlated with RTC laws must be included if we are to generate unbiased estimates of the impact of RTC laws. At the same time, including irrelevant and/or highly collinear variables can also undermine efforts at valid estimation of the impact of RTC laws. At the very least, it seems advisable to control for the levels of police and incarceration because these have been the two most important criminal justice policy instruments in the battle against crime.

1. The DAW Panel Data Model

In addition to the state and year fixed effects of the no-controls model and the identifier for the presence of an RTC law, our preferred “DAW model” includes an array of other factors that might be expected to influence crime, such as the levels of police and incarceration, various income, poverty, and unemployment measures, and six demographic controls designed to capture the presence of males in three racial categories (black, white, other) in two high-crime age groupings (15–19 and 20–39). Table 2 lists the full

Table 2: Table of Explanatory Variables for Four Panel Data Studies

<i>Explanatory Variables</i>	<i>DAW</i>	<i>LM</i>
Right-to-carry law	x	x
Lagged per capita incarceration rate	x	
Lagged police staffing per 100,000 residents	x	
Poverty rate	x	
Unemployment rate	x	
Per capita ethanol consumption from beer	x	
Percentage of state population living in metropolitan statistical areas (MSA)	x	
Real per capita personal income	x	x
Real per capita income maintenance		x
Real per capita retirement payments		x
Real per capita unemployment insurance payments		x
Population density		x
Lagged violent or property arrest rate		x
State population		x
6 Age-sex-race demographic variables —all 6 combinations of black, white, and other males in 2 age groups (15–19, 20–39) indicating the percentage of the population in each group	x	
36 Age-sex-race demographic variables —all possible combinations of black, white, and other males in 6 age groups (10–19, 20–29, 30–39, 40–49, 50–64, and over 65) and repeating this all for females, indicating the percentage of the population in each group		x

NOTE: The DAW model is advanced in this article and the LM model was previously published by Lott and Mustard.

set of explanatory variables for both the DAW model and the comparable panel data model used by Lott and Mustard (LM).³⁷

Mathematically, the simple dummy model takes the following form:

$$\ln(\text{crime rate}_{it}) = \beta X_{it} + \gamma RTC_{it} + \alpha_t + \delta_i + \varepsilon_{it} \quad (1)$$

where γ is the coefficient on the RTC dummy, reflecting the average estimated impact of adopting a RTC law on crime. The matrix X_{it} contains either the DAW or LM covariates

³⁷While we attempt to include as many state-year observations in these regressions as possible, District of Columbia incarceration data are missing after the year 2001. In addition, a handful of observations are also dropped from the LM regressions owing to states that did not report any usable arrest data in various years. Our regressions are performed with Huber-White robust standard errors that are clustered at the state level, and we lag the arrest rates used in the LM regression models. The rationales underlying both choices are described in more detail in Aneja et al. (2014). All the regressions presented in this article are weighted by state population.

Table 3: Panel Data Estimates Suggesting that RTC Laws Increase Violent and Property Crime: State- and Year-Fixed Effects, DAW Regressors, 1979–2014

	<i>Murder Rate</i>	<i>Firearm Murder Rate</i>	<i>Nonfirearm Murder Rate</i>	<i>Violent Crime Rate</i>	<i>Property Crime Rate</i>
	(1)	(2)	(3)	(4)	(5)
Dummy variable model	2.27 (5.05)	2.90 (6.74)	1.53 (3.32)	9.02*** (2.90)	6.49** (2.74)

NOTE: All models include year- and state-fixed effects, and OLS estimates are weighted by state population. Robust standard errors (clustered at the state level) are provided next to point estimates in parentheses. The violent and property crime data are from the Uniform Crime Reports (UCR) while the murder data are from the National Vital Statistics System (NVSS). Six demographic variables (based on different age-sex-race categories) are included as controls in the regression above. Other controls include the lagged incarceration rate, the lagged police employee rate, real per capita personal income, the unemployment rate, poverty rate, beer, and percentage of the population living in MSAs. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All figures reported in percentage terms.

and demographic controls for state i in year t . The vectors α and δ are year and state fixed effects, respectively, while ε_{it} is the error term.

The DAW panel data estimates of the impact of RTC laws on crime are shown in Table 3.³⁸ The results are consistent with, although smaller in magnitude than, those observed in the no-controls model: RTC laws on average increased violent crime by 9.0 percent and property crime by 6.5 percent in the years following adoption.³⁹ The effect of RTC laws on murder is seen in Table 3 to be very imprecisely estimated and not statistically significant.⁴⁰

We should also note one caveat to our results. Panel data analysis assumes that the treatment in any one state does not influence crime in nontreatment states. However, as we noted above,⁴¹ RTC laws tend to lead to substantial increases in gun thefts and those guns tend to migrate to states with more restrictive gun laws, where they elevate violent crime. This flow of guns from RTC to non-RTC states has been documented by gun trace data (Knight 2013), and Olson et al. (2019) find that “firearm trafficking from states with less restrictive firearm legislation to neighboring states with more restrictive firearm legislation

³⁸The complete set of estimates for all explanatory variables (except the demographic variables) for the DAW and LM dummy models are shown in Appendix Table B1.

³⁹Defensive uses of guns are more likely for violent crimes because the victim will clearly be present. For property crimes, the victim is typically absent, thus providing less opportunity to defend with a gun. It is unclear whether the many ways in which RTC laws could lead to more crime, which we discuss in Section II.A.2, would be more likely to facilitate violent or property crime, but our intuition is that violent crime would be more strongly influenced, which is in fact what Table 3 suggests.

⁴⁰We thank Phil Cook for informing us that UCR murder data are both less complete and less discerning than murder data collected by the National Vital Statistics. Note that we subtract all cases of justifiable homicides from the murder counts in our own Vital Statistics data.

⁴¹See text at footnotes 20–22.

increases firearm homicide rates in those restrictive states.”⁴² As a result, our panel data estimates of the impact of RTC laws are downward biased by the amount that RTC laws induce crime spillovers into non-RTC states.⁴³ One police investigation revealed that of the 224 guns a single gun trafficker in the DC area was known to have sold in just five months of 2015, 94 were later found at crime scenes from Virginia to New York (Hermann & Weiner 2019).

2. The LM Panel Data Model

Table 2’s recitation of the explanatory variables contained in the Lott and Mustard (LM) panel data model reveals there are no controls for the levels of police and incarceration in each state, even though a substantial literature has found that these factors have a large impact on crime. Indeed, as we saw in Table 1, both factors grew substantially and statistically significantly after RTC law adoption. A Bayesian analysis of the impact of RTC laws found that “the incarceration rate is a powerful predictor of future crime rates,” and specifically faulted this omission from the Lott and Mustard model (Strnad 2007:201, n.8). We have discussed an array of infirmities with the LM model in Aneja et al. (2014), including their reliance on flawed pseudo-arrest rates, and highly collinear demographic variables.

As noted in Aneja et al. (2014):

The Lott and Mustard arrest rates ... are a ratio of arrests to crimes, which means that when one person kills many, for example, the arrest rate falls, but when many people kill one person, the arrest rate rises, since only one can be arrested in the first instance and many can in the second. The bottom line is that this “arrest rate” is not a probability and is frequently greater than one because of the multiple arrests per crime. For an extended discussion on the abundant problems with this pseudo arrest rate, see Donohue and Wolfers (2009).

The LM arrest rates are also econometrically problematic since the denominator of the arrest rate is the numerator of the dependent variable crime rate, improperly leaving the dependent variable on both sides of the regression equation. We lag the arrest rates by one year to reduce this problem of ratio bias.

Lott and Mustard’s use of 36 demographic variables is also a potential concern. With so many enormously collinear variables, the high likelihood of introducing noise into the estimation process is revealed by the wild fluctuations in the coefficient estimates on these variables. For example, consider the LM explanatory variables “neither black nor white male aged 30–39” and the identical corresponding female category. The LM dummy variable model for violent crime suggests that the male group will significantly

⁴²“Seventy-five percent of traceable guns recovered by authorities in New Jersey [a non-RTC state] are purchased in states with weaker gun laws, according to ... firearms trace data ... compiled by the federal Bureau of Alcohol, Tobacco, Firearms and Explosives ... between 2012 and 2016” (Pugliese 2018). See also Freskos (2018b).

⁴³Some of the guns stolen from RTC permit holders may also end up in foreign countries, which will stimulate crime there but not bias our panel data estimates. For example, a recent analysis of guns seized by Brazilian police found that 15 percent came from the United States. Since many of these were assault rifles, they were probably not guns carried by American RTC permit holders (Paraguassu & Brito 2018).

Table 4: Panel Data Estimates of the Impact of RTC Laws: State-and Year-Fixed Effects, Using Actual and Modified LM Regressors, 1977–2014

<i>Panel A: LM Regressors Including 36 Demographic Variables</i>					
	<i>Murder Rate</i>	<i>Firearm Murder Rate</i>	<i>Nonfirearm Murder Rate</i>	<i>Violent Crime Rate</i>	<i>Property Crime Rate</i>
	(1)	(2)	(3)	(4)	(5)
Dummy variable model	-5.17 (3.33)	-3.91 (4.82)	-5.70** (2.45)	-1.38 (3.16)	-0.34 (1.71)
<i>Panel B: LM Regressors with 6 DAW Demographic Variables</i>					
	<i>Murder Rate</i>	<i>Firearm Murder Rate</i>	<i>Nonfirearm Murder Rate</i>	<i>Violent Crime Rate</i>	<i>Property Crime Rate</i>
	(1)	(2)	(3)	(4)	(5)
Dummy variable model	3.75 (5.92)	4.34 (7.85)	2.64 (4.02)	10.03** (4.81)	7.59** (3.72)
<i>Panel C: LM Regressors with 6 DAW Demographic Variables and Adding Controls for Incarceration and Police</i>					
	<i>Murder Rate</i>	<i>Firearm Murder Rate</i>	<i>Nonfirearm Murder Rate</i>	<i>Violent Crime Rate</i>	<i>Property Crime Rate</i>
	(1)	(2)	(3)	(4)	(5)
Dummy variable model	4.99 (5.50)	5.96 (7.20)	3.76 (4.29)	10.05** (4.54)	8.10** (3.63)

NOTE: All models include year- and state-fixed effects, and OLS estimates are weighted by state population. Robust standard errors (clustered at the state level) are provided next to point estimates in parentheses. In Panel A, 36 demographic variables (based on different age-sex-race categories) are included as controls in the regressions above. In Panel B, only six demographic variables are included. In Panel C, only six demographic variables are included and controls are added for incarceration and police. For all three panels, other controls include the previous year's violent or property crime arrest rate (depending on the crime category of the dependent variable), state population, population density, real per capita income, real per capita unemployment insurance payments, real per capita income maintenance payments, and real retirement payments per person over 65. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. All figures reported in percentage terms.

increase crime (the coefficient is 219), but their female counterparts have an even greater dampening effect on crime (with a coefficient of -258). Both conflicting estimates (not shown in Appendix Table B1) are statistically significant at the 0.01 level, and they are almost certainly picking up noise rather than revealing true relationships. Bizarre results are common in the LM estimates among these 36 demographic variables.⁴⁴

⁴⁴Aneja et al. (2014) test for the severity of the multicollinearity problem using the 36 LM demographic variables, and the problem is indeed serious. The variance inflation factor (VIF) is shown to be in the range of 6 to 7 for the RTC variable in the LM dummy model when the 36 demographic controls are used. Using the six DAW variables reduces the multicollinearity for the RTC dummy to a tolerable level (with VIFs always below the desirable threshold of 5).

Table 4, Panel A shows the results of the LM panel data model estimated over the period 1977–2014. As seen above, the DAW model generated estimates that RTC laws raised violent and property crime (in the dummy model of Table 3), while the estimated impact on murders was too imprecise to be informative. The LM model generates no statistically significant estimates, except for an apparent decline in non-firearm-related murders. We can almost perfectly restore the DAW Table 3 findings, however, by simply limiting the inclusion of 36 highly collinear demographic variables to the more typical array used in the DAW regressions, as seen in Panel B of Table 4. This modified LM dummy variable model suggests that RTC laws increase violent and property crime, mimicking the DAW dummy variable model estimates, and this same finding persists if we add in controls for police and incarceration, as seen in Panel C of Table 4.

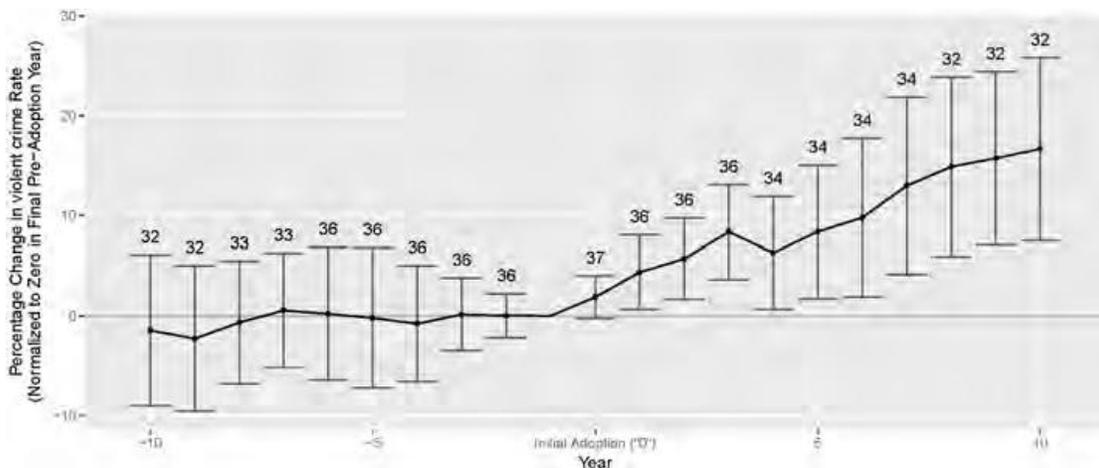
3. Testing the DAW and LM Models for the Parallel Trends Assumption

Many researchers are content to present panel data results such as those shown in Tables 3 and 4 without establishing their econometric validity. This can be a serious mistake. We have already registered concerns about the choice of controls included in the LM model, but, as we will see, the LM model regressions in Panel A of Table 4—including the spurious finding that RTC laws reduce non-firearm homicides—uniformly violate the critical assumption of parallel trends. In sharp contrast, the DAW model illustrates nearly perfect parallel trends in the decade prior to RTC adoption for violent crime and sufficiently satisfies this assumption in three of the other four regressions in Table 3 (murder, non-firearm murder, and property crime).

To implement this test and to provide more nuanced estimates of the impact of RTC laws on crime than in the simple dummy models of Tables 3 and 4, we ran regressions showing the values on yearly dummy variables for 10 years prior to RTC adoption to 10 years after RTC adoption. If the key parallel trends assumption of panel data analysis is valid, we should see values of the pre-adoption dummies that show no trend and are close to zero. Figure 2 shows that the DAW violent crime model performs extremely well: the pre-adoption dummies are virtually all zero (and hence totally flat) for the eight years prior to adoption, and violent crime starts rising in the year of adoption, showing statistically significant increases after the law has been in effect for at least a full year. The upward trend in violent crime continues for the entire decade after adoption. Figure 2 also highlights that the single dummy models of Tables 3 and 4 (which implicitly assume an immediate and constant post-adoption impact on crime) are mis-specified. Importantly, we can now see the exact timing and pattern of the estimated impact on crime, which can, and in this case does, provide further support for a causal interpretation of the estimated increase in violent crime.

In contrast to the ideal performance of the DAW violent crime model, all of the Table 4 regressions using the LM model perform extremely poorly. For example, consider the LM model for firearm murder depicted in Figure 3, which shows that there is

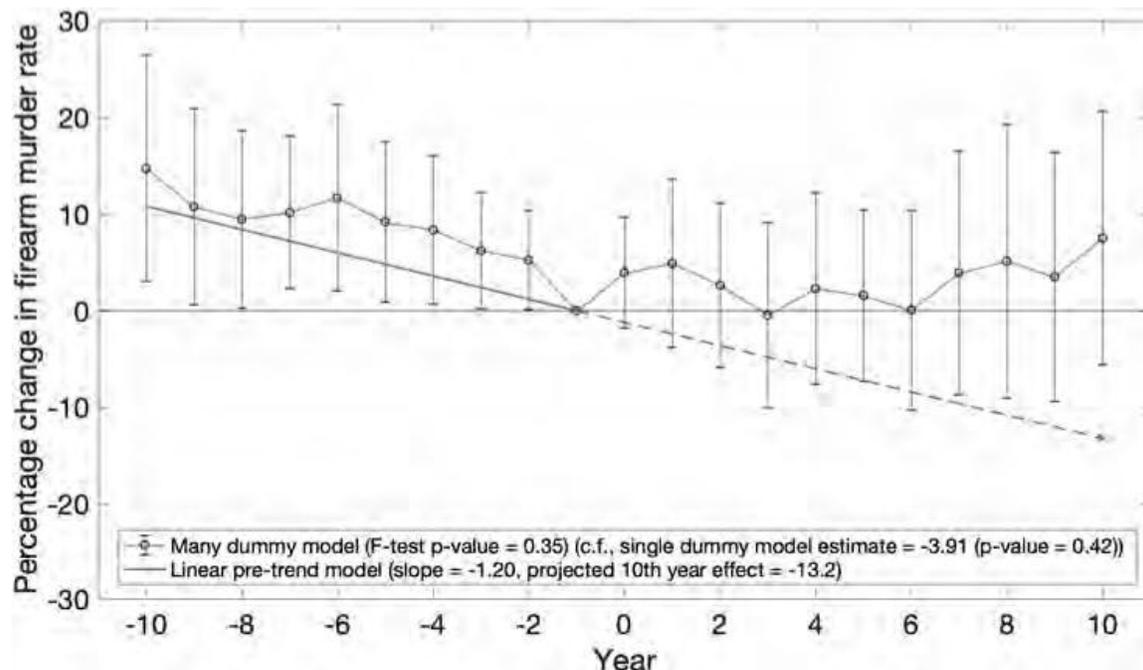
Figure 2: The impact of RTC laws on violent crime, DAW model, 1979–2014.



NOTE: We regress crime on dummies for pre- and post-passage years and DAW covariates. Reference year is year before adoption and adoption year is first year with RTC in place at any time, meaning that in states that adopt after January 1, this will capture only a partial effect of RTC laws. We display the 95 percent confidence interval for each estimate using cluster-robust standard errors and show the number of states that contribute to each estimate.

an enormously steep downward trend in the values of the pre-adoption dummies. Indeed, we see that the downward trend reverses just at the time of adoption of the RTC law and after six years we observe statistically significant increases in firearm

Figure 3: The impact of RTC laws on firearm murder, LM model, 1977–2014



murder above the prior trend. Thus, while Table 4 ostensibly showed a statistically insignificant 3.9 percent drop in violent crime, the more discerning analysis of Figure 3 shows that that estimate is econometrically invalid, given such an influential violation of the parallel trends requirement. In fact, the LM model estimated for Figure 3 provides evidence that the adoption of RTC laws reversed a previous benign trend starting exactly at the time of RTC adoption and led to higher levels of firearm homicide.

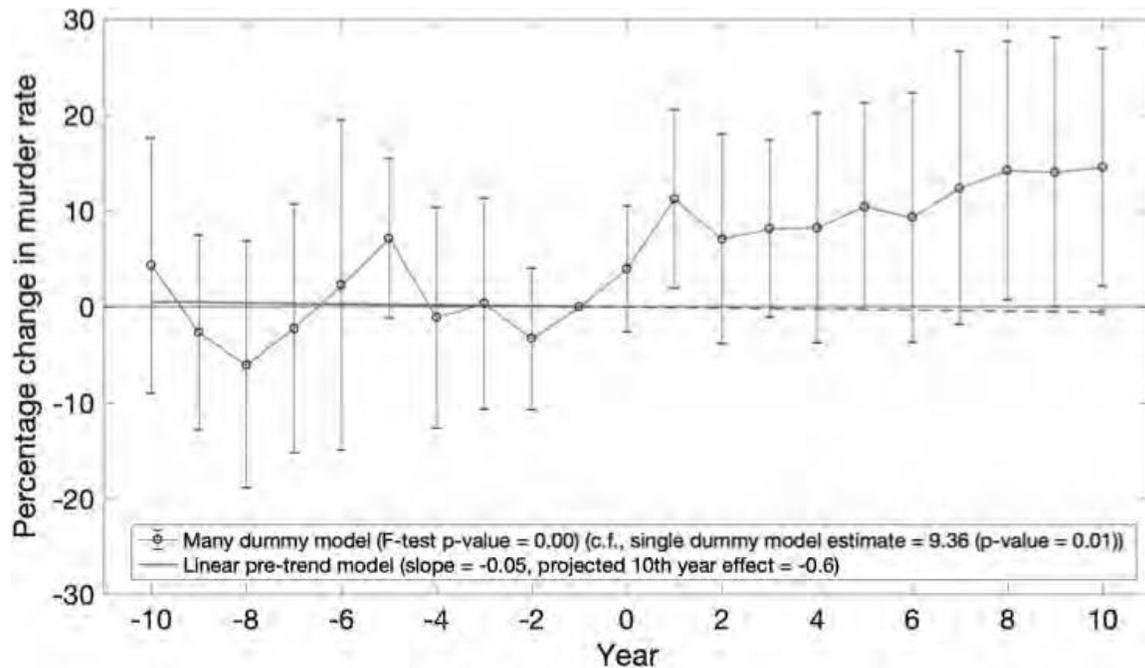
Appendix D depicts the same year-by-year estimates for the other crimes using both the DAW and LM models. It is worth noting that, for our entire data period, the four DAW and LM murder and firearm murder figures show an apparent malign break in trend at the time of RTC adoption, while the trend for non-firearm murder remains unchanged in the DAW and LM models. The unchanged downward trend in the LM non-firearm model illustrates the violation of the parallel trends assumption, invalidating the anomalous finding for that crime in Panel A of Table 4.⁴⁵

For the DAW and LM property crime panel data estimates, we see almost the same pattern. While the pre-adoption performance of the DAW property crime model (see Appendix Figure D2) is not quite as perfect as it was for violent crime, it still shows a roughly flat pattern for the eight years prior to adoption, followed by a persistent pattern of increasing property crime in the 10 years after RTC adoption. The increase in property crime turns statistically significant at the time of adoption. In Appendix Figure D3, however, we again see the same deficient pattern observed for the LM model in Appendix Figure D1: property crime falls in the 10 years prior to adoption, and the pattern reverses itself, leading to increasing property crime in the decade following RTC adoption.

We also conducted a panel data assessment looking at the 11 states that adopted RTC laws in the period from 2000–2014 when the confounding effect of the crack epidemic had subsided. The results provide further support that RTC laws increase crime, including estimates that overall murder and firearm murder rise substantially with RTC adoption. See further discussion and relevant figures and estimates in Appendix C. Figure 4 shows the year-by-year estimated effect of RTC laws on overall murder for the DAW model for this postcrack time period. The figure shows a flat pretrend (albeit with some variance around it) and then a sizeable jump in murder starting just at the year of RTC adoption. The LM model shows substantially the same statistically significant increase in murder.

⁴⁵Appendix Figure D1 also illustrates why the LM dummy model estimate on violent crime in Panel A of Table 4 was not positive and statistically significant (as it was for the DAW model in Table 3 and the modified LM models in Panels B and C of Table 4): Appendix Figure D1 reveals that, for the LM model, violent crime was trending down throughout the pre-adoption period, dropping from 5 percentage points to zero over that decade, at which point it reverses and violent crime increases to roughly a 6 percent increase by 10 years after RTC adoption. The v-shape pattern over that two-decade period leads the LM dummy model to obscure the increase in violent crime that is clearly seen in Appendix Figure D1.

Figure 4: The impact of RTC laws on murder, DAW model, 2000–2014



B. Summary of Panel Data Analysis

The uncertainty about the impact of RTC laws on crime expressed in the NRC Report was based on an analysis of data only through 2000. The preceding evaluation of an array of different specifications over the full data period from the late 1970s through 2014 as well as in the postcrack period has given consistent evidence that something bad happened to murder and violent and property crime right at the time of RTC adoption. The most statistically significant crime increases for the full period were seen for DAW violent and property crime. For the postcrack period, the largest and most highly statistically significant increases were seen for murder and firearm murder.

Other work has also provided evidence that RTC laws increase murder and/or overall violent crime—see Zimmerman (2014), examining postcrack-era data and the recent work by Donohue (2017b) and Siegel et al. (2017) concluding that RTC laws increase firearm and handgun homicide. Work by McElroy and Wang (2017) reinforces this conclusion, with results from a dynamic model that accounts for forward-looking behavior finding that violent crime would be one-third lower if RTC laws had not been passed. We discuss other recent published studies finding that RTC laws increase violent crime in Appendix C.

Despite the substantial panel data evidence in the post-NRC literature that supports the finding of the pernicious influence of RTC laws on crime, the NRC suggestion that

new techniques should be employed to estimate the impact of these laws is fitting. The important paper by Strnad (2007) used a Bayesian approach to argue that none of the published models used in the RTC evaluation literature rated highly in his model selection protocol when applied to data from 1977–1999.

Durlauf et al. attempt to sort out the different specification choices in evaluating RTC laws by using their own Bayesian model averaging approach using county data from 1979–2000. Applying this technique, the authors find that in their preferred spline (trend) model, RTC laws elevate violent crime in the three years after RTC adoption: “As a result of the law being introduced, violent crime increases in the first year and continues to increase afterwards” (2016:50). By the third year, their preferred model suggests a 6.5 percent increase in violent crime. Since their paper only provides estimates for three postpassage years, we cannot draw conclusions beyond this but note that their finding that violent crime increases by over 2 percent per year owing to RTC laws is a substantial crime increase. Moreover, the authors note: “For our estimates, the effect on crime of introducing guns continues to grow over time” (2016:50).⁴⁶

Owing to the substantial challenges of estimating effects from observational data, it will be useful to see if yet another statistical approach that has different attributes from the panel data methodology can enhance our understanding of the impact of RTC laws. The rest of this article will use this synthetic control approach, which has been deemed “arguably the most important innovation in the policy evaluation literature in the last 15 years” (Athey & Imbens 2017).

IV. ESTIMATING THE IMPACT OF RTC LAWS USING SYNTHETIC CONTROLS

The synthetic control methodology, which is becoming increasingly prominent in economics and other social sciences, is a promising new statistical approach for addressing the impact of RTC laws.⁴⁷ While most synthetic control papers focus on a single

⁴⁶While our analysis focused on crime at the state level, there is obviously heterogeneity in crime rates within states, which is amalgamated into our population-weighted state average figures. A paper by Kovandzic et al. (KMV) buttresses the view that our state-focused estimates are not giving a misleading impression of the impact of RTC laws on violent crime. KMV limited their analysis to urban areas within each state, estimating the impact of RTC laws on crime using a panel data analysis from 1980–2000 on 189 cities with a population of 100,000 or more (Kovandzic et al. 2005). Although they did not estimate an overall violent crime effect, they did report that RTC laws were associated with a highly statistically significant increase in the rate of aggravated assault, the largest single component of violent crime. Their figures suggest that RTC laws led to a 20.1 percent increase in aggravated assault in the 10 years following adoption.

⁴⁷The synthetic control methodology has been deployed in a wide variety of fields, including health economics (Nonnemaker et al. 2011), immigration economics (Bohn et al. 2014), political economy (Keele 2009), urban economics (Ando 2015), the economics of natural resources (Mideksa 2013), and the dynamics of economic growth (Cavallo et al. 2013).

treatment in a single geographic region, we look at 33 RTC adoptions occurring over three decades throughout the country. For each adopting (“treated”) state we will find a weighted average of other states (“a synthetic control”) designed to serve as a good counterfactual for the impact of RTC laws because it had a pattern of crime similar to that of the adopting state prior to RTC adoption. By comparing what actually happened to crime after RTC adoption to the crime performance of the synthetic control over the same period, we generate estimates of the causal impact of RTC laws on crime.⁴⁸

A. *The Basics of the Synthetic Control Methodology*

The synthetic control method attempts to generate representative counterfactual units by comparing a treatment unit (i.e., a state adopting an RTC law) to a set of control units across a set of explanatory variables over a preintervention period. The algorithm searches for similarities between the treatment state of interest and the control states during this period and then generates a synthetic counterfactual unit for the treatment state that is a weighted combination of the component control states.⁴⁹ Two conditions are placed on these weights: they must be nonnegative and they must sum to 1. In general, the matching process underlying the synthetic control technique uses pretreatment values of both the outcome variable of interest (in our case, some measure of crime) and other predictors believed to influence this outcome variable.⁵⁰ For the reasons set forth in Appendix K, we use every lag of the dependent variable as predictors in the DAW and LM specifications. Once the synthetic counterfactual is generated and the weights associated with each control unit are assigned, the *synth* program then calculates values for the outcome variable associated with this counterfactual and the root mean squared prediction error (RMSPE) based on differences between the treatment and synthetic control units in the pretreatment period. The effect of the treatment can then be estimated by comparing the actual values of the dependent variable for the treatment unit to the corresponding values of the synthetic control.

B. *Generating Synthetic Controls for 33 States Adopting RTC Laws During Our Data Period*

To illustrate the procedure outlined above, consider the case of Texas, whose RTC law went into effect on January 1, 1996. The potential control group for each treatment state

⁴⁸For a more detailed technical description of this method, we direct the reader to Abadie and Gardeazabal (2003) and Abadie et al. (2010, 2014).

⁴⁹Our analysis is done in Stata using the *synth* software package developed by Alberto Abadie, Alexis Diamond, and Jens Hainmueller.

⁵⁰Roughly speaking, the algorithm that we use finds \mathbf{W} (the weights of the components of the synthetic control) that minimizes $\sqrt{(\mathbf{X}_1 - \mathbf{X}_0\mathbf{W})\mathbf{V}(\mathbf{X}_1 - \mathbf{X}_0\mathbf{W})}$, where \mathbf{V} is a diagonal matrix incorporating information about the relative weights placed on different predictors, \mathbf{W} is a vector of nonnegative weights that sum to 1, \mathbf{X}_1 is a vector containing pretreatment information about the predictors associated with the treatment unit, and \mathbf{X}_0 is a matrix containing pretreatment information about the predictors for all the control units.

consists of all nine states with no RTC legislation as of the year 2014, as well as states that pass RTC laws at least 10 years after the passage of the treatment state (e.g., in this case, the five states passing RTC laws after 2006, such as Nebraska and Kansas, whose RTC laws went into effect at the beginning of 2007). Since we estimate results for up to 10 years postpassage,⁵¹ this restriction helps us avoid including states with their own permissive concealed carry laws in the synthetically constructed unit (which would mar the control comparison).

After entering the necessary specification information into the *synth* program (e.g., treatment unit, list of control states, explanatory variables, etc.), the algorithm proceeds to construct the synthetic unit from the list of control states specific to Texas and generates values of the dependent variable for the counterfactual for both the pre-treatment and posttreatment periods. The rationale behind this methodology is that a close fit in the prepassage time series of crime between the treatment state and the synthetic control generates greater confidence in the accuracy of the constructed counterfactual. Computing the posttreatment difference between the dependent variables of the treatment state and the synthetic control unit provides the synthetic control estimate of the treatment effect attributable to RTC adoption in that state.

1. Synthetic Control Estimates of Violent Crime in Two States

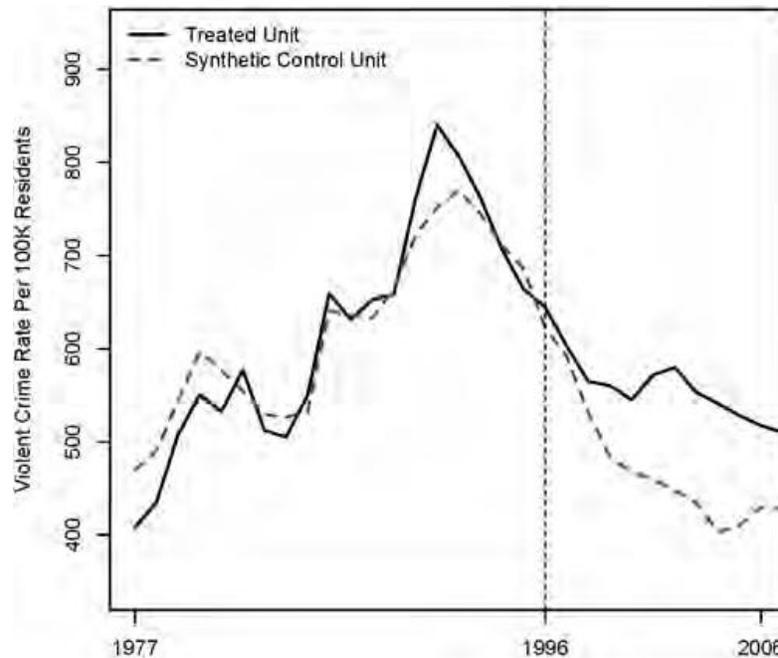
Figure 5 shows the synthetic control graph for violent crime in Texas over the period from 1977 through 2006 (10 years after the adoption of Texas’s RTC law). The solid black line shows the actual pattern of violent crime for Texas, and the vertical line indicates when the RTC law went into effect. Implementing the synthetic control protocol identifies three states that generate a good fit for the pattern of crime experienced by Texas in the pre-1996 period. These states are California, which gets a weight of 57.7 percent owing to its similar attributes compared to Texas, Nebraska with a weight of 9.7 percent, and Wisconsin with a weight of 32.6 percent.

One of the advantages of the synthetic control methodology is that one can assess how well the synthetic control (call it “synthetic Texas,” which is identified in Figure 5 by the dashed line) matches the pre-RTC-passage pattern of violent crime to see whether the methodology is likely to generate a good fit in the 10 years of postpassage data. Here the fit looks rather good in mimicking the rises and falls in Texas violent crime from 1977–1995. This pattern increases our confidence that synthetic Texas will provide a good prediction of what would have happened in Texas had it not adopted an RTC law.

Looking at Figure 5, we see that while both Texas and synthetic Texas (the weighted average violent crime performance of the three mentioned states) show declining crime rates in the postpassage decade after 1996, the crime drop is

⁵¹Our choice of 10 years is informed by the tradeoffs associated with using a different timeframe. Tables 5 and 6 indicate that the increase in violent crime due to RTC laws is statistically significant at the .01 level for all years after seven years post-adoption.

Figure 5: Texas: Violent crime rate.



Effect of 1996 RTC Law 10 Years After Adoption: 16.9%

NOTE: Passage Year Difference From SC: 3.6% Composition of SC: CA (0.577); NE (0.097); WI (0.326) CVRMSPE: 0.06 (8 of 33 states, where 1 denotes the state with the best pre-passage fit.).

States Never Passing RTC Laws Included in Synthetic Control: CA;

RTC Adopting States Included in Synthetic Control: NE (2007); WI (2012).

substantially greater in synthetic Texas, which had no RTC law over that period, than in actual Texas, which did. As Figure 5 notes, 10 years after adopting its RTC law, violent crime in Texas was 16.9 percent *higher* than we would have expected had it not adopted an RTC law.⁵²

Figure 5 also illustrates perhaps the most important lesson of causal inference: one cannot simply look before and after an event to determine the consequence of the event. Rather, one needs to estimate the difference between what did unfold and the counterfactual of what would have unfolded without the event. The value of the synthetic control methodology is that it provides a highly transparent estimate of that counterfactual, using a tool designed to ensure the validity of the parallel trends assumption that we have already seen is so critical to achieving meaningful causal estimates. Thus, when Lott

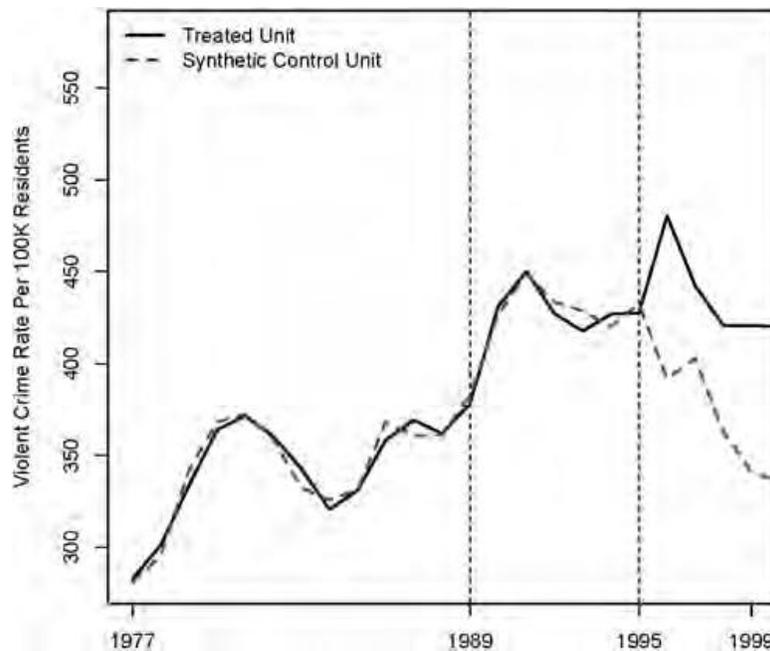
⁵²Texas's violent crime rate 10 years post-adoption exceeds that of "synthetic Texas" by 20.41 percent $= \frac{517.3 - 429.6}{429.6} \times 100\%$. While some researchers would take that value as the estimated effect of RTC, we chose to subtract off the discrepancy in 1996 between the actual violent crime rate and the synthetic control value in that year. This discrepancy is 3.55 percent $= \frac{644.4 - 622.3}{622.3} \times 100\%$ (shown in the line just below the graph of Figure 5). See footnote 58 for further discussion of this calculation. Figure 5 shows a (rounded) estimated violent crime increase in Texas of 16.9 percent. We arrive at this estimate by subtracting the 1996 discrepancy of 3.55 percent from the 20.41 percent 10th-year discrepancy, which generates a TEP of 16.86 percent.

(2010) quotes a Texas District Attorney suggesting that he had reversed his earlier opposition to the state's RTC law in light of the perceived favorable experience with the law, we see why it can be quite easy to draw the inaccurate causal inference that Texas's crime decline was facilitated by its RTC law. The public may perceive the falling crime rate post-1996 (the solid black line), but our analysis suggests that Texas would have experienced a more sizable violent crime decline if it had not passed an RTC law (the dotted line). More specifically, Texas experienced a 19.7 percent decrease in its aggregate violent crime rate in the 10 years following its RTC law (between 1996 and 2006), while the state's synthetic control experienced a larger 31.0 percent decline. This counterfactual would not be apparent to residents of the state or to law enforcement officials, but our results suggest that Texas's RTC law imposed a large social cost on the state.

The greater transparency of the synthetic control approach is one advantage of this methodology over the panel data models that we considered above. Figure 5 makes clear what Texas is being compared to, and we can reflect on whether this match is plausible and whether anything other than RTC laws changed in these three states during the post-passage decade that might compromise the validity of the synthetic control estimate of the impact of RTC laws.

Figure 6 shows our synthetic control estimate for Pennsylvania, which adopted an RTC law in 1989 that did not extend to Philadelphia until a subsequent law went into

Figure 6: Pennsylvania: Violent crime rate.



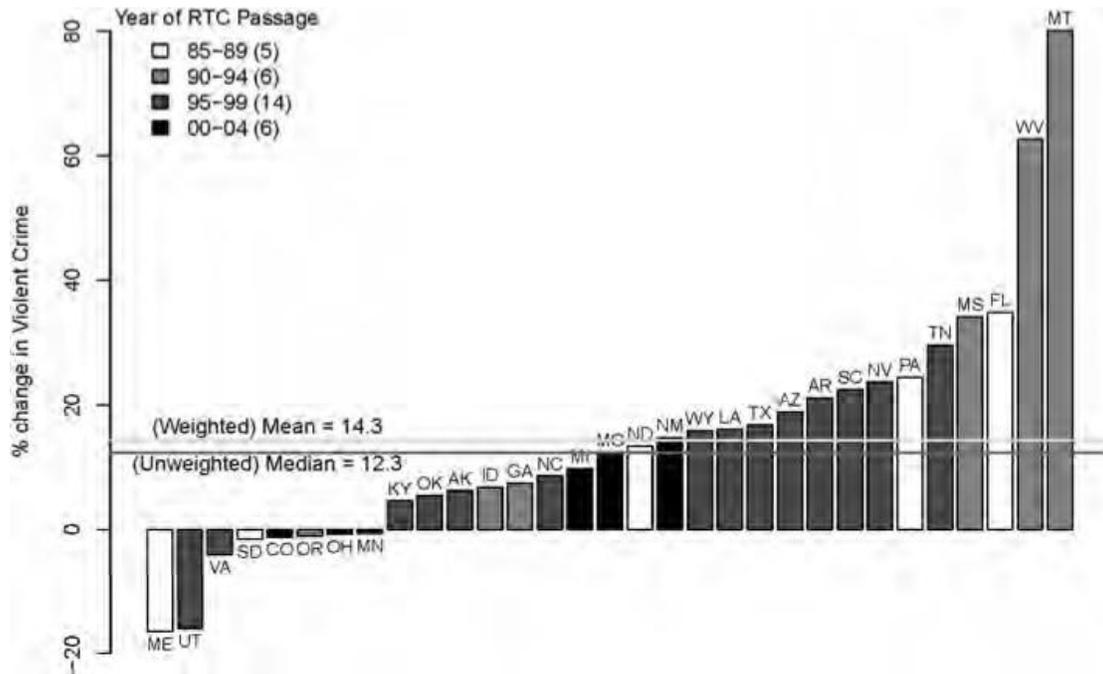
Effect of 1989 RTC Law 10 Years After Adoption: 24.4%

NOTE: Passage Year Difference From SC: -1.1%. Composition of SC: DE (0.078); HI (0.073); MD (0.038); NE (0.016); NJ (0.103); OH (0.27); WI (0.424) CVRMSPE: 0.017 (1 of 33 states, where 1 denotes the state with the best pre-passage fit).

States Never Passing RTC Laws Included in Synthetic Control: DE; HI; MD; NJ;

RTC Adopting States Included in Synthetic Control: NE (2007); OH (2004); WI (2012).

Figure 7: The effect of RTC laws on violent crime after 10 years, synthetic control estimates for 31 states (1977–2014).



effect on October 11, 1995. In this case, synthetic Pennsylvania is comprised of eight states and the prepassage fit is nearly perfect. Following adoption of the RTC laws, synthetic Pennsylvania shows substantially better crime performance than actual Pennsylvania after the RTC law is extended to Philadelphia in late 1995, as illustrated by the second vertical line at 1996. The synthetic control method estimates that RTC laws in Pennsylvania increased its violent crime rate by 24.4 percent after 10 years.⁵³

2. State-Specific Estimates Across All RTC States

Because we are projecting the violent crime experience of the synthetic control over a 10-year period, there will undoubtedly be a deviation from the “true” counterfactual and our estimated counterfactual. If we were only estimating the impact of a legal change for a single state, we would have an estimate marred by this purely stochastic aspect of changing crime. Since we are estimating an average effect across a large number of states, the

⁵³In Appendix I, we include all 33 graphs showing the path of violent crime for the treatment states and the synthetic controls, along with information about the composition of these synthetic controls, the dates of RTC adoption (if any) for states included in these synthetic controls, and the estimated treatment effect (expressed in terms of the percent change in a particular crime rate) 10 years after adoption (or seven years after adoption for two states that adopted RTC laws in 2007, since our data end in 2014). The figures also document the discrepancy in violent crime in the year of adoption between the actual and synthetic control values.

stochastic variation will be diminished as the overestimates and underestimates will tend to wash out in our mean treatment estimates. Figure 7 shows the synthetic control estimates on violent crime for all 31 states for which we have 10 years of postpassage data. For 23 of the 31 states adopting RTC laws, the increase in violent crime is noteworthy.⁵⁴ Although three states were estimated to have crime reductions greater than the -1.6 percent estimate of South Dakota, if one averages across all 31 states, the (population-weighted) mean treatment effect after 10 years is a 14.3 percent *increase* in violent crime. If one instead uses an (unweighted) median measure of central tendency, RTC laws are seen to *increase* crime by 12.3 percent.

3. Less Effective Prepassage Matches

Section IV.B.1 provided two examples of synthetic controls that matched the crime of the treatment states well in the prepassage period, but this does not always happen. For example, we would have considerably less confidence in the quality of the synthetic control estimates for Maine, whose poor estimate is depicted in Appendix Figure I11. Maine also happens to be the state showing the greatest reduction in violent crime following RTC adoption, as indicated in Figure 7.

For Maine, one sees that the synthetic control and the state violent crime performance diverged long before RTC adoption in 1986, and that, by the date of adoption, Maine's violent crime rate was already 37.9 percent below the synthetic control estimate. The violent crime rate of actual Maine was trending down, while the synthetic control estimate had been much higher and trending up in the immediate pre-adoption period. The difficulty in generating good prepassage matches for states like Maine stems from their unusually low violent crime in the prepassage period.

Appendix Figure D11 reproduces Figure 7 while leaving out the five states for which the quality of prepassage fit is clearly lower than in the remaining 26 states.⁵⁵ This knocks out North Dakota, South Dakota, Maine, Montana, and West Virginia, thereby eliminating three of the five outlier estimates at both ends of the scale, and leaving the mean and median effects of RTC laws relatively unchanged from Figure 7. As Appendix Figure D11 shows, the (weighted) mean increase in crime across the listed 26 RTC-adopting states is 13.7 percent while the (unweighted) median increase is now 11.1 percent. Increases in violent crime of this magnitude are troubling. Consensus estimates of the elasticity of crime with respect to incarceration hover around 0.15 today, which suggests that to offset the increase in crime caused by RTC adoption, the average RTC state would need to approximately double its prison population.

⁵⁴The smallest of these, Kentucky, had an increase of 4.6 percent.

⁵⁵In particular, for these five states, the prepassage CVRMSPE—that is, the RMSPE transformed into a coefficient of variation by dividing by the average prepassage crime rate—was 19 percent or greater. See note 61 for further discussion of this statistic.

V. AGGREGATION ANALYSIS USING SYNTHETIC CONTROLS

A small but growing literature applies synthetic control techniques to the analysis of multiple treatments.⁵⁶ We estimate the percentage difference in violent crime between each treatment (RTC-adopting) state and the corresponding synthetic control in both the year of the treatment and in the 10 years following it. This estimate of the treatment effect percentage (TEP) obviously uses data from fewer posttreatment years for the two treatment states⁵⁷ in which RTC laws took effect less than 10 years before the end of our sample.

We could use each of these 10 percentage differences as our estimated effects of RTC laws on violent crime for the 10 postpassage years, but, as noted above, we make one adjustment to these figures by subtracting from each the percentage difference in violent crime in the adoption year between the treatment and synthetic control states. In other words, if 10 years after adopting an RTC law, the violent crime rate for the state was 440 and the violent crime rate for the synthetic control was 400, one estimate of the effect of the RTC law could be 10 percent ($= \frac{440-400}{400}$). Rather than use this estimate, however, we have subtracted from this figure the percentage difference between the synthetic and treatment states in the year of RTC adoption. If, say, the violent crime rate in the treatment state that year was 2 percent higher than the synthetic control value, we would subtract 2 from 10 to obtain an estimated 10th-year effect of RTC laws of 8 percent.⁵⁸ We

⁵⁶The closest paper to the present study is Arindrajit Dube and Ben Zipperer (2013), who introduce their own methodology for aggregating multiple events into a single estimated treatment effect and calculating its significance. Their study centers on the effect of increases in the minimum wage on employment outcomes, and, as we do, the authors estimate the percentage difference between the treatment and the synthetic control in the post-treatment period. While some papers analyze multiple treatments by aggregating the areas affected by these treatments into a single unit, this approach is not well-equipped to deal with a case such as RTC law adoption where treatments affect the majority of panel units and more than two decades separate the dates of the first and last treatment under consideration, as highlighted in Figure 7.

⁵⁷These two states are Kansas and Nebraska, which adopted RTC laws in 2007. See note 4 discussing the states for which we cannot estimate the impact of RTC laws using synthetic controls.

⁵⁸It is unclear *ex ante* whether one should implement this subtraction. The intuitive rationale for our choice of outcome variable was that pretreatment differences between the treatment state and its synthetic control at the time of RTC adoption likely reflected imperfections in the process of generating a synthetic control and should not contribute to our estimated treatment effect if possible. In other words, if the treatment state had a crime rate that was 5 percent greater than that of the synthetic control in both the pretreatment and posttreatment period, it would arguably be misleading to ignore the pretreatment difference and declare that the treatment increased crime rates by 5 percent. On the other hand, subtracting off the initial discrepancy might be adding noise to the subsequent estimates.

We resolve this issue with the following test of our synthetic control protocol: we pretend that each RTC-adopting state actually adopted its RTC law five years before it did. We then generate synthetic control estimates of this phantom law over the next five years of actual pretreatment data. If our synthetic control approach is working perfectly, it should simply replicate the violent crime pattern for the five pretreatment years. Consequently, the estimated “effect” of the phantom law should be close to zero. Indeed, when we follow our subtraction protocol, the synthetic controls match the pretreatment years more closely than when we do not provide this normalization. Specifically, with subtraction the estimated “effect” in the final pretreatment year is a wholly insignificant 3.2 percent; without subtraction, it jumps to a statistically significant 5.3 percent. Consequently,

then look across all the state-specific estimates of the impact of RTC laws on violent crime for each of the 10 individual postpassage years and test whether they are significantly different from zero.⁵⁹

A. *RTC Laws Increase Violent Crime*

We begin our analysis of the aggregated synthetic control results using predictors derived from the DAW specification. Table 5 shows our results on the full sample examining violent crime.⁶⁰ Our estimates of the normalized average treatment effect percentage (TEP) suggest that states that passed RTC laws experienced more deleterious changes in violent criminal activity than their synthetic controls in the 10 years after adoption. On average, treatment states had aggregate violent crime rates that were almost 7 percent higher than their synthetic controls five years after passage and around 14 percent higher 10 years after passage. Table 5 suggests that the longer the RTC law is in effect (up to the 10th year that we analyze), the greater the cost in terms of increased violent crime.

As we saw in Figures 6 (Pennsylvania) and 111 (Maine), the validity of using the posttreatment difference between crime rates in the treatment state (the particular state adopting an RTC law that we are analyzing) and its corresponding synthetic control as a measure of the effect of the RTC law depends on the strength of the match between these two time series in the pretreatment period. To generate an estimate of pretreatment fit that takes into account differences in pretreatment crime levels, we estimate the coefficient of variation for the root mean squared prediction error (RMSPE), which

normalization is the preferred approach for violent crime. It should also be noted that our actual synthetic control estimates will be expected to perform better than this phantom RTC estimate since we will be able to derive our synthetic controls from five additional years of data, thereby improving our pretreatment fit.

As it turns out, the choice we made to subtract off the initial-year crime discrepancy is a conservative one, in that the estimated crime increases from RTC laws would be *greater* without subtraction. We provide synthetic control estimates for the DAW model without subtraction of the adoption-year percentage difference for violent crime, murder, and property crime in Appendix F. Comparison of these Appendix F estimates with those in the text (Table 5) reveals that our preferred method of subtracting yields more conservative results (i.e., a smaller increase in violent crime due to RTC). In Table 5, we estimate the 10th-year TEP for violent crime as roughly 13.5 to 14.3 percent, while the comparable estimates without subtraction are roughly 17–18 percent, as seen in Appendix Tables F1, F2, and F3. Indeed, without subtraction, every estimated impact would show RTC laws lead to a statistically significant increase in every crime category we consider except non-firearm homicide, as seen in Appendix F.

⁵⁹This test is performed by regressing these differences in a model using only a constant term and examining whether that constant is statistically significant. These regressions are weighted by the population of the treatment state in the posttreatment year under consideration. Robust standard errors corrected for heteroskedasticity are used in this analysis.

⁶⁰We discuss the synthetic control estimates for murder and property crime in Section V.F.

Table 5: The Impact of RTC Laws on the Violent Crime Rate, DAW Covariates, Full Sample, 1977–2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Average normalized treatment effect percentage (TEP)	-0.117 (1.076)	2.629* (1.310)	3.631* (1.848)	4.682** (2.068)	6.876*** (2.499)	7.358** (3.135)	10.068*** (2.823)	12.474*** (3.831)	14.021*** (3.605)	14.344*** (2.921)
N	33	33	33	33	33	33	33	31	31	31
Pseudo <i>p</i> value	0.936	0.274	0.220	0.192	0.094	0.106	0.060	0.038	0.032	0.032

NOTE: Standard errors in parentheses. Column numbers indicate postpassage year under consideration; *N* = number of states in sample. The synthetic controls method is run using the nested option, and each year's estimate and statistical significance is computed as explained in note 59. **p* < 0.10; ***p* < 0.05; ****p* < 0.01.

is the ratio of the synthetic control's pretreatment RMSPE to the pretreatment average level of the outcome variable for the treatment state.⁶¹

To evaluate the sensitivity of the aggregate synthetic control estimate of the crime impact of RTC laws in Table 5, we consider two subsamples of treatment states: states whose coefficients of variation are less than two times the average coefficient of variation for all 33 treatments and states whose coefficients of variation are less than this average. We then rerun our synthetic control protocol using each of these two subsamples to examine whether restricting our estimation of the average treatment effect to states for which a relatively "better" synthetic control could be identified would meaningfully change our findings.

All three samples yield roughly identical conclusions: RTC laws are consistently shown to increase violent crime, with the 10th-year increase ranging from a low of 13.5 (when we remove the six states with above-average values of the CV RMSPE) to a high of 14.3 percent (Table 5).

B. The Placebo Analysis

Our ability to make valid inferences from our synthetic control estimates depends on the accuracy of our standard error estimation. To test the robustness of the standard errors that we present under the first row of Table 5, we incorporate an analysis using placebo treatment effects similar to Ando (2015).⁶² For this analysis, we generate 500 sets of randomly generated RTC dates that are designed to resemble the distribution of actual RTC

⁶¹While the RMSPE is often used to assess this fit, we believe that the use of this measure is not ideal for comparing fit across states, owing to the wide variation that exists in the average pretreatment crime rates among the 33 treatment states that we consider. For example, the pretreatment RMSPE associated with our synthetic control analysis using the DAW predictor variables and aggregate violent crime as the outcome variable is nearly identical for Texas (37.1) and Maine (36.4), but the pretreatment levels of Texas's aggregate violent crime rate are far greater than Maine's. To be more specific, Texas's average violent crime rate prior to the implementation of its RTC law (from 1977 through 1995) was 617 violent crimes per 100,000 residents, while the corresponding figure for Maine was 186 violent crimes per 100,000 residents, less than one-third of Texas's rate. The more discerning CV of the RMSPE is 0.06 for Texas (with a year of adoption discrepancy of only 3.6 percent), while for Maine, the CV is a dramatically higher at 0.196 (with an initial year discrepancy of -37.9 percent). Accordingly, since the percentage imprecision in our synthetic pretreatment match for Maine is so much greater than for Texas, we have greater confidence in our estimates that in the 10th year, Texas's RTC law had increased violent crime by 16.9 percent than we do in an estimate that Maine's law had decreased violent crime by 16.5 percent.

⁶²Ando (2015) examines the impact of constructing nuclear plants on local real per capita taxable income in Japan by generating a synthetic control for every coastal municipality that installed a nuclear plant. Although the average treatment effect measured in our article differs from the one used by Ando, we follow Ando in repeatedly estimating average placebo effects by randomly selecting different areas to serve as placebo treatments. (The sheer number of treatments that we are considering in this analysis prevents us from limiting our placebo treatment analysis to states that never adopt RTC laws, but this simply means that our placebo estimates will likely be biased *against* finding a qualitatively significant effect of RTC laws on crime, since some of our placebo treatments will be capturing the effect of the passage of RTC laws on crime rates.) Our estimated average treatment effect can then be compared to the distribution of average placebo treatment effects. Heersink and Peterson (2016) and Cavallo et al. (2013) also perform a similar randomization procedure to estimate the significance of their estimated average treatment effects, although the randomization procedure in the latter paper differs from ours by restricting the timing of placebo treatments to the exact dates when actual treatments took place.

passage dates that we use in our analysis.⁶³ For each of the 500 sets of randomly generated RTC dates, we then use the synthetic control methodology and the DAW predictors to estimate synthetic controls for each of the 33 states whose randomly generated adoption year is between 1981 and 2010. We use these data to estimate the percentage difference between each placebo treatment and its corresponding synthetic control during both the year of the treatment and each of the 10 posttreatment years (for which we have data) that follow it. Using the methodology described in notes 52 and 58, we then test whether the estimated treatment effect for each of the 10 posttreatment years is statistically significant.

To further assess the statistical significance of our results, we compare each of the 10 coefficient estimates in Table 5 with the distribution of the 500 average placebo treatment effects that use the same crime rate, posttreatment year, and sample as the given estimate. To assist in this comparison process, we report a pseudo p value that is equal to the proportion of our placebo treatment effects whose absolute value is greater than the absolute value of the given estimated treatment effect. This pseudo p value provides another intuitive measure of whether our estimated average treatment effects are qualitatively large compared to the distribution of placebo effects. Our confidence that the treatment effect that we are measuring for RTC laws is real increases if our estimated treatment effect is greater than the vast majority of our estimated average placebo treatment effects. Examining our pseudo p values in Table 5, we see that our violent crime results are always statistically significant in comparison to the distribution of placebo coefficients at the 0.05 level eight years or more past RTC adoption.

C. Synthetic Control Estimates Using LM's Explanatory Variables

In our Section III panel data analysis, we saw that RTC laws were associated with significantly higher rates of violent crime in the DAW model (Table 3), but not in the LM model (Table 4, Panel A). Under the synthetic controls approach, however, we find that the results are the same whether one uses the DAW or LM explanatory variables. This is necessarily true when one uses yearly lags in implementing the synthetic controls – see Kaul et al. (2016) – but it is also true when we use three lags of the dependent variable in our synthetic control protocol, as shown in Table 6. The detrimental effects of RTC laws on violent crime rates are statistically significant at the 0.05 level starting three years after the passage of an RTC law, and appear to increase over time. The treatment effects associated with violent crime in Table 6 range from 9.6 percent in the seventh posttreatment year to 12.8 percent in the 10th posttreatment year. Remarkably, the DAW and LM synthetic control estimates of the impact of RTC laws on violent crime are nearly identical

⁶³More specifically, we randomly choose eight states to never pass RTC laws, six states to pass RTC laws before 1981, 33 states to pass RTC laws between 1981 and 2010, and three states to pass their RTC laws between 2011 and 2014. (Washington, DC is not included in the placebo analysis since it is excluded from our main analysis.) These figures were chosen to mirror the number of states in each of these categories in our actual data set.

Table 6: The Impact of RTC Laws on the Violent Crime Rate, LM covariates, Full Sample, 1977–2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Average Normalized TEP	0.309 (1.318)	1.981 (1.646)	4.063* (2.192)	5.211* (2.572)	7.159** (2.887)	6.981** (3.319)	9.644*** (3.016)	11.160*** (3.680)	12.115*** (3.857)	12.794*** (3.200)
N	33	33	33	33	33	33	33	31	31	31

NOTE: Standard errors in parentheses. Column numbers indicate post-passage year under consideration; N = number of states in sample. The synthetic controls method is run using the non-nested option, and each year's estimate and statistical significance is computed as explained in footnote 59. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

(compare Tables 6 and Appendix Table K1), and this is true even when we limit the sample of states in the manner described above.⁶⁴

D. The Contributions of Donor States to the Synthetic Control Estimates: Evaluating Robustness

One of the key elements of the synthetic control approach is its selection among plausible control states. For each state adopting an RTC law in year X, the approach selects among states that do not have RTC laws through at least ten years after X, including never-adopting states. Appendix Figure D10 lists all the states that are eligible under this criterion to serve as synthetic controls for one or more of the 33 adopting states, and shows how often they are selected. The horizontal length of each bar tells us how much that state contributes to our synthetic control violent crime estimates.⁶⁵ As the figure indicates, Hawaii appears most frequently—contributing to a synthetic control 18 of the 33 times it is eligible and averaging a 15.2 percent contribution—but California, a substantial contributor to multiple large states, edges it out for the largest average contribution (18.1 percent).

Hawaii's relatively large contribution as a donor state in the synthetic control estimates has some advantages but also raises concern that this small state might be unrepresentative of the states for which it is used as a control. For example, note that the largest share of Virginia's synthetic control comes from Hawaii (27.9 percent), with Rhode Island, Kansas, and Nebraska making up the lion's share of the remaining synthetic control. We had already mentioned one problem with the panel data analysis caused by the tendency of lax gun control states to serve as a source for guns that contribute to crime in the non-RTC states, and Virginia has always been a major source of that interstate flow. Since Virginia's guns are not likely to end up in Hawaii, the bias that the treatment infects the control is reduced for that particular match. Nonetheless, one may be concerned that Hawaii might be unduly skewing the estimates of the impact of RTC laws on violent crime.

To address this, as well as the analogous concern for other potentially idiosyncratic control states, we generated 18 additional TEP estimates, with each one generated by dropping a single one of the 18 states that appears as an element of our synthetic control analysis (as identified in Appendix Figure D10). The results of this exercise are presented in Appendix Figure D12, which shows that our estimated increase in violent crime resulting from the adoption of an RTC law is extremely robust: All 18 estimates remain statistically significant at the 0.01 percent level, and

⁶⁴The 10th-year effect in the synthetic control analysis using the LM variables is 12.4 percent when we eliminate the three states with more than twice the average CV of the RMSPE. Knocking out the seven states with above-average values of this CV generates a similar 12.5 percent effect.

⁶⁵In particular, it reflects the portion of each synthetic state it becomes part of, weighted by the treated state's population. For example, Texas's population is 13.6 percent of the total treated states' population. As a result, a state that made up 50 percent of synthetic Texas (but is not a donor for any other treatment state) would have a bar of size 6.8 percent.

the smallest TEP, which comes from dropping Illinois as a control state, is 12.0 percent. Note in particular that dropping Hawaii from the list of potential donor states slightly *increases* the estimate of the increase in violent crime caused by RTC laws. In fact, when we dropped Hawaii completely as a potential control and repeated the previous protocol of dropping one state at a time, the estimated increase in violent crime from RTC never fell below 12 percent (which was the value when New York was dropped as well as Hawaii). Indeed, the synthetic control finding that RTC laws increase violent crime is so robust that even if we drop California, New York, and Hawaii from the pool of potential donor states, RTC laws still increase violent crime by 8.9 percent after 10 years ($p = 0.018$).

E. Does Gun Prevalence Influence the Impact of RTC Laws?

The wide variation in the state-specific synthetic control estimates that was seen in Figures 7 and D11 suggests that there is considerable noise in some of the outlier estimates of a few individual states. For example, it is highly improbable that RTC laws led to a 16.5 percent decrease in violent crime in Maine and an 80.2 percent increase in violent crime in Montana, the two most extreme estimates seen in Figure 7. Since averaging across a substantial number of states will tend to eliminate the noise in the estimates, one should repose much greater confidence in the aggregated estimates than in any individual state estimate. Indeed, the fact that we can average across 33 separate RTC-adopting states is what generates such convincing and robust estimates of the impact of RTC laws on violent crime.

Another way to distill the signal from the noise in the state-specific estimates is to consider whether there is a plausible factor that could explain underlying differences in how RTC adoption influences violent crime. For example, RTC laws might influence crime differently depending on the level of gun prevalence in the state.

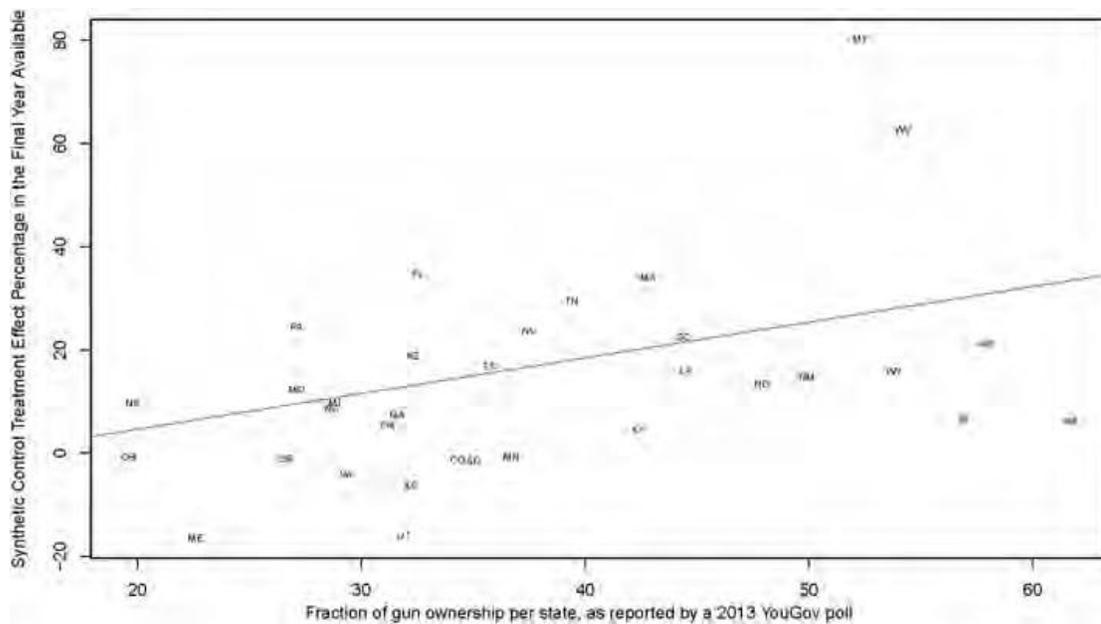
Figure 8 shows the scatter diagram for 33 RTC-adopting states, and relates the estimated impact on violent crime to a measure of gun prevalence in each RTC-adopting state. The last line of the note below the figure provides the regression equation, which shows that gun prevalence is positively related to the estimated increase in crime ($t = 2.39$).⁶⁶

F. The Murder and Property Crime Assessments with Synthetic Controls

The synthetic control estimates of the impact of RTC laws on violent crime uniformly generate statistically significant estimates, and our phantom RTC law synthetic control estimates for the five pretreatment years (described in note 58) give us confidence that the synthetic control approach is working well for our violent crime estimates, as illustrated in Appendix Table L1. Since the estimated increases in violent crime are

⁶⁶The gun prevalence data were collected by the data analytics firm YouGov in a 2013 online survey (Kalesan et al. 2016); 4,486 people were initially surveyed, although only 4,000 results are used in the final data set. YouGov used a proximity matching method to select the survey results for inclusion, matching respondents by race, age, gender, and education to the demographic breakdown of the 2010 American Community Survey.

Figure 8: The impact of gun ownership on the increase in violent crime due to RTC laws (synthetic control estimates, 1977–2014).



NOTE: Treatment effect displayed is for the 10th year after RTC adoption (but 7th post–passage year for Kansas and Nebraska). Treatment Effect = $-9.15 + 0.69 * \text{Gun Prevalence}$. $t = 2.39$; $R^2 = 0.16$. Regression weighted by population in the final TEP year.

statistically significant and consistently observed in both our panel data and synthetic control analyses, these represent our most robust finding.

Just as we saw in the panel data analysis, the synthetic controls provide evidence of increases in the murder and firearm murder categories, but it is weaker and less precise than our violent crime estimates. For example, both Appendix Tables E1 and E2 show estimated crime increases of 8.7 percent (murder) and 15.3 percent (firearm murder), but only the 8.7 figure is statistically significant at the 0.10 level. Interestingly, our phantom law test works well for murder and even suggests statistically significant increases in that crime beginning right at the time of RTC adoption (Appendix Table L3). The firearm murder estimates perform less well in this test, generating an estimated fall in crime of 6.8 percent in the year prior to RTC adoption (Appendix Table L5).

The results from implementing this phantom law approach for property crime are perhaps our less encouraging estimates. While our estimated “effect” in the year prior to adoption would ideally be close to zero in this test, for property crime it is 6.9 percent, with the latter significant at the 0.10 level. (The full results of this test for all the crime categories are shown in Appendix L.) If we accept our normalized estimate for the impact of RTC laws on property crime it would give little reason to reject a null hypothesis of no effect (Appendix Table E8). Because our synthetic control estimates for violent crime are validated by our phantom adoption test and generate uniform and highly

robust results whether dropping selected donor states or states with poor fit, or using either the DAW or LM models, we have greater confidence in and therefore highlight our violent crime estimates. Accordingly, we consign our further discussion of the synthetic control estimates of murder and property crime to Appendix E.

VI. CONCLUSION

The extensive array of panel data and synthetic control estimates of the impact of RTC laws that we present uniformly undermine the “More Guns, Less Crime” hypothesis. There is not even the slightest hint in the data from any econometrically sound regression that RTC laws reduce violent crime. Indeed, the weight of the evidence from the panel data estimates as well as the synthetic control analysis best supports the view that the adoption of RTC laws substantially raises overall violent crime in the 10 years after adoption.

In our initial panel data analysis, our preferred DAW specification predicted that RTC laws have led to statistically significant and substantial increases in violent crime. We also presented both panel data and synthetic control estimates that RTC laws substantially increase the percentage of robberies committed with a firearm, while having no restraining effect on the overall number of robberies. Moreover, to the extent the massive theft of guns from carrying guns outside the home generates crime spillovers to non-RTC states, our estimated increases in violent crime are downward biased.

We then supplemented our panel data results using our synthetic control methodology, and the finding from our panel data analysis was strongly buttressed. Whether we used the DAW or LM specifications, states that passed RTC laws experienced 13–15 percent *higher* aggregate violent crime rates than their synthetic controls after 10 years (results that were significant at either the 0.05 or 0.01 level after five years).

The synthetic control effects that we measure represent meaningful increases in violent crime rates following the adoption of RTC laws, and this conclusion remained unchanged after restricting the set of states considered based on model fit and after considering a large number of robustness checks. The consistency across different specifications and methodologies of the finding that RTC elevates violent crime enables far stronger conclusions than were possible over a decade ago when the NRC Report was limited to analyzing data only through 2000 with the single tool of panel data evaluation.

The best available evidence using different statistical approaches—panel data regression and synthetic control—with varying strengths and shortcomings and with different model specifications all suggest that the net effect of state adoption of RTC laws is a substantial increase in violent crime.

REFERENCES

- Abadie, Alberto, Alexis Diamond, & Jens Hainmueller (2010) “Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California’s Tobacco Control Program,” 105 (490) *J. of the American Statistical Association* 493.

- (2014) Comparative Politics and the Synthetic Control Method,” 59(2) *American J. of Political Science* 495.
- Abadie, Alberto, & Javier Gardeazabal (2003) “The Economic Costs of Conflict: A Case Study of the Basque Country,” 93(1) *American Economic Rev.* 113.
- ABC News (2018) “Man Annoyed by IHOP Customer Before Allegedly Shooting Him in Head,” *ABC News*. <https://abc13.com/man-annoyed-by-ihop-customer-before-allegedly-shooting-him/3160627/>
- Adda, Jérôme, Brendon McConnell, & Imran Rasul (2014) “Crime and the Depenalization of Cannabis Possession: Evidence from a Policing Experiment,” 122(5) *J. of Political Economy* 1130.
- Ando, Michihito (2015) “Dreams of Urbanization: Quantitative Case Studies on the Local Impacts of Nuclear Power Facilities Using the Synthetic Control Method,” 85 *J. of Urban Economics* 68.
- Aneja, Abhay, John J. Donohue, & Alexandria Zhang (2011) “The Impact of Right to Carry Laws and the NRC Report: The Latest Lessons for the Empirical Evaluation of Law and Policy,” 13(2) *American Law & Economics Rev.* 565.
- (2014) “The Impact of Right to Carry Laws and the NRC Report: The Latest Lessons for the Empirical Evaluation of Law and Policy,” *National Bureau of Economic Research Working Paper* 18294.
- Associated Press (2014) “Official: Suspect in Deadly Hospital Shooting Had Lengthy History of Gun Arrests, Violence,” July 26 *Fox News*. <http://www.foxnews.com/us/2014/07/26/official-suspect-in-deadly-hospital-shooting-had-lengthy-history-gun-arrests.html>
- (2015) “8-Year-Old Arizona Boy Accidentally Shot by Baby Sitter,” September 8 *Daily Record*. http://www.canoncitydailyrecord.com/ci_28778997/8-year-old-arizona-boy-accidentally-shot-by
- Athey, Susan, & Guido W. Imbens (2017) “The State of Applied Econometrics: Causality and Policy Evaluation,” 31(2) *J. of Economic Perspectives* 3.
- Ayres, Ian, & John J. Donohue (2003) “The Latest Misfires in Support of the ‘More Guns, Less Crime’ Hypothesis,” 55 *Stanford Law Rev.* 1371.
- Barbash, Fred (2018) “Calif. Teacher Resigns After Unintentionally Firing Weapon in Gun Safety Class,” April 12 *Washington Post*. https://www.washingtonpost.com/news/morning-mix/wp/2018/04/12/calif-teacher-resigns-after-unintentionally-firing-weapon-in-gun-safety-class/?noredirect=on&utm_term=.68faa7eb0133
- Biette-Timmons, Nora (2017) “More People Are Pulling Guns During Road-Rage Incidents,” August 10 *Trace*. <https://www.thetrace.org/2017/08/guns-road-rage-cleveland-2017>
- Biography.com (2016) “Bernhard Goetz,” November 15 *Online*. <https://www.biography.com/people/bernhard-goetz-578520>
- Blair, J. Pete, & Katherine W. Schweit (2014) *A Study of Active Shooter Incidents in the United States Between 2000 and 2013*. Washington, DC: Texas State Univ. & Federal Bureau of Investigation, U.S. Department of Justice.
- Bohn, Sarah, Magnus Lofstrom, & Steven Raphael (2014) “Did the 2007 Legal Arizona Workers Act Reduce the State’s Unauthorized Immigrant Population?” 96(2) *Rev. of Economics & Statistics* 258.
- Boots, Michelle Theriault (2017) “In Alaska, a High Bar for Taking Guns from the Mentally Ill,” January 9 *Anchorage Daily News*. <https://www.adn.com/alaska-news/2017/01/09/in-alaska-a-high-bar-for-the-mentally-ill-to-part-with-their-guns/>
- Bureau of Alcohol, Tobacco, Firearms, & Explosives (2012) *2012 Summary: Firearms Reported Lost and Stolen*. <https://www.atf.gov/resource-center/docs/2012-firearms-reported-lost-and-stolenpdf/1/download>
- Bureau of Justice Statistics (2014) *The Nation’s Two Measures of Homicide*. <https://www.bjs.gov/content/pub/pdf/ntmh.pdf>
- Byers, Christine (2010) “Police Report Details AAB Shooting Chaos,” November 18 *St. Louis Post-Dispatch*. https://www.stltoday.com/news/local/crime-and-courts/police-report-details-abb-shooting-chaos/article_bb52f36b-3757-5c95-a775-384c52dfd887.html

- Calder, Chad (2018) "Legal Analysts Weigh in on Ronald Gasser's Defense in Joe McKnight Killing as Trial Set to Begin," January 15 *New Orleans Advocate*. https://www.theadvocate.com/new-orleans/news/courts/article_f51f97ca-fa45-11e7-a3eb-2fa820d7858f.html
- Campbell, Elizabeth (2017) "521 Guns Stolen in 2017 from Unlocked Cars, Jacksonville Police Say," December 11 *News 4 Jax*. <https://www.news4jax.com/news/local/jacksonville/521-guns-stolen-in-2017-from-unlocked-cars-jacksonville-police-say>
- Carter, Chelsea J., Ed Lavandera, & Evan Perez (2013) "Who Is Navy Yard Gunman Aaron Alexis?" *CNN*. <http://www.cnn.com/2013/09/16/us/navy-yard-suspects/index.html>
- Cavallo, Eduardo, Sebastian Galiani, Ilan Noy, & Juan Pantano (2013) "Catastrophic Natural Disasters and Economic Growth," 95(5) *Rev. of Economics & Statistics* 1549.
- CEA (2016) *Economic Perspectives on Incarceration and the Criminal Justice System*. Washington, DC: Council of Economic Advisors, Executive Office of the President of the United States.
- Chalfin, Aaron, & Justin McCrary (2017) "Criminal Deterrence: A Review of the Literature," 55(1) *J. of Economic Literature* 5.
- Clary, Mike, Megan O'Matz, & Lisa Arthur (2017) "Puerto Rico Police Seized Guns from Airport Shooter Esteban Santiago," January 13 *Sun Sentinel*. <http://www.sun-sentinel.com/news/fort-lauderdale-hollywood-airport-shooting/fl-santiago-guns-puerto-rico-20170113-story.html>
- Cohen, Dov, Richard E. Nisbett, Brian F. Bowdle, & Norbert Schwarz (1996) "Insult, Aggression, and the Southern *Culture of Honor*: An 'Experimental Ethnography'," 70(5) *J. of Personality & Social Psychology* 945.
- Cook, Philip J. (2018) "Gun Theft and Crime," 95(1) *J. of Urban Health* 305.
- Cook, Philip J., Jens Ludwig, & Adam M. Samaha (2009) "Gun Control After *Heller*: Threats and Side-shows from a Social Welfare Perspective," 56(5) *UCLA Law Rev.* 1041.
- DePrang, Emily (2015) "The Mystery of Milwaukee's 'Human Holster'," July 16 *Trace*. <https://www.thetrace.org/2015/07/concealed-carry-wisconsin-human-holster/>
- Donohue, John J. (2003) "The Final Bullet in the Body of the More Guns, Less Crime Hypothesis," 2(3) *Criminology & Public Policy* 397.
- (2017a) "Comey, Trump, and the Puzzling Pattern of Crime in 2015 and Beyond," 117(5) *Columbia Law Rev.* 1297.
- (2017b) "Laws Facilitating Gun Carrying and Homicide," 107(12) *American J. of Public Health* 1864.
- Donohue, John J., & Justin Wolfers (2009) "Estimating the Impact of the Death Penalty on Murder," 11(2) *American Law & Economics Rev.* 249.
- Dube, Arindrajit, & Ben Zipperer (2013) "Pooling Multiple Case Studies Using Synthetic Controls: An Application to Minimum Wage Policies," *IZA Discussion Paper* 8944. <https://ssrn.com/abstract=2589786>
- Durlauf, Steven N., Salvado Navarro, & David A. Rivers (2016) "Model Uncertainty and the Effect of Shall-Issue Right-to-Carry Laws on Crime," 81 *European Economic Rev.* 32.
- Eltagouri, Marwa (2017) "Man Accidentally Shoots Himself and His Wife at a Church, Shortly After a Discussion on Shootings," November 17 *Washington Post*. <https://www.washingtonpost.com/news/acts-of-faith/wp/2017/11/17/a-man-accidentally-shot-himself>
- Fernandez, Manny, Liam Stack, & Alan Blinder (2015) "9 Are Killed in Biker Gang Shootout in Waco," May 17 *New York Times*. <http://www.nytimes.com/2015/05/18/us/motorcycle-gang-shootout-in-waco-texas.html>
- Ford, Richard (2016) "Richard Ford on America's Gun Problem," March 18 *Financial Times*. <https://www.ft.com/content/d0cea3d0-eaab-11e5-bb79-2303682345c8>
- Fortin, Jacey (2018) "Georgia Teacher Fired Gun While Barricaded in Classroom, Police Say," February 28 *New York Times*. <https://www.nytimes.com/2018/02/28/us/georgia-teacher-gun-shooting.html>
- Fox News (2016) "Ohio Gun Shop Owner Killed During Concealed Carry Class," June 19 *Fox News*. <https://www.foxnews.com/us/ohio-gun-shop-owner-killed-during-concealed-carry-class>

- Freskos, Brian (2016) "Guns Are Stolen in America Up to Once Every Minute. Owners Who Leave Their Weapons in Cars Make it Easy for Thieves," September 21 *Trace*. <https://www.thetrace.org/2016/09/stolen-guns-cars-trucks-us-atlanta/>
- (2017a) "As Thefts of Guns from Cars Surge, Police Urge Residents to Leave Their Weapons at Home," March 6 *Trace*. <https://www.thetrace.org/2017/03/as-thefts-of-guns-from-cars-surge-police-urge-residents-to-leave-their-weapons-at-home/>
- (2017b) "Missing Pieces," November 20 *Trace*. <https://www.thetrace.org/features/stolen-guns-violent-crime-america/>
- (2017c) "These Gun Owners Are at the Highest Risk of Having Their Firearms Stolen," April 11 *Trace*. <https://www.thetrace.org/2017/04/gun-owners-high-risk-firearm-theft/>
- (2018a) "Citing *The Trace's* Reporting, Top Gun Violence Scholar Calls for More Research on Threat of Stolen Firearms," April 26 *Trace*. <https://www.thetrace.org/rounds/stolen-guns-research-agenda-phil-cook/>
- (2018b) "Maryland Will Invest in Gun Trafficking Crackdown," April 30 *Trace*. <https://www.thetrace.org/2018/04/maryland-gun-trafficking-task-force-wiretapping-baltimore/>
- Friedman, David D. (1990) *Price Theory: An Intermediate Text*. South-Western Publishing Co. http://www.daviddfriedman.com/Academic/Price_Theory/PThy_Chapter_20/PThy_Chapter_20.html
- Fuchs, Erin (2013) "Why the South Is More Violent Than the Rest of America," September 18 *Business Insider*. <http://www.businessinsider.com/south-has-more-violent-crime-fbi-statistics-show-2013-9>
- Gibbons, Thomas, & Robert Moran (2000) "Man Shot, Killed in Snow Dispute," January 27 *Philadelphia Inquirer*. http://articles.philly.com/2000-01-27/news/25598207_1_snow-dispute-man-shot-christian-values
- Glanton, Dahleen, & Carlos Sadovi (2014) "Concealed Carry Shooting Reignites Debate," July 31 *Chicago Tribune*. <http://www.chicagotribune.com/news/ct-crestwood-concealed-carry-0730-20140730-story.html>
- Gueverra, Ericka Cruz (2018) "Man Killed by Armed PSU Officers Had Valid Concealed Carry Permit," June 30 *OPB*. <https://www.opb.org/news/article/portland-state-shooting-victim-jason-erik-washington/>
- Hauser, Christine (2017) "White Police Officer in St. Louis Shoots Off-Duty Black Colleague," June 26 *New York Times*. https://www.nytimes.com/2017/06/26/us/saint-louis-black-officer.html?_r=0
- Heath, Michelle (2015) "Gun Goes Off Inside Christus Facility, Injures Woman," October 19 *Beaumont Enterprise*. <http://www.beaumontenterprise.com/news/article/Gun-goes-off-inside-Christus-facility-injures-6578001.php>
- Heersink, Boris, & Brenton Peterson (2016) "Measuring the Vice-Presidential Home State Advantage with Synthetic Controls," 44(4) *American Politics Research* 734.
- Hemenway, David, Deborah Azrael, & Matthew Miller (2017) "Whose Guns Are Stolen? The Epidemiology of Gun Theft Victims," 4(1) *Injury Epidemiology* 11.
- Hemenway, David, Mary Vrinotis, & Matthew Miller (2006) "Is an Armed Society a Polite Society? Guns and Road Rage," 38(4) *Accident Analysis and Prevention* 687.
- Hermann, Peter, & Rachel Weiner (2019) "He Put 224 Guns on the Streets. His Family Would Pay a Price," January 24 *Washington Post*. https://www.washingtonpost.com/local/public-safety/he-put-224-guns-on-the-streets-his-family-would-pay-a-price/2019/01/23/68cd2520-1a57-11e9-8813-cb9dec761e73_story.html?utm_term=.8bf6bbb0072e
- Hernandez, Alex V. (2017) "Police: No Charges in Fatal Shootout at Elmwood Park Gas Station," April 10 *Chicago Tribune*. <http://www.chicagotribune.com/suburbs/elmwood-park/news/ct-elm-elmwood-park-shooting-tl-0413-20170409-story.html>
- Ho, Vivian (2015) "Gun Linked to Pier Killing Stolen from Federal Ranger," July 8 *San Francisco Chronicle*. <http://www.sfchronicle.com/crime/article/Gun-linked-to-S-F-pier-killing-was-BLM-6373265.php>

- Ho, Vivian, & Kale Williams (2015) "Gun in 2 Killings Stolen from Unlocked Car in Fisherman's Wharf, Cops Say," October 9 *San Francisco Chronicle*. <http://www.sfgate.com/crime/article/Gun-in-2-killings-stolen-from-unlocked-car-in-6562039.php>
- Holzel, Dee (2008) "Shootout in Winnemucca: Three Dead, Two Injured in Early-Morning Gunfight," May 24 *Elko Daily Free Press*. https://elkodaily.com/news/local/shootout-in-winnemucca-three-dead-two-injured-in-early-morning/article_83fe3832-cc3b-528b-88bd-a85ce65f5967.html
- Hopkins, Kyle (2017) "Accused Florida Airport Shooter to Appear in Alaska Case by Phone," March 28 2 *KTUU Anchorage*. <http://www.ktuu.com/content/news/ Diagnosed-with-serious-mental-illness-accused-airport-shooter-to-appear-in-Alaska-case-by-phone-417394013.html>
- Horwitz, Josh (2011) "Speaking of 'Fast and Furious': NRA Leaders Well-Versed in Fomenting Foreign Conflicts," September 13 *Huffington Post*. https://www.huffingtonpost.com/josh-horwitz/speaking-of-fast-and-furi_b_959633.html
- Igielnik, Ruth, & Anna Brown (2017) *Key Takeaways on Americans' Views of Guns and Gun Ownership*. Pew Research Center. <http://www.pewresearch.org/fact-tank/2017/06/22/key-takeaways-on-americans-views-of-guns-and-gun-ownership>
- Kalesan, Bindu, Marcos D. Villarreal, Katherine M. Keyes, & Sandro Galea (2016) "Gun Ownership and Social Gun Culture," 22(3) *Injury Prevention* 216.
- Kalinowski, Bob (2012) "Police: Plymouth Homicide Suspect Shot by Patron," September 10 *Citizens' Voice*. <http://citizensvoice.com/news/police-plymouth-homicide-suspect-shot-by-patron-1.1370815>
- Kaste, Martin (2019) "Gun Carry Laws Can Complicate Police Interactions," July 19 *NPR*. <https://www.npr.org/2016/07/19/486453816/open-carry-concealed-carry-gun-permits-add-to-police-nervousness>
- Kaul, Ashok, Stefan Klobner, Gregor Pfeifer & Manuel Schieler (2016) "Synthetic Control Methods: Never Use All Pre-Intervention Outcomes as Economic Predictors."
- Keele, Luke (2009) "An Observational Study of Ballot Initiatives and State Outcomes," *Working Paper*. https://www.researchgate.net/publication/228715196_An_observational_study_of_ballot_initiatives_and_state_outcomes
- KHOU (2015) "One Man Injured After Carjacking, Shooting at Gas Station," September 27 *KHOU 11*. <http://www.khou.com/news/one-man-injured-after-carjacking-shooting-at-gas-station/142447940>
- KIMT (2018) "Update: Court Documents Chronicle Tense Moments Prior to Rochester Shooting" January 17 *KIMT 3 News*. <http://www.kimt.com/content/news/Rochester-shooting-Weiss-charged-with-2nd-degree-murder-469747873.html>
- Knight, Brian (2013) "State Gun Policy and Cross-State Externalities: Evidence from Crime Gun Tracing," 5(4) *American Economic J.: Economic Policy* 200.
- Kovandzic, Tomislav, Thomas Marvell, & Lynne Vieraitis (2005) "The Impact of 'Shall-Issue' Concealed Handgun Laws on Violent Crime Rates: Evidence from Panel Data for Large Urban Cities," 9 *Homicide Studies* 292.
- KTUU (2017) "Esteban Santiago, Accused Fort Lauderdale Shooter, Agreed to Anger Management Courses in Alaska," January 9 2 *KTUU Anchorage*. <http://www.ktuu.com/content/news/Esteban-Santiago-accused-Fort-Lauderdale-shooter-had-agreed-to-under-anger-management-in-Alaska-410177225.html>
- Lane, Emily (2018) "Cardell Hayes Again Claims Self-Defense in Will Smith Shooting Death: Appeal," February 15 *NOLA.com*. https://www.nola.com/crime/2018/02/cardell_hayes_self-defense_wil.html
- Lat, David (2012) "*DiDonato v. Ung*: The Temple Law Shooter Gets Hit—With a Civil Suit," January 12 *Above the Law*. <https://abovethelaw.com/2012/01/didonato-v-ung-the-sequel-or-the-temple-law-shooter-gets-hit-with-a-lawsuit>
- Levenson, Eric (2017) "Judge Denies 'Stand Your Ground' Defense in Movie Theater Shooting," March 11 *CNN*. <http://www.cnn.com/2017/03/10/us/stand-your-ground-movie-trial/index.html>

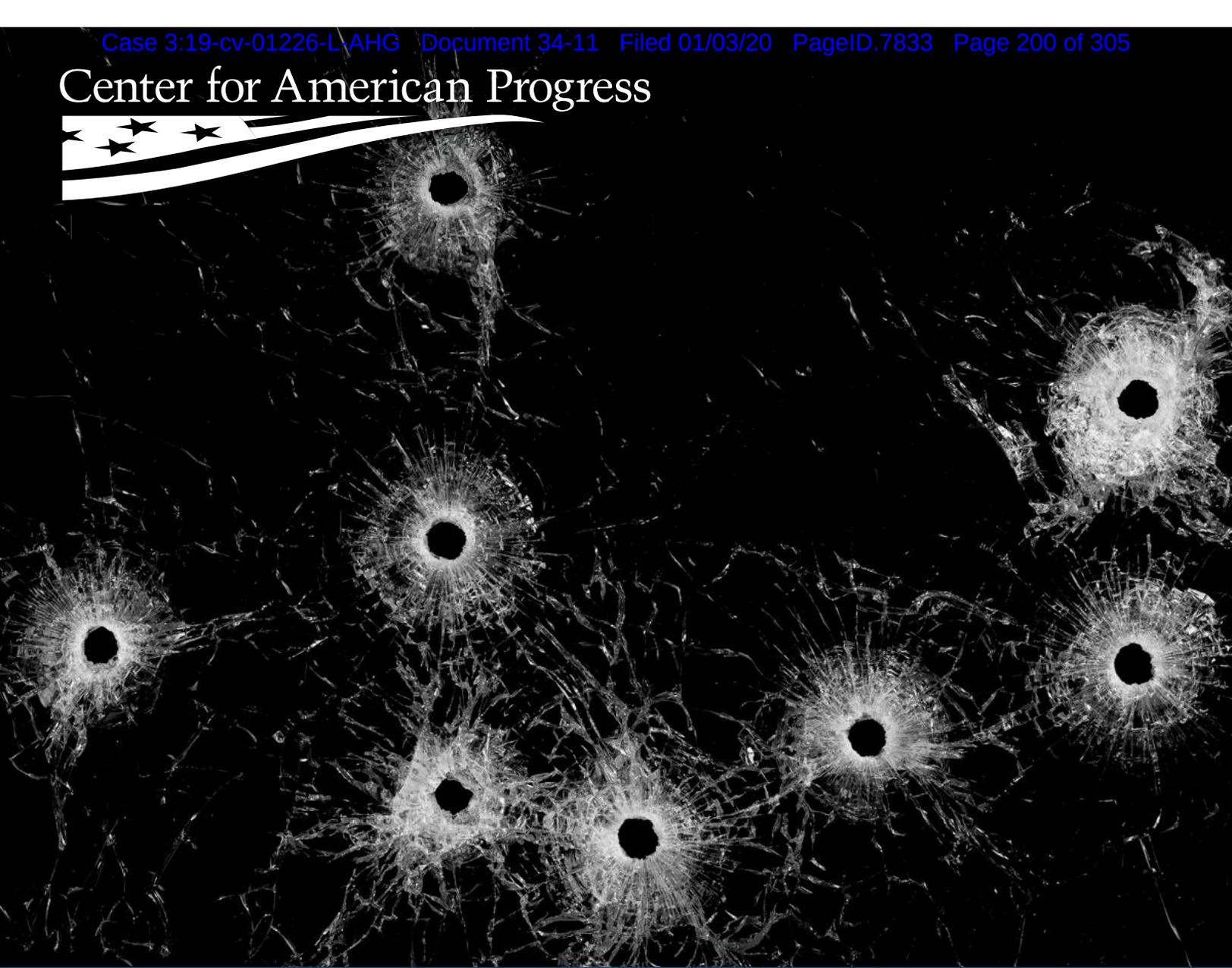
- Lopez, German (2018) "Police Shootings Are Also Part of America's Gun Problem," April 9 *Vox*. <https://www.vox.com/2018/4/9/17205256/gun-violence-us-police-shootings>
- Lott, John R. (2010) *More Guns, Less Crime: Understanding Crime and Gun Control Laws*. Chicago, IL: Univ. of Chicago Press.
- Lott, John R., & David B. Mustard (1997) "Crime, Deterrence, and Right-to-Carry Concealed Handguns," 26(1) *J. of Legal Studies* 1.
- Lozano, Alicia Victoria (2017) "28-Year-Old David Desper Charged in Road Rage Killing of 18-Year-Old Bianca Roberson," July 2 *NBC Philadelphia*. <https://www.nbcphiladelphia.com/news/local/Police-Update-on-Road-Rage-Killing-of-18-Yr-Old-432100983.html>
- Lunny, SanRay (2010) *Unloaded Open Carry*. San Mateo County Sheriff's Office. http://www.calgunlaws.com/wp-content/uploads/2012/09/San-Mateo-County-Sheriffs-Office_Unloaded-Open-Carry.pdf
- Luthern, Ashley (2015) "Concealed Carry Draws Opposite Views—And a Murky Middle," June 11 *Milwaukee Wisconsin J. Sentinel*. <http://www.jsonline.com/news/crime/concealed-carry-draws-opposite-views-and-a-murky-middle-b99510854z1-307079321.html>
- MacDonald, Sally (2012) "CHL Holder Fired Shot that Killed Store Clerk," May 31 *Free Republic*. <http://www.freerepublic.com/focus/f-news/2889792/posts>
- McElroy, Majorie B., & Will Peichun Wang (2017) "Seemingly Inextricable Dynamic Differences: The Case of Concealed Gun Permit, Violent Crime and State Panel Data." https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2992058
- McLaughlin, Elliott, & Madeline Holcombe (2018) "Mother of Man Killed by Police at Alabama Mall Ponders Open Casket as Family Seeks Justice," November 26 *CNN*. <https://www.cnn.com/2018/11/25/us/alabama-shooting-family-seeks-answers/index.html>
- Mettler, Katie (2016) "'He Thought He Could Help': Concealed Carry Gun-Wielder Intervenes in Domestic Dispute and Is Shot Dead," May 3 *Washington Post*. <https://www.washingtonpost.com/news/morning-mix/wp/2016/05/03/he-thought-he-could-help>
- Mideksa, Torben K. (2013) "The Economic Impact of Natural Resources," 65(2) *J. of Environmental Economics & Management* 277.
- Miller, Matthew, Deborah Azrael, David Hemenway, & Frederic I. Solop (2002) "'Road Rage' in Arizona: Armed and Dangerous," 34(6) *Accident Analysis & Prevention* 807.
- Moody, Carlisle E., & Thomas B. Marvell (2008) "The Debate on Shall-Issue Laws," 5(3) *Econ J. Watch* 269.
- Moody, Carlisle E., Thomas B. Marvell, Paul R. Zimmerman, & Fasil Alemante (2014) "The Impact of Right-to-Carry Laws on Crime: An Exercise in Replication," 4 *Rev. of Economics & Finance* 33.
- Morin, Rich, & Andrew Mercer (2017) *A Closer Look at Police Officers Who Have Fired Their Weapon on Duty*. Pew Research Center. <https://www.pewresearch.org/fact-tank/2017/02/08/a-closer-look-at-police-officers-who-have-fired-their-weapon-on-duty/>
- Murdock, Jason (2018) "Arizona Man Accidentally Shoots Himself in Groin in Walmart," November 29 *Newsweek*. <https://www.newsweek.com/arizona-man-accidentally-shoots-himself-groin-walmart-1236287>
- Nagin, Daniel S. (Forthcoming) "Firearm Availability and Police Use of Force," *Annals of American Academy of Political & Social Science*.
- National Research Council (2005) *Firearms and Violence: A Critical Review*. Washington, DC: National Academies Press.
- NBC News (2014) "Cost of Bravery: Vegas Bystander Died Trying to Stop Rampage," June 10 *NBC News*. <https://www.nbcnews.com/storyline/vegas-cop-killers/cost-bravery-vegas-bystander-died-trying-stop-rampage-n127361>
- Nonnemaker, James, Mark Engelen, & Daniel Shive (2011) "Are Methamphetamine Precursor Control Laws Effective Tools to Fight the Methamphetamine Epidemic?" 20(5) *Health Economics* 519.
- Office of the Director—Strategic Management (2013) *2012 Summary: Firearms Reported Lost and Stolen*. U.S. Department of Justice, Bureau of Alcohol, Tobacco, Firearms & Explosives. <https://www.atf.gov/resource-center/docs/2012-firearms-reported-lost-and-stolenpdf-1/download>

- Officer.com (2017) "Chief: Concealed-Carry Law Is 'Irresponsible'," June 29 *Officer.com*. <https://www.officer.com/command-hq/news/12348064/milwaukee-police-chief-calls-concealedcarry-law-irresponsible>
- Olson, Erik J., Mark Hoofnagle, Elinore J. Kaufman, William C. Schwab, Patrick Reilly, & Mark J. Seamon (2019) "American Firearm Homicides: The Impact of Your Neighbors," February 7 *J. of Trauma & Acute Care Surgery*. https://journals.lww.com/jtrauma/Abstract/publishahead/American_Firearm_Homicides_The_Impact_of_Your.98406.aspx#pdf-link
- Owens, David (2018) "Retired Hartford Firefighter Donald Brown Sentenced to 7 Years in Shooting," January 9 *Hartford Courant*. <http://www.courant.com/news/connecticut/hc-hartford-donald-brown-sentenced-0110-story.html>
- Palmer, Ewan (2018) "Pregnant Woman Shot by Daughter, 3, After Finding Gun in Car," April 18 *Newsweek*. <http://www.newsweek.com/pregnant-woman-shot-daughter-3-after-finding-gun-car-outside-platos-closet-891073>
- Paraguassu, Lisandra, & Ricardo Brito (2018) "U.S. Biggest Source of Illegal Foreign Guns in Brazil: Report," January 10 *Reuters*. <https://www.reuters.com/article/us-usa-brazil-arms/u-s-biggest-source-of-illegal-foreign-guns-in-brazil-report-idUSKBN1EZ2M5>
- Parsons, Chelsea, & Eugenio Weigend Vargas (2017) *Stolen Guns in America: A State-by-State Analysis*. Center for American Progress. <https://cdn.americanprogress.org/content/uploads/2017/07/25052308/StolenGuns-report.pdf>
- Perrusquia, Marc (2017) "Stolen Guns: 'Getting Them Is the Easy Part,'" *Commercial Appeal*. <http://projects.commercialappeal.com/woundedcity/stolen-guns-this-fence-makes-a-bad-neighbor.php>
- Phillips, Charles D., Obioma Nwaiwu, Darcy K. McMaughan Moudouni, Rachel Edwards, & Szu hsuang Lin (2013) "When Concealed Handgun Licensees Break Bad: Criminal Convictions of Concealed Handgun Licensees in Texas, 2001–2009," 103(1) *American J. of Public Health* 86.
- Pilger, Lori (2018) "FBI Accuses White Supremacist of Terror Attack on Amtrak Train in Rural Nebraska," January 4 *Lincoln J. Star*. http://journalstar.com/news/state-and-regional/nebraska/fbi-accuses-white-supremacist-of-terror-attack-on-amtrak-train/article_82f0860e-3c75-5a66-ab0c-a2e3a3c16aab.html
- Planty, Michael, & Jennifer Truman (2013) "Firearm Violence, 1993–2011." *U.S. Department of Justice Bureau of Justice Statistics BJS Special Report* 241730.
- Plumlee, Rick (2012) "Eight with Concealed-Carry Permits Charged with Felonies in Sedgwick County," November 17 *Wichita Eagle*. <http://www.kansas.com/latest-news/article1103131.html>
- Pugliese, Nicholas (2018) "It's Tough to Buy a Gun in New Jersey. So Where Do All the Guns Used in Crimes Come From?" April 16 *NorthJersey.com*. <https://www.northjersey.com/story/news/new-jersey/2018/04/16/nj-new-jersey-where-do-guns-used-crimes-come/503115002/>
- Robles, Frank, & Christine Hauser (2015) "Lawyers Provide Details in Police Shooting of Corey Jones in Florida," October 22 *New York Times*. <https://www.nytimes.com/2015/10/23/us/florida-corey-jones-police-shooting.html>
- Sampson, Zachary T. (2014) "Stolen Guns, Like One Used to Kill Tarpon Springs Officer, Routine at Crime Scenes," December 24 *Tampa Bay Times*. <http://www.tampabay.com/news/publicsafety/crime/gun-police-say-was-used-to-kill-tarpon-springs-officer-stolen-from/2211436>
- Sauro, Sean (2019) "Plans Made to Honor Men Killed in State College Shooting Spree," January 26 *Penn Live*. <https://www.pennlive.com/news/2019/01/plans-made-to-honor-men-killed-in-state-college-shooting-spree.html>
- Savitsky, Sasha (2019) "Country Singer Justin Carter Dead at 35 After Accidental Shooting," March 22 *Fox News*. <https://www.foxnews.com/entertainment/country-singer-justin-carter-dead-at-35-after-accidental-shooting>
- Scherer, Jasper (2016) "Fla. 'Loud Music' Murder: Firing into Car Full of Teens Playing Rap Music Not 'Self-Defense,' Court Rules," November 18 *Washington Post*. <https://www.washingtonpost.com/news/morning-mix/wp/2016/11/18/fla-loud-music-murder-firing>

- Schwarz, Hunter (2014) "Idaho Professor Shoots Himself in Foot Two Months After State Legalizes Guns on Campuses," September 5 *Washington Post*. https://wapo.st/InAtjTj?tid=ss_mail&utm_term=.a706e9990995
- Schwarzschild, Todd, & Drew Griffin (2011) "ATF Loses Track of 1,400 Guns in Criticized Probe," July 12 *CNN*. <http://www.cnn.com/2011/POLITICS/07/12/atf.guns/index.html>
- Shen, Aviva (2017) "When the Driver Who Just Cut You Off Also Has a Gun," April 10 *Trace*. <https://www.thetrace.org/2017/04/road-rage-shootings-guns/>
- Siegel, Michael, Molly Pahn, Ziming Xuan, Craig S. Ross, Sandro Galea, Bindu Kalesan, Eric Fleegler, & Kristin A. Goss (2017) "Easiness of Legal Access to Concealed Firearm Permits and Homicide Rates in the United States," 107(12) *American J. of Public Health* 1923.
- Simon, Darran (2018) "Manslaughter Defendant in 'Stand Your Ground' Case Said He Felt Scared in Altercation," September 3 *CNN*. <https://www.cnn.com/2018/09/03/us/michael-drejka-stand-your-ground-jailhouse-interview/index.html>
- Simpson, Kevin (2017) "Shoppers Pulled Guns in Response to Thornton Walmart Shooting, But Police Say that Slowed Investigation," November 2 *Denver Post*. <http://www.denverpost.com/2017/11/02/shoppers-pulled-weapons-walmart-shooting/>
- Slobodzian, Joseph A. (2011) "Ung Acquitted in Wounding of DiDonato in Old City," February 16 *Inquirer*. http://www.philly.com/philly/news/local/20110216_Ung_acquitted_in_wounding_of_DiDonato_in_Old_City.html
- Soderling, Luke (2016) *How to Inform an Officer You Are Carrying a Handgun and Live* [video file]. <https://www.youtube.com/watch?v=fOO99qcASEM>
- Stanglin, Doug (2018) "Parkland Teacher Charged with Leaving Loaded Gun in Public Restroom," April 13 *USA Today*. <https://www.usatoday.com/story/news/2018/04/13/parkland-teacher-charged-leaving-loaded-gun-public-restroom/514855002/>
- Stark, Emily, & Daniel Sachau (2016) "Lake Wobegon's Guns: Overestimating Our Gun-Related Competences," 4(1) *J. of Social & Political Psychology* 8.
- Strnad, Jeff (2007) "Should Legal Empiricists Go Bayesian?" 9(1) *American Law & Economics Rev.* 195.
- Stuart, Hunter (2013) "2 Concealed Carry Holders Kill Each Other In Road Rage Incident," September 19 *Huffington Post*. http://www.huffingtonpost.com/2013/09/19/michigan-concealed-carry-road-rage-two-dead_n_3956491.html
- US News (2018) "Cops: Mom Was Turning on Safety When Gun Fired, Killing Girl," April 23 *US News*. <https://www.usnews.com/news/best-states/ohio/articles/2018-04-23/cops-mom-was-turning-on-safety-when-gun-fired-killing-girl>
- Violence Policy Center (2017) *Mass Shootings Committed by Concealed Carry Killers: May 2007 to the Present*. <http://concealedcarrykillers.org/wp-content/uploads/2017/06/ccwmassshootings.pdf>
- WFTV (2015) "3 Injured When Man's Gun Goes Off in Sanford Cracker Barrel," November 2 *WFTV* 9. <http://www.wftv.com/news/local/man-not-charged-after-gun-goes-sanford-cracker-bar/26880670>
- Williams, Clois, & Steven Waltrip (2004) *Aircrew Security: A Practical Guide*. New York, NY: Ashgate Publishing.
- Wilson, Robert (2016) "Common Sense," February 29 *American Scholar*. <https://theamericanscholar.org/common-sense/#>
- Witt, Jessica K., & James R. Brockmole (2012) "Action Alters Object Identification: Wielding a Gun Increases the Bias to See Guns," 38(5) *J. of Experimental Psychology: Human Perception & Performance* 1159.
- Zimmerman, Paul R. (2014) "The Deterrence of Crime Through Private Security Efforts: Theory and Evidence," 37 *International Rev. of Law & Economics* 66.

EXHIBIT 60

Center for American Progress



America Under Fire

An Analysis of Gun Violence in the United States
and the Link to Weak Gun Laws

By Chelsea Parsons and Eugenio Weigend October 2016

Center for American Progress



America Under Fire

An Analysis of Gun Violence in the United States
and the Link to Weak Gun Laws

By Chelsea Parsons and Eugenio Weigend October 2016

Contents

- 1 Introduction and summary**
- 4 10 indicators of gun violence and the Gun Violence Index**
- 27 The link between high levels of gun violence and weak state gun laws**
- 32 Conclusion**
- 34 Methodology**
- 39 About the authors**
- 40 Endnotes**

Introduction and summary

One of the key questions in the gun debate is whether strong gun laws—such as requiring background checks for all gun sales; limiting who may carry guns and where they may carry them; and providing increased oversight of the gun industry—are effective at reducing gun violence. This is not an easy question to answer, as there are myriad factors that may contribute to the rate of gun violence in any community. In addition to easy access to guns facilitated and enabled by weak gun laws, there are an interconnected web of social and economic issues that can have an impact on rates of violence in a community, such as persistent poverty, lack of employment and educational opportunities, and a breakdown in the police-community relationship that imperils community safety. Much of the burden of day-to-day gun violence in this country falls disproportionately on communities of color, which are often at the epicenter of these related challenges. Another factor that may affect rates of gun deaths in a state is the level of gun ownership in that state, which is difficult to assess because of the lack of any comprehensive accounting of private gun ownership in this country.¹ And roughly two-thirds of gun deaths in the United States are the result of suicide, which raises another set of questions regarding the role of access to guns in contributing to high rates of suicide.

Despite the many factors that may contribute to rates of gun violence in a particular community, there is a robust and growing body of research that demonstrates an undeniable correlation between certain strong gun laws and lower rates of gun violence. A 2013 study by a group of public health researchers examined the relationship between the overall strength of a state's gun laws and rates of gun deaths in the state and found that states with stronger gun laws had lower rates of gun deaths than states with weaker gun laws.² A 2011 study that analyzed state-level data drew similar conclusions: Firearm-related deaths were significantly lower in states that had enacted laws to ban assault weapons, require trigger locks, and mandate safe storage of guns.³ Two studies led by Daniel Webster at the Johns

Hopkins Bloomberg School of Public Health demonstrated the impact of state laws requiring a permit—and background check—before an individual can purchase a handgun. When Connecticut implemented this requirement, gun-related homicides in the state fell 40 percent; when Missouri eliminated this requirement, gun homicides increased 26 percent.⁴ And research conducted by Everytown for Gun Safety, a nonprofit gun violence prevention advocacy group, found that states that require universal background checks for all handgun sales have significantly lower rates of intimate partner gun homicides of women, law enforcement officers killed by handguns, and gun-related suicides.⁵

In 2013, the Center for American Progress conducted a study to assess the correlation between the relative strength or weakness of a state's gun laws, as measured by the Law Center to Prevent Gun Violence, and rates of gun violence in the state across 10 categories of gun violence or gun-related crimes. Consistent with the research cited above, the CAP study found a strong correlation between strong gun laws and lower rates of gun violence.⁶

In the 3.5 years since that study, a number of things have changed that warrant revisiting that research. Many states have acted to strengthen their gun laws: Since the mass shooting at Sandy Hook Elementary School, eight states have enacted laws to require universal background checks—bringing the total number of states that have enacted such laws to 18—and 20 states have strengthened their laws to help keep guns out of the hands of domestic abusers.⁷ Unfortunately, other states have taken the opposite approach, loosening laws regarding where guns may be carried and weakening or eliminating concealed carry permit requirements.⁸ In addition, improvements made in the collection of data relating to gun violence now allow more precise tracking of events such as mass shootings and fatal shootings by law enforcement officers.

In this report, the authors revisit CAP's 2013 analysis with a revised methodology, some new categories of gun violence, and updated state grades from the Law Center to Prevent Gun Violence. The report provides a state ranking across 10 key indicators of gun violence, then uses these rankings to calculate an overall Gun Violence Index score for each state. Using this score, the authors assessed the correlation between the rate of overall gun violence in the state and the relative strength or weakness of each state's gun laws.

Once again, CAP finds a strong and significant link between weak gun laws and high rates of gun violence. The 10 states with the weakest gun laws collectively have an aggregate level of gun violence that is 3.2 times higher than the 10 states with the strongest gun laws. And while this correlation does not prove a causal relationship between stronger gun laws and fewer gun deaths, the link between stronger gun laws and lower rates of gun violence cannot be ignored. As the gun debate continues to churn, policymakers at all levels of government must take action to close dangerous loopholes and enact strong gun laws to protect all of the nation's communities from this national disgrace.

10 indicators of gun violence and the Gun Violence Index

In order to measure levels of gun violence for each state, CAP analyzed data relating to 10 different types of gun violence:

- Rate of overall gun deaths per every 100,000 people, 2005-2014
- Rate of gun suicides per every 100,000 people, 2005-2014
- Rate of gun homicides per every 100,000 people, 2005-2014
- Rate of fatal gun accidents per every 1 million people, 2005-2014
- Rate of mass shootings per every 1 million people, 2006-2015
- Rate of intimate partner gun homicides of women per every 1 million women, 2005-2014
- Rate of gun deaths among people younger than age 21 per every 100,000 people younger than age 21, 2005-2014
- Rate of law enforcement officers feloniously killed with a firearm per every 1 million people, 2005-2014
- Rate of fatal shootings by police per every 1 million people, 2015-2016
- Crime gun export rates per every 100,000 people, 2010-2015

For each of these indicators, the authors ranked the states from zero, defined as the state with the lowest level of gun violence, to 100, defined as the state with the highest level of gun violence. The remaining states were given values in between depending on their place in the range. The authors then averaged the scores of the 10 indicators to calculate a final overall Gun Violence Index score for each state.

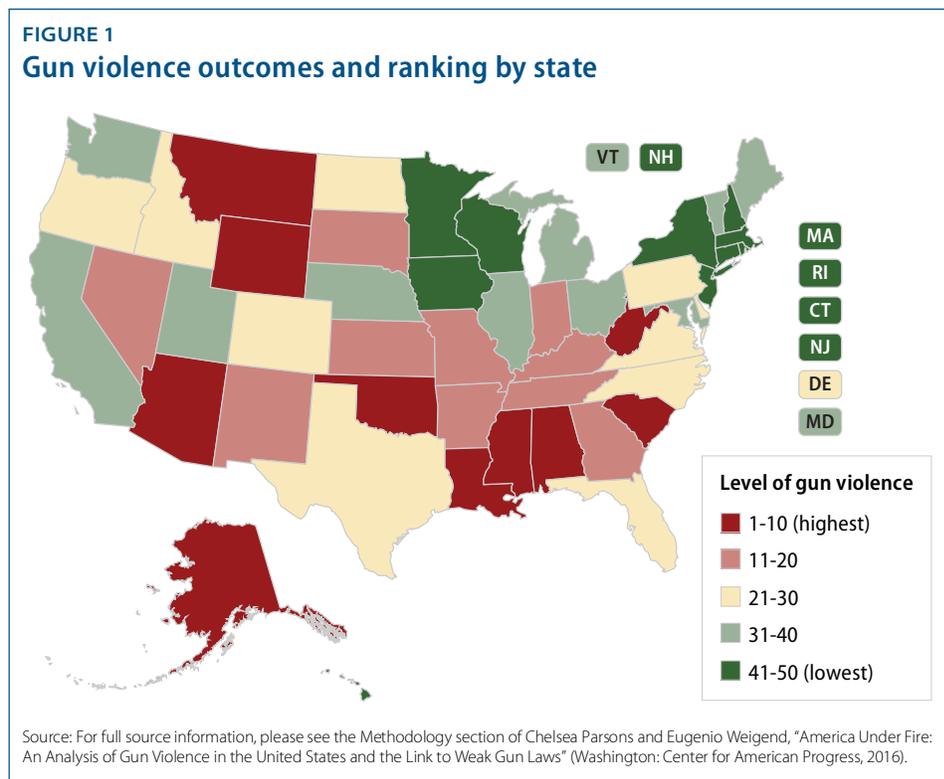
TABLE 1
Gun Violence Index ranking

Ranking	State	Gun Violence Index	Ranking	State	Gun Violence Index
1	Louisiana	75	26	Colorado	33
2	Alaska	66	27	Florida	33
3	Mississippi	61	28	Pennsylvania	32
4	West Virginia	60	29	Delaware	30
5	Alabama	59	30	Oregon	29
6	South Carolina	57	31	Vermont	29
7	Wyoming	56	32	Utah	29
8	Arizona	53	33	Michigan	28
9	Montana	51	34	Maryland	28
10	Oklahoma	51	35	Ohio	28
11	Nevada	50	36	Maine	27
12	New Mexico	50	37	Washington	26
13	Tennessee	49	38	California	26
14	Arkansas	47	39	Nebraska	26
15	Missouri	47	40	Illinois	23
16	Kentucky	46	41	Wisconsin	23
17	Georgia	44	42	New Hampshire	21
18	Kansas	40	43	Minnesota	17
19	South Dakota	39	44	Iowa	16
20	Indiana	38	45	Connecticut	12
21	North Carolina	38	46	New Jersey	12
22	Idaho	36	47	New York	11
23	Virginia	36	48	Rhode Island	9
24	North Dakota	35	49	Hawaii	6
25	Texas	34	50	Massachusetts	6

States in **red** indicate the 10 states with the highest levels of gun violence. States in **green** indicate the 10 states with the lowest levels of gun violence.

Source: For full source information, please see the Methodology section of Chelsea Parsons and Eugenio Weigend, "America Under Fire: An Analysis of Gun Violence in the United States and the Link to Weak Gun Laws" (Washington: Center for American Progress, 2016).

Table 1 presents the results of the Gun Violence Index for each state according to their placement in the national ranking. States with a higher score, closer to 100, have higher overall rates of gun violence than states with a lower score, closer to zero. The 10 states with the highest level of gun violence are Louisiana, Alaska, Mississippi, West Virginia, Alabama, South Carolina, Wyoming, Arizona, Montana, and Oklahoma. The 10 states with the lowest levels of gun violence are Massachusetts, Hawaii, Rhode Island, New York, New Jersey, Connecticut, Iowa, Minnesota, New Hampshire, and Wisconsin.



Overall gun deaths

The overall scope of gun violence in America is truly staggering. In 2014, more than 33,000 people were killed with guns in the United States, amounting to 92 people killed with guns every day.⁹ The Centers for Disease Control and Prevention, or CDC, separates gun-related deaths into three broad categories based on the intent of the shooter: intentional violence-related, accidental, and suicide. There is also a small category for gun deaths for which the intent of the shooter cannot be determined. Aggregating these categories gives a total picture of overall gun deaths in the state. As illustrated in table 2, the rate of overall gun deaths from 2005 to 2014 vary widely across the states and were particularly high in Louisiana, Alaska, Mississippi, Alabama, and Wyoming. These states presented rates higher than 16 gun deaths per every 100,000 residents. In contrast, Hawaii, Massachusetts, Rhode Island, New York, Connecticut, and New Jersey presented rates lower than six gun deaths per every 100,000 residents.

TABLE 2

Rate of overall gun deaths, 2005–2014

National average rate: 10.24 per every 100,000 people

Ranking	State	Rate per every 100,000 people	Score	Ranking	State	Rate per every 100,000 people	Score
1	Louisiana	18.78	100	26	Texas	10.73	49
2	Alaska	18.20	96	27	Pennsylvania	10.69	49
3	Mississippi	17.49	92	28	Oregon	10.62	49
4	Alabama	16.79	87	29	Maryland	10.45	48
5	Wyoming	16.27	84	30	Virginia	10.42	47
6	Arkansas	15.78	81	31	Ohio	9.96	45
7	Montana	15.58	80	32	Delaware	9.62	42
8	Tennessee	15.08	77	33	North Dakota	9.40	41
9	New Mexico	14.91	76	34	South Dakota	9.32	41
10	Nevada	14.74	75	35	Vermont	9.04	39
11	Oklahoma	14.71	74	36	Washington	8.90	38
12	Arizona	14.60	74	37	Maine	8.59	36
13	South Carolina	14.22	71	38	Illinois	8.41	35
14	West Virginia	13.94	70	39	Nebraska	8.35	34
15	Missouri	13.84	69	40	Wisconsin	8.28	34
16	Kentucky	13.44	66	41	California	8.25	34
17	Idaho	12.91	63	42	New Hampshire	6.94	26
18	Georgia	12.76	62	43	Minnesota	6.82	25
19	North Carolina	12.02	57	44	Iowa	6.78	25
20	Florida	11.60	55	45	New Jersey	5.26	15
21	Indiana	11.39	54	46	Connecticut	5.25	15
22	Michigan	11.33	53	47	New York	4.82	12
23	Utah	11.28	53	48	Rhode Island	4.00	7
24	Colorado	11.22	52	49	Massachusetts	3.39	3
25	Kansas	10.82	50	50	Hawaii	2.88	0

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.

Source: Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data," available at http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html (last accessed June 2016).

Gun suicides

The largest category of gun deaths in the United States are gun-related suicides: Roughly two-thirds of all gun deaths in this country are suicides. Access to firearms significantly increases the risk that a suicide attempt will be fatal. While suicide attempts involving methods other than guns have a 5 percent fatality rate, 85 percent of suicide attempts with a firearm are fatal.¹⁰ People complete suicide more often with a gun than with any other method: Of the more than 375,000 people who died by suicide in the U.S. from 2005 to 2014, roughly half used a gun.¹¹ A person dies by gun-related suicide in the United States approximately every 30 minutes.¹²

Table 3 ranks the states based on the rate of gun suicides from 2005 to 2014, which vary widely from state to state. While Alaska, Wyoming, Montana, Idaho, and Nevada presented rates higher than 10 gun suicides per every 100,000 people from 2005 to 2014, 10 states presented rates lower than five gun suicides per every 100,000 people.

TABLE 3

Rate of gun suicides, 2005–2014

National average rate: 5.99 per every 100,000 people

Ranking	State	Rate per every 100,000 people	Score	Ranking	State	Rate per every 100,000 people	Score
1	Alaska	14.21	100	26	Maine	7.25	44
2	Wyoming	14.11	99	27	North Carolina	7.11	43
3	Montana	13.26	92	28	Indiana	6.97	42
4	Idaho	11.02	75	29	Florida	6.74	40
5	Nevada	10.33	69	30	Virginia	6.72	40
6	New Mexico	9.99	66	31	Washington	6.68	40
7	West Virginia	9.98	66	32	Texas	6.57	39
8	Oklahoma	9.87	65	33	New Hampshire	6.01	35
9	Utah	9.62	63	34	Pennsylvania	5.97	34
10	Arkansas	9.57	63	35	Wisconsin	5.96	34
11	Kentucky	9.47	62	36	Michigan	5.86	33
12	Arizona	9.36	61	37	Ohio	5.82	33
13	Alabama	9.03	59	38	Nebraska	5.74	32
14	Tennessee	9.01	58	39	Iowa	5.52	31
15	Mississippi	8.95	58	40	Minnesota	5.31	29
16	Colorado	8.70	56	41	Delaware	4.95	26
17	Oregon	8.68	56	42	Maryland	4.14	20
18	North Dakota	8.21	52	43	California	3.96	18
19	Louisiana	8.06	51	44	Illinois	3.40	14
19	South Carolina	8.06	51	45	Connecticut	2.68	8
21	South Dakota	8.03	51	46	Rhode Island	2.37	5
22	Missouri	7.95	50	47	New York	2.23	4
23	Vermont	7.82	49	48	Hawaii	2.20	4
24	Kansas	7.67	48	49	New Jersey	1.86	1
25	Georgia	7.32	45	50	Massachusetts	1.69	0

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.

Source: Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data," available at http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html (last accessed June 2016).

Gun homicides

More than 30 people are murdered with a gun every day in the United States, which amounts to a person being murdered with a gun every 48 minutes.¹³ Moreover, according to information from the CDC, close to 69 percent of all homicides from 2005 to 2014 were committed with a gun, placing firearms as the number one tool for homicides.¹⁴ The United States is an outlier among peer nations when it comes to gun murders: The U.S. gun murder rate is 25 times higher than the average rate of other high-income countries.¹⁵

Gun homicides have a disproportionate impact on communities of color in the United States.¹⁶ While African Americans make up 14 percent of the national population, they account for 56 percent of gun homicides.¹⁷ This discrepancy is even more acute in a number of states. For example, while African Americans make up 15 percent of the population in Michigan and New Jersey, they represent 80 percent and 75 percent of gun homicide victims in those states, respectively. The Hispanic population in some states also experiences disproportionate rates of gun violence. For example while Hispanics represent 29 percent and 12 percent of the state population in Arizona and Rhode Island, they account for 49 percent and 39 percent of gun homicide victims in those states, respectively.¹⁸

Among states, the disparity in terms of rates of gun homicides is significant. The average of the five states with the highest rates—7.14 per every 100,000 population—is 10 times higher than the average of the five states with the lowest rates, 0.72 per every 100,000 population. Louisiana’s gun homicide rate alone is more than two times higher than the national average rate and 29 percent higher than Mississippi’s rate, the state that ranks second. In contrast, five states presented rates lower than one gun homicide per every 100,000 people.

TABLE 4

Rate of gun homicides, 2005–2014

National average rate: 3.85 per every 100,000 people

Ranking	State	Rate per every 100,000 people	Score	Ranking	State	Rate per every 100,000 people	Score
1	Louisiana	9.75	100	26	New Jersey	3.29	30
2	Mississippi	7.53	76	27	West Virginia	3.04	27
3	Alabama	6.90	69	28	Alaska	2.95	26
4	Maryland	5.96	59	29	Kansas	2.67	23
5	South Carolina	5.56	55	30	Connecticut	2.46	21
6	Arkansas	5.44	53	30	New York	2.46	21
7	Missouri	5.36	52	32	Nebraska	2.25	19
8	Michigan	5.22	51	33	Wisconsin	2.07	17
8	Tennessee	5.22	51	34	Colorado	2.06	17
10	Georgia	4.94	48	35	Washington	1.79	14
11	Illinois	4.72	45	36	Massachusetts	1.55	11
12	Arizona	4.69	45	36	Montana	1.55	11
13	Florida	4.57	44	38	Rhode Island	1.49	10
14	North Carolina	4.50	43	39	Wyoming	1.48	10
15	Delaware	4.44	42	40	Oregon	1.43	10
16	Pennsylvania	4.33	41	41	Minnesota	1.28	8
17	Oklahoma	4.25	40	42	Idaho	1.23	7
18	New Mexico	4.04	38	43	Utah	1.16	7
19	Indiana	3.92	37	44	Maine	1.01	5
20	California	3.91	37	45	Iowa	1.00	5
21	Nevada	3.87	36	46	Vermont	0.95	4
22	Ohio	3.81	36	47	South Dakota	0.75	2
23	Texas	3.78	35	48	North Dakota	0.74	2
24	Kentucky	3.31	30	49	New Hampshire	0.63	1
24	Virginia	3.31	30	50	Hawaii	0.54	0

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.

Source: Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data," available at http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html (last accessed June 2016).

Fatal gun accidents

A person is accidentally killed with a gun every 15 hours in the United States.¹⁹ While accidental gun deaths account for the smallest portion of overall gun deaths, making up around 2 percent of annual gun deaths in the United States, they often occur in the most tragic of circumstances and involve young children who gain access to loaded guns that were improperly stored.²⁰ And although these numbers are small when compared to gun homicides or suicides, they are significant when placed in other contexts. For example, in 2015, more people were fatally shot in the United States by toddlers with guns than by terrorists.²¹

Assessing the full scope of accidental gun deaths across states is a challenge, as there are inconsistencies in how the states code and report these deaths.²² However, the best available data come from the CDC; these data demonstrate that Louisiana, Mississippi, Alabama, West Virginia, and Tennessee had the highest rates of accidental gun deaths from 2005 to 2014, with rates above five per every 1 million people, while seven states had rates lower than one fatal gun accident per every 1 million people.²³

TABLE 5
Rate of fatal gun accidents, 2005–2014

National average rate: 1.9 per every 1 million people

Ranking	State	Rate per every one million people	Score	Ranking	State	Rate per every one million people	Score
1	Louisiana	7.6	100	25	Nevada	1.5	14
2	Mississippi	6.3	82	27	Colorado	1.4	13
3	Alabama	6.1	79	27	Illinois	1.4	13
4	West Virginia	5.7	73	27	Ohio	1.4	13
5	Tennessee	5.3	68	27	Virginia	1.4	13
6	Wyoming	4.7	59	31	Oregon	1.3	11
7	Arkansas	4.6	58	32	California	1.2	10
8	Kentucky	4.2	52	32	Florida	1.2	10
8	Montana	4.2	52	32	Iowa	1.2	10
10	South Carolina	4.1	51	32	New Hampshire	1.2	10
11	Oklahoma	3.9	48	36	Michigan	1.1	8
12	Alaska	3.7	45	36	Utah	1.1	8
13	Idaho	3.4	41	36	Washington	1.1	8
14	Missouri	3.3	39	39	Wisconsin	0.9	6
15	South Dakota	3.2	38	40	Minnesota	0.8	4
16	Georgia	2.9	34	41	Connecticut	0.7	3
17	North Carolina	2.8	32	41	Massachusetts	0.7	3
18	Indiana	2.5	28	43	New Jersey	0.6	1
18	North Dakota	2.5	28	43	New York	0.6	1
20	Nebraska	2.3	25	45	Maryland	0.5	0
20	Pennsylvania	2.3	25	-	Delaware	-	-
22	Kansas	2.2	24	-	Hawaii	-	-
23	Texas	2.1	23	-	Maine	-	-
24	New Mexico	1.8	18	-	Rhode Island	-	-
25	Arizona	1.5	14	-	Vermont	-	-

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.

Source: Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data," available at http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html (last accessed June 2016). The CDC does not provide data for states that reported fewer than 10 deaths during this period.

Mass shootings

While mass shootings constitute a very small part of gun violence in the United States, they often receive the most attention from the media and policymakers and tend to grip the nation. These incidents are generally not representative of the daily toll of gun violence experienced in many communities, yet they have a substantial impact on the gun debate. Recent research also suggests that, while infrequent, mass shootings have increased in the United States: One study found that public mass shootings that resulted in four or more fatalities have tripled since 2011.²⁴

In recent years, increased efforts have been made to track mass shootings in real time—not only the episodes of random, public shootings, but also incidents in which multiple people are shot in the context of domestic violence or other interpersonal disputes. There are a few different ways to measure mass shootings in the United States. Some sources count all incidents where four or more people are shot, regardless of the number of fatalities, while other sources—including the Federal Bureau of Investigation, or FBI—include only those incidents in which four or more people are killed.

This report uses the data collected by *USA Today*, which tracks all mass shootings that result in the death of four or more people. According to these data, six states did not have any mass shooting incidents in which four or more people were killed from 2006 to 2015. The remaining states presented at least one such mass shooting during this period.²⁵ North Dakota, West Virginia, Kansas, Wyoming, Louisiana, and South Carolina presented rates that were more than two times higher than the national average. Meanwhile, Massachusetts, New Jersey, and Pennsylvania had rates lower than 0.025 mass shootings per every million people.

TABLE 6
Rate of mass shootings, 2006–2015

National average rate: 0.083 per every one million people

Ranking	State	Rate per every one million people	Score	Ranking	State	Rate per every one million people	Score
1	North Dakota	0.294	100	25	Utah	0.073	25
2	West Virginia	0.217	74	27	Texas	0.072	25
3	Kansas	0.212	72	28	California	0.070	24
4	Wyoming	0.180	61	29	Maryland	0.069	24
5	Louisiana	0.177	60	30	Georgia	0.062	21
6	South Carolina	0.175	59	31	Michigan	0.060	21
7	Vermont	0.160	54	32	Connecticut	0.056	19
8	Arizona	0.158	54	33	North Carolina	0.053	18
9	Maine	0.151	51	34	Oregon	0.053	18
10	Missouri	0.134	46	35	New Mexico	0.049	17
11	South Dakota	0.123	42	36	Colorado	0.040	14
12	Washington	0.120	41	37	Minnesota	0.038	13
13	Nebraska	0.110	37	38	Arkansas	0.035	12
14	Oklahoma	0.107	36	39	Iowa	0.033	11
15	Wisconsin	0.106	36	40	New York	0.031	11
16	Alabama	0.105	36	41	Pennsylvania	0.024	8
17	Montana	0.102	34	42	New Jersey	0.023	8
18	Indiana	0.093	32	43	Massachusetts	0.015	5
19	Kentucky	0.093	31	50	Alaska	0.000	0
20	Illinois	0.086	29	50	Delaware	0.000	0
21	Tennessee	0.079	27	50	Hawaii	0.000	0
22	Ohio	0.078	27	50	Idaho	0.000	0
23	Virginia	0.075	26	50	Mississippi	0.000	0
24	Nevada	0.075	25	50	New Hampshire	0.000	0
25	Florida	0.074	25	50	Rhode Island	0.000	0

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.

Source: Center of American Progress analysis of USA Today, "Behind the Bloodshed," available at <http://www.gannett-cdn.com/GDCContent/mass-killings/index.html#title> (last accessed June 2016). According to this source, seven states did not report any mass shootings during the 2006–2015 period.

Intimate partner gun homicides of women

The deadly intersection between domestic violence and gun violence has been well established. When domestic abusers have easy access to guns, the risk that a woman will be murdered increases exponentially: When a gun is present in the home, the risk of lethal violence against women by a relative or an intimate partner is eight times higher than in homes without a gun and is 20 times greater when there is a previous history of domestic violence.²⁶ A previous CAP analysis found that, from 2005 to 2014, roughly one-third of murders of American women were committed by an intimate partner and half of those homicides were committed with a gun.²⁷

Review of the FBI *Supplemental Homicide Data* reveals that South Carolina, Louisiana, Nevada, Tennessee, and Oklahoma have the highest rates of intimate partner gun homicides against women from 2005 to 2014. In contrast, Illinois and Massachusetts present rates lower than one case per every 1 million women.

TABLE 7

Rate of intimate partner gun homicides of women, 2005–2014

National average rate: 3.71 per every one million women

Ranking	State	Rate per every one million women	Score	Ranking	State	Rate per every one million women	Score
1	South Carolina	7.69	100	26	Indiana	3.57	43
2	Louisiana	6.93	89	27	Kansas	3.50	42
3	Nevada	6.43	83	28	Vermont	3.47	41
4	Tennessee	6.07	77	29	South Dakota	3.45	41
5	Oklahoma	6.00	77	30	Delaware	3.26	39
6	Georgia	5.70	72	31	California	3.05	36
7	Arizona	5.64	72	32	Maryland	2.89	33
8	Kentucky	5.42	69	33	Washington	2.72	31
9	Alaska	5.33	67	34	Michigan	2.67	30
10	Texas	5.32	67	35	Ohio	2.61	30
11	West Virginia	5.24	66	36	Utah	2.51	28
12	Missouri	5.00	63	37	Nebraska	2.40	27
13	Alabama	4.67	58	38	Minnesota	2.25	25
14	Virginia	4.64	58	39	Connecticut	2.13	23
15	North Carolina	4.49	56	40	Wisconsin	2.10	23
16	Montana	4.48	56	41	New Hampshire	1.95	20
17	Mississippi	4.41	54	42	New York	1.83	19
18	New Mexico	4.38	54	43	North Dakota	1.79	18
19	Oregon	4.16	51	44	New Jersey	1.73	17
20	Arkansas	4.14	51	45	Hawaii	1.63	16
21	Wyoming	4.04	49	46	Iowa	1.56	15
22	Pennsylvania	4.02	49	47	Rhode Island	1.47	14
23	Idaho	4.01	49	48	Massachusetts	0.80	4
24	Colorado	3.93	48	49	Illinois	0.48	0
25	Maine	3.84	47	-	Florida	-	-

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.

Source: Center of American Progress analysis of Federal Bureau of Investigation, Supplemental Homicide Data (U.S. Department of Justice, 2005–2014). "Intimate partner" includes boyfriends, girlfriends, husbands, wives, ex-wives, ex-husbands, common-law wives, and common law husbands. The state of Florida does not report information to the FBI and therefore is not included in this ranking.

Gun deaths among people younger than age 21

The impact of gun violence falls disproportionately on young people in the United States. In 2015, gun violence surpassed car accidents as the leading cause of death of Millennials in this country.²⁸ Once again, America is an outlier when it comes to gun violence: The rate of gun-related homicides among young people in the United States is 49 times higher than peer nations.²⁹

Louisiana tops the states for having the highest rate of gun deaths of people younger than age 21 with a rate that is more than twice as high as the national average. Hawaii presents less than one gun death per every 100,000 people younger than age 21.

TABLE 8

Rate of gun deaths among people younger than age 21, 2005–2014

National average rate: 4.13 per every 100,000 people under 21

Ranking	State	Rate per every 100,000 people younger than age 21	Score	Ranking	State	Rate per every 100,000 people younger than age 21	Score
1	Louisiana	9.24	100	26	Idaho	4.08	41
2	Alaska	8.06	86	27	Ohio	4.00	40
3	Mississippi	6.17	65	28	Kansas	3.88	39
4	Missouri	6.08	64	29	Virginia	3.84	38
5	Alabama	6.07	64	30	West Virginia	3.80	38
6	New Mexico	5.56	58	31	Kentucky	3.68	36
7	Montana	5.55	58	32	Texas	3.65	36
7	Wyoming	5.55	58	33	South Dakota	3.64	36
9	Illinois	5.30	55	34	Nebraska	3.43	33
10	Oklahoma	5.22	54	35	Colorado	3.38	33
11	South Carolina	5.17	53	36	Wisconsin	3.22	31
12	Tennessee	5.15	53	37	Washington	2.80	26
13	Arkansas	5.14	53	38	Oregon	2.73	25
14	Maryland	5.12	53	39	New Jersey	2.66	25
15	Arizona	5.00	51	40	Vermont	2.65	25
15	Michigan	5.00	51	41	Utah	2.60	24
17	Pennsylvania	4.77	49	42	Minnesota	2.47	22
18	Nevada	4.67	48	43	Iowa	2.41	22
19	North Dakota	4.56	46	44	New York	2.31	21
20	Delaware	4.50	46	45	Connecticut	2.22	20
21	Florida	4.40	45	46	Maine	2.10	18
22	California	4.31	44	46	Rhode Island	2.10	18
23	Georgia	4.28	43	48	Massachusetts	1.77	14
24	Indiana	4.25	43	49	New Hampshire	1.70	14
25	North Carolina	4.20	42	50	Hawaii	0.51	0

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.

Source: Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data," available at http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html (last accessed June 2016).

Law enforcement officers feloniously killed with a firearm

There are approximately 900,000 sworn law-enforcement officers in the United States who often face substantial risks in the performance of their duties to protect community safety.³⁰ According to the National Law Enforcement Officers Memorial Fund, from 2006 to 2015, 1,439 officers were killed in the line of duty, both as a result of attacks on officers and accidents.³¹ According to the FBI, more than 90 percent of officers who were fatally assaulted in the line of duty from 2005 to 2014 were killed with guns.³² The risks faced by officers were tragically highlighted in a number of recent incidents, including and the murder of a police officer on her first day of work in Virginia in February 2016 while she and fellow officers were responding to a domestic violence call, and the ambush attacks of police officers in Dallas and Baton Rouge in July 2016.³³

Alaska, Louisiana, Mississippi, South Dakota, New Hampshire, Kansas, and West Virginia presented the highest rates of law enforcement officers being killed with a gun while Wyoming, Vermont, Nebraska, Maine, and Connecticut did not have any such incidents during this time period.

TABLE 9

Rate of law enforcement officers feloniously killed with a firearm, 2005–2014

National average rate: 0.16 officers per every one million people

Ranking	State	Rate per every one million people	Score	Ranking	State	Rate per every one million people	Score
1	Alaska	0.568	100	26	North Dakota	0.147	26
2	Louisiana	0.376	66	27	Minnesota	0.132	23
3	Mississippi	0.372	66	28	Tennessee	0.127	22
4	South Dakota	0.369	65	29	Kentucky	0.116	20
5	New Hampshire	0.304	54	30	Ohio	0.113	20
6	Kansas	0.282	50	31	Delaware	0.112	20
7	West Virginia	0.271	48	32	Michigan	0.111	19
8	Arizona	0.268	47	33	California	0.110	19
9	Alabama	0.211	37	34	Illinois	0.110	19
10	Georgia	0.208	37	35	Rhode Island	0.095	17
11	Arkansas	0.207	37	36	New York	0.088	15
12	Montana	0.203	36	37	Maryland	0.087	15
13	New Mexico	0.197	35	38	Oklahoma	0.081	14
14	South Carolina	0.196	35	39	Hawaii	0.074	13
15	Nevada	0.187	33	40	New Jersey	0.068	12
16	Missouri	0.185	33	41	Iowa	0.066	12
17	Utah	0.184	32	42	Idaho	0.065	11
18	Pennsylvania	0.182	32	43	Massachusetts	0.061	11
19	Virginia	0.176	31	44	Wisconsin	0.053	9
20	Florida	0.175	31	45	Oregon	0.053	9
21	North Carolina	0.170	30	50	Connecticut	0.000	0
22	Washington	0.165	29	50	Maine	0.000	0
23	Texas	0.160	28	50	Nebraska	0.000	0
24	Colorado	0.160	28	50	Vermont	0.000	0
25	Indiana	0.155	27	50	Wyoming	0.000	0

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.Source: Center for American Progress analysis of Federal Bureau of Investigation, "Uniform Crime Reports: Law Enforcement Officers Killed & Assaulted," available at <https://www.fbi.gov/about-us/cjis/ucr/leoka> (last accessed June 2016). Connecticut, Maine, Nebraska, Vermont, and Wyoming did not present any cases from 2005 to 2014.

Fatal shootings by police

The use of lethal force by police officers has been a top concern in many communities for decades—particularly communities of color that have a deep and complicated history with police—and has been part of a larger conversation about police-community relations in cities across the country.³⁴ This issue gained new national attention after the shooting death of Michael Brown by police in Ferguson, Missouri, in August 2014 and a number of other unarmed black men in the two years since. One of the most troubling revelations in the wake of Brown’s death was the lack of reliable, complete, and timely data on how frequently police officers use lethal force in the course of their duties. While the FBI has purported to collect this information as part of the Uniform Crime Reporting program, those data have been notoriously incomplete.³⁵ In 2015, two news organizations, *The Guardian* and *The Washington Post* attempted to fill this gap by launching real-time data collection projects that track incidents involving use of lethal force by police officers.³⁶ These efforts have created a much more robust source of data to measure the frequency with which officers use deadly force and the circumstances of those incidents. This has allowed numerous journalists and researchers to study these incidents and has resulted in a new body of research about use of lethal force by police.³⁷

These new data on shootings by police allowed the authors of this report to assess both sides of fatal encounters between police and the community—not just the rates at which officers are shot and killed, which was one of the indicators considered in the 2013 report—but also the frequency of fatal shootings by police. Many of these fatal shootings by police will be deemed justified by the criminal justice system as a lawful use of force; however, they still represent part of the full picture of what gun violence looks like in many communities.

Using data from *The Guardian*, the authors were able to measure fatal shootings by police in every state from January 2015 through July 2016. The table below shows that New Mexico is by far the state with the highest rate of police officers fatally shooting individuals, which is more than three times higher than the national average. On the other hand, Rhode Island, New York, and Connecticut have rates lower than one per every 1 million people.

TABLE 10

Rate of fatal shootings by police, 2015–2016

National average rate: 2.79 per every one million people

Ranking	State	Rate per every one million people	Score	Ranking	State	Rate per every one million people	Score
1	New Mexico	8.87	100	26	Georgia	2.34	20
2	Wyoming	6.85	75	27	Wisconsin	2.26	19
3	Alaska	6.11	66	28	Kansas	2.24	19
4	Oklahoma	6.08	66	29	Arkansas	2.19	18
5	Arizona	5.09	54	30	Delaware	2.15	18
6	Nevada	4.80	50	31	North Carolina	2.07	17
7	Colorado	4.42	46	32	Indiana	2.05	17
8	Louisiana	4.20	43	33	Maryland	2.01	16
9	South Dakota	4.12	42	34	Washington	1.99	16
10	Montana	3.92	40	35	Ohio	1.90	15
11	West Virginia	3.78	38	36	Virginia	1.87	14
12	Alabama	3.61	36	37	Minnesota	1.75	13
13	California	3.56	35	38	Vermont	1.60	11
14	Oregon	3.29	32	39	Illinois	1.55	10
15	Nebraska	3.20	31	40	New Hampshire	1.51	10
16	Missouri	2.97	28	41	North Dakota	1.37	8
17	South Carolina	2.92	27	42	Iowa	1.29	7
18	Kentucky	2.84	26	43	New Jersey	1.29	7
19	Texas	2.81	26	44	Massachusetts	1.26	7
20	Idaho	2.77	25	45	Pennsylvania	1.21	6
21	Mississippi	2.67	24	46	Michigan	1.21	6
22	Tennessee	2.61	23	47	Maine	1.13	5
23	Florida	2.56	23	48	Rhode Island	0.95	3
24	Hawaii	2.47	22	49	New York	0.91	3
25	Utah	2.39	21	50	Connecticut	0.69	0

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.Source: Center for American Progress analysis of *The Guardian*, "The Counted: People killed by police in the US," available at <http://www.theguardian.com/us-news/ng-interactive/2015/jun/01/the-counted-police-killings-us-database> (last accessed August 2016). For 2016, this report only considers those cases between January and July.

Crime gun export rates

Guns do not respect state boundaries; the patchwork of inconsistent gun laws from state to state has contributed to a dynamic in which crime guns often move from states with weak gun laws to states with stronger gun laws. State and local law enforcement can submit all guns recovered in connection with crime to the U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives, or ATF, to determine the first point of sale and the first legal purchaser of that gun. ATF then aggregates information about crime guns recovered in each state in annual trace data reports, which allows for an analysis of the movement of crime guns from state to state.

From 2010 to 2015 nearly 30 percent of all crime guns submitted for tracing crossed state lines before being used in connection with a crime.³⁸ Previous research has demonstrated that states are not equal opportunity exporters of crime guns: A 2010 study by Mayors Against Illegal Guns found that just 10 states were responsible for selling nearly half of the crime guns that had crossed state lines.³⁹

According to ATF data, from 2010 to 2015, West Virginia and Mississippi had rates of crime guns exported to other states that were more than twice the national average. New York, Hawaii, and New Jersey had the lowest rate of crime gun exports with rates lower than three crime guns per every 100,000 people.

TABLE 11

Crime gun export rates, 2010–2015

National average rate: 19.8 per every 100,000 people

Ranking	State	Rate per every 100,000 people	Score	Ranking	State	Rate per every 100,000 people	Score
1	West Virginia	52.1	100	26	Oregon	18.6	32
2	Mississippi	49.6	95	27	South Dakota	16.7	29
3	Alaska	39.0	74	28	North Dakota	16.6	28
4	Nevada	37.0	69	29	Ohio	15.7	27
5	South Carolina	36.1	68	30	Utah	15.3	26
6	Wyoming	34.2	64	31	Pennsylvania	14.9	25
7	Alabama	33.3	62	32	Colorado	14.1	23
8	Kentucky	33.1	62	33	Missouri	14.0	23
9	Virginia	31.6	59	34	Washington	13.2	21
10	Indiana	31.5	58	35	Florida	13.1	21
11	Arizona	30.3	56	36	Nebraska	11.8	19
12	Georgia	30.1	56	37	Iowa	11.7	19
13	Montana	29.7	55	38	Wisconsin	11.0	17
14	Arkansas	26.6	49	39	Maryland	10.9	17
15	Idaho	25.0	45	40	Texas	10.2	15
16	New Hampshire	23.7	43	41	Michigan	7.6	10
17	Louisiana	23.5	42	42	Illinois	6.8	9
18	Delaware	23.1	41	43	Connecticut	6.8	9
19	New Mexico	22.4	40	44	Minnesota	6.4	8
20	Vermont	21.6	39	45	Rhode Island	4.9	5
21	Oklahoma	20.9	37	46	California	4.5	4
22	North Carolina	20.7	37	47	Massachusetts	3.6	2
23	Kansas	20.3	36	48	New York	2.9	1
24	Tennessee	19.7	35	49	Hawaii	2.8	1
25	Maine	19.1	33	50	New Jersey	2.5	0

States in **red** indicate the 10 states with the highest rates. States in **green** indicate the 10 states with the lowest rates.Source: Center for American Progress analysis of Bureau of Alcohol, Tobacco, Firearms and Explosives, Firearms Trace Data (2010–2015), available at <https://www.atf.gov/resource-center/data-statistics>.

The link between high levels of gun violence and weak state gun laws

As discussed above, there are numerous factors that influence rates of gun violence in any community and that could account for variations in the frequency of different types of gun deaths from state to state. In this report, CAP seeks to zero-in on one such factor and assess whether there is a relationship between the strength of a state's gun laws and the levels of gun violence in the state. In doing so, this report does not discount the importance of those other factors, but rather seeks to address one of the key questions in the national gun debate: whether gun laws have an impact on reducing gun violence. In addition, the level of gun violence may vary widely within a state and increased rates in some cities may drive up the statewide rates. In this report, the authors only consider statewide rates of gun violence and the relationship to statewide gun laws.

To conduct this analysis, the authors used the “2015 Gun Law State Scorecard” prepared by the Law Center to Prevent Gun Violence, or Law Center, which ranks each state according to its gun laws and assigns each state a corresponding grade. In the “Scorecard,” states received points for having enacted strong gun laws designed to help keep communities safe by keeping guns out of the wrong hands, such as laws requiring universal background checks; prohibiting domestic abusers from possessing guns; limiting bulk gun purchases; and banning assault weapons and high-capacity magazines. States lost points for having enacted laws that jeopardize public safety, such as eliminating the permit requirement for carrying concealed guns; expansive self-defense laws; and allowing guns in sensitive locations, such as schools and bars.⁴⁰

The 10 states rated as having the weakest gun laws in 2015 are as follows:

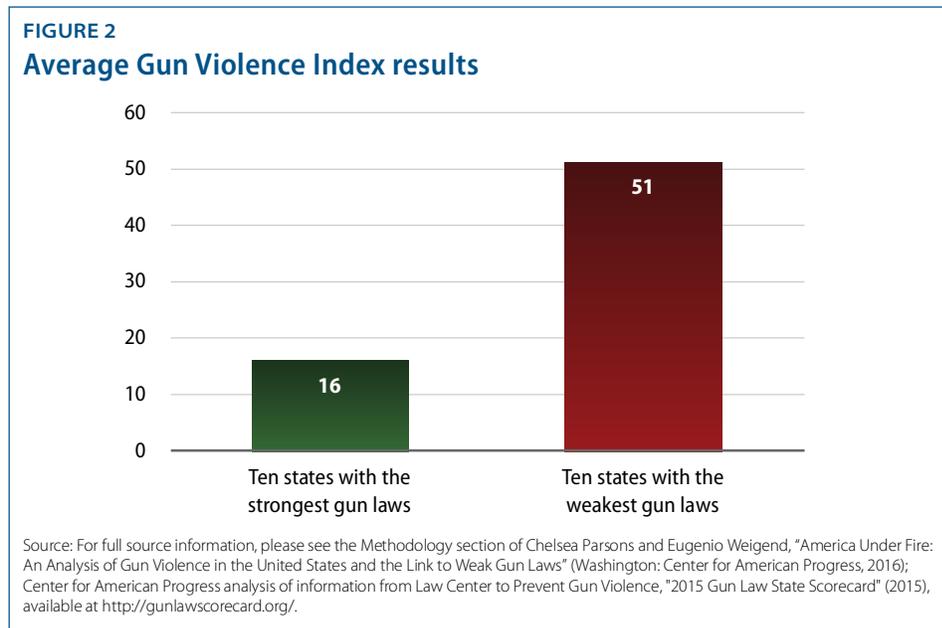
- Kansas
- Mississippi
- Wyoming
- Arizona
- Alaska
- Idaho
- Louisiana
- Kentucky
- Vermont
- Missouri

The 10 states rated as having the strongest gun laws in 2015 are as follows:

- California
- Connecticut
- New Jersey
- Maryland
- Massachusetts
- New York
- Hawaii
- Illinois
- Rhode Island
- Delaware

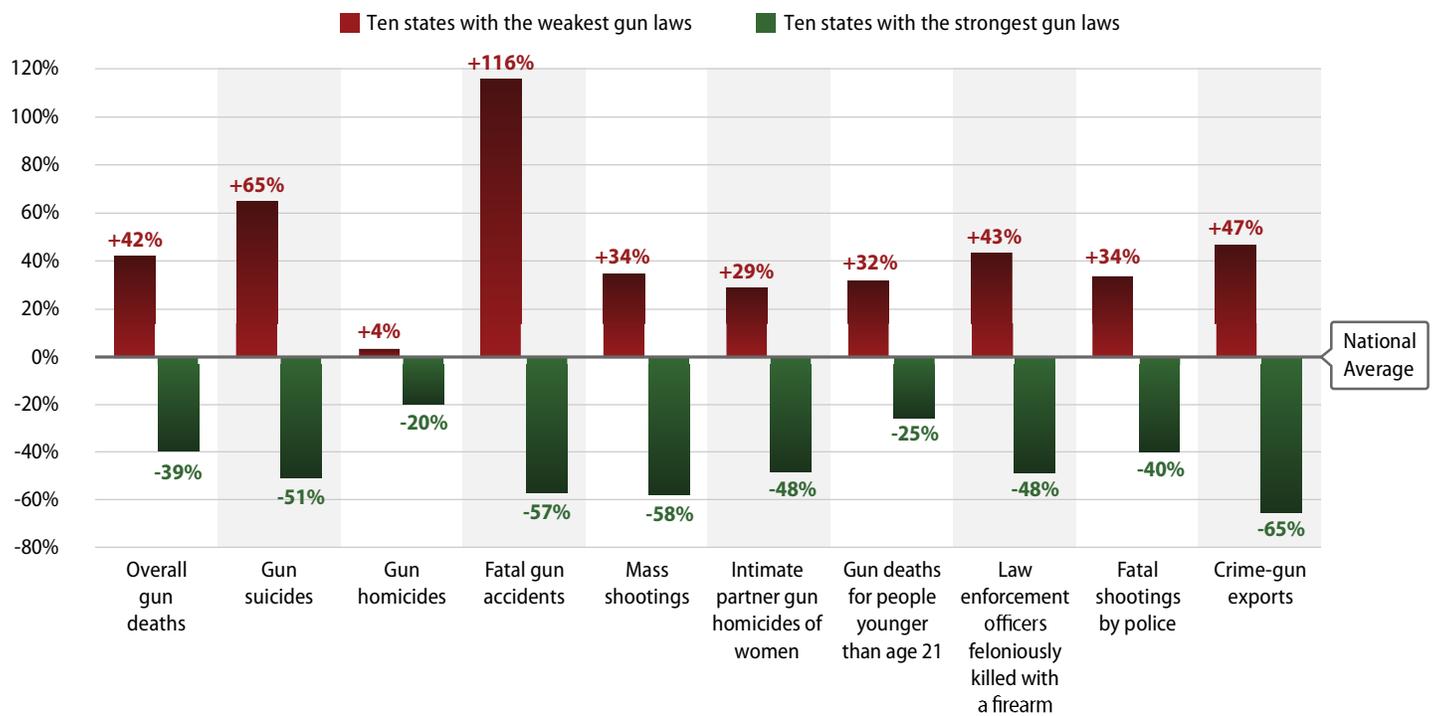
Weak gun laws, bad results

Comparing the Gun Violence Index score for each state with the Law Center’s scorecard, the authors found that there is a significant correlation between the strength of a state’s gun laws and the levels of gun violence in the state: The 10 states with the weakest gun laws collectively have an aggregate level of gun violence that is 3.2 times higher than the average of the 10 states with the strongest gun laws.⁴¹



Additionally, in each individual category of gun violence analyzed, the 10 states with the weakest gun laws have collectively higher levels of gun violence than the 10 states with the strongest gun laws and collectively present higher rates in comparison to national average rates. These disparities are particularly clear on fatal gun-related accidents, gun suicides, rates of crime guns exported to other states, rates of law enforcement officers feloniously killed with a gun and overall gun deaths. On the other hand, the 10 states with the strongest gun laws present average rates that are lower than the national average rates across all 10 indicators.

FIGURE 3
Comparison of average rates of gun violence to the national average



Source: Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data," available at http://webappa.cdc.gov/sas-web/ncipc/dataRestriction_inj.html (last accessed June 2016); *USA Today*, "Behind the Bloodshed," available at <http://www.gannett-cdn.com/GDContent/mass-killings/index.html#title> (last accessed June 2016); Federal Bureau of Investigation, *Supplemental Homicide Data* (U.S. Department of Justice, 2005–2014); Federal Bureau of Investigation, "Uniform Crime Reports: Law Enforcement Officers Killed & Assaulted," available at <https://www.fbi.gov/about-us/cjis/ucr/leoka> (last accessed June 2016); *The Guardian*, "The Counted: People killed by police in the US," available at <http://www.theguardian.com/us-news/ng-interactive/2015/jun/01/the-counted-police-killings-us-database> (last accessed June 2016); Bureau of Alcohol, Tobacco, Firearms and Explosives, *Firearms Trace Data (2010–2015)*, available at <https://www.atf.gov/resource-center/data-statistics> (last accessed July 2016); Law Center to Prevent Gun Violence, "2015 Gun Law State Scorecard" (2015), available at <http://gunlawscorecard.org/>.

Of the 10 states with the weakest gun laws, nine are among the top-25 states with the highest levels of gun violence in the country. In contrast, of the 10 states with the strongest gun laws, all are among the 25 states with the lowest levels of gun violence in the country, including the six states with the overall lowest levels of gun violence in our index.

TABLE 12

Gun Violence Index ranking

States with the weakest and strongest gun laws

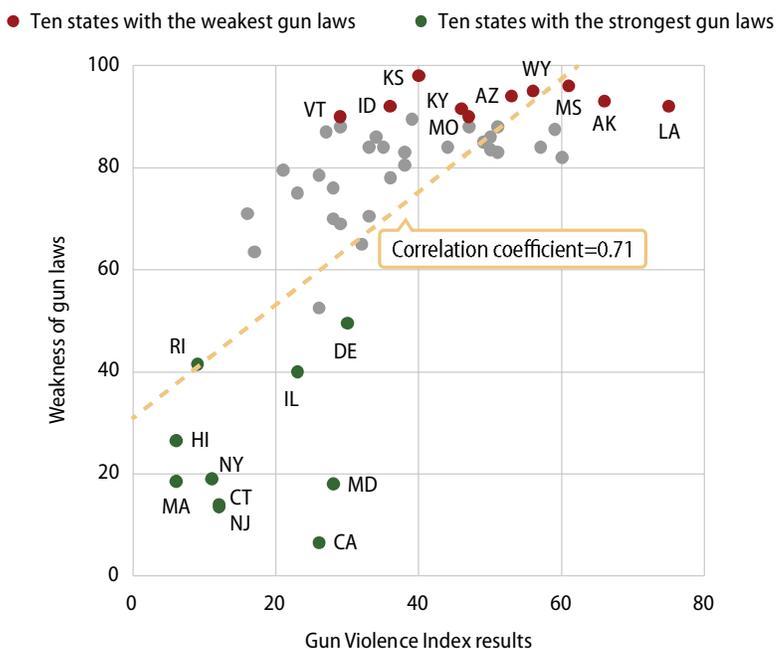
Ranking	State	Gun Violence Index	Ranking	State	Gun Violence Index
1	Louisiana	75	26	Colorado	33
2	Alaska	66	27	Florida	33
3	Mississippi	61	28	Pennsylvania	32
4	West Virginia	60	29	Delaware	30
5	Alabama	59	30	Oregon	29
6	South Carolina	57	31	Vermont	29
7	Wyoming	56	32	Utah	29
8	Arizona	53	33	Michigan	28
9	Montana	51	34	Maryland	28
10	Oklahoma	51	35	Ohio	28
11	Nevada	50	36	Maine	27
12	New Mexico	50	37	Washington	26
13	Tennessee	49	38	California	26
14	Arkansas	47	39	Nebraska	26
15	Missouri	47	40	Illinois	23
16	Kentucky	46	41	Wisconsin	23
17	Georgia	44	42	New Hampshire	21
18	Kansas	40	43	Minnesota	17
19	South Dakota	39	44	Iowa	16
20	Indiana	38	45	Connecticut	12
21	North Carolina	38	46	New Jersey	12
22	Idaho	36	47	New York	11
23	Virginia	36	48	Rhode Island	9
24	North Dakota	35	49	Hawaii	6
25	Texas	34	50	Massachusetts	6

States in **red** indicate the 10 states with the weakest gun laws. States in **green** indicate the 10 states with the strongest gun laws.

Source: For full source information, please see the Methodology section of Chelsea Parsons and Eugenio Weigend, "America Under Fire: An Analysis of Gun Violence in the United States and the Link to Weak Gun Laws" (Washington: Center for American Progress, 2016).

Finally, by plotting the Gun Violence Index score for each state and the strength of each state's gun laws, the authors find a clear correlation between these two variables. With a correlation coefficient of 0.71, this link is statistically significant and visually apparent as shown on Figure 2. This means that states with stronger gun laws tend to have lower levels of gun violence and, vice versa, states with weaker gun laws tend to have higher levels of gun violence.⁴²

FIGURE 4
Correlation between state gun laws and gun violence outcomes



Source: For full source information, please see the Methodology section of Chelsea Parsons and Eugenio Weigend, *America Under Fire: An Analysis of Gun Violence in the United States and the Link to Weak Gun Laws* (Washington: Center for American Progress, 2016); Center for American Progress analysis of information from Law Center to Prevent Gun Violence, "2015 Gun Law State Scorecard" (2015), available at <http://gunlawscorecard.org/>; Personal communication from Garrett McDonough, communications director, Law Center to Prevent Gun Violence, December 21, 2015.

Conclusion

The United States of America is not the only country on Earth with violent or dangerous people. We are not inherently more prone to violence. But we are the only advanced country on Earth that sees this kind of mass violence erupt with this kind of frequency. It doesn't happen in other advanced countries. It's not even close. And as I've said before, somehow we've become numb to it and we start thinking that this is normal.

—President Barack Obama, January 5, 2016⁴³

Gun violence is a uniquely American problem, and the intensely polarized politics surrounding it can make it seem like an intractable one. But looking across the vastly different experiences of the states reveals that high rates of gun deaths are not inevitable and that there are policy options available to begin to stem the tide of gun violence in many communities. While there are many factors that contribute to high rates of gun deaths and gun laws alone are not a panacea, CAP's research in this report and the finding of a strong correlation between strong gun laws and fewer gun deaths in the states sends a powerful message to lawmakers to take a serious look at a number of smart laws that can have an impact on reducing gun violence. Some of those policies include:

- Closing the private-sale loophole and requiring background checks for all gun sales
- Banning or more strictly regulating the sale and possession of assault weapons and high-capacity magazines
- Prohibiting domestic abusers and stalkers from gun possession
- Investing in community-based programs designed to address underlying root causes of violence in impacted communities

- Strengthening the federal law to penalize gun traffickers who flood vulnerable communities with illegal guns
- Increasing oversight of the gun industry
- Requiring a permit to carry concealed, loaded guns in the community
- Banning gun possession at certain sensitive locations, such as bars, houses of worship, and schools

Methodology

Selecting the 10 measures

There are many different ways to measure gun violence and gun crime on the state level. For this report the authors looked at 22 total possible indicators and ultimately chose 10. One of the reasons these measures were selected was the fact that these indicators came from reliable sources such as the National Center for Injury Prevention at the Centers for Disease Control and Prevention, the Federal Bureau of Investigation, the Bureau of Alcohol, Tobacco, Firearms and Explosives, and several news outlets. The authors also selected these indicators because data were available in each category for at least 45 states, allowing the authors to access data for at least 90 percent of the states in each category. There were also some types of gun violence that the authors were unable to measure in a sufficient number of states and therefore chose not to include. In addition, the authors could not include nonfatal gun injuries because the CDC does not provide this information broken down by state.

The authors selected five indicators of gun violence that affect the overall population: overall gun deaths, gun suicides, gun homicides, accidental gun deaths and mass shootings, defined as incidents in which four or more people were killed in a single incident. They chose four categories of gun violence because of their particular impact on vulnerable groups: rates of intimate partner gun homicides against women, rates of gun deaths for people younger than age 21, rates of police officers feloniously killed with a gun and rates of fatal shootings by police officers. Finally, the authors include a measurement of illegal movement of guns across states: the rate of crime guns exported to other states from 2010-2015.

Calculating the Gun Violence Index

Rates of overall gun deaths, gun suicides, gun homicides, fatal gun accidents and gun deaths for people younger than age 21 were obtained directly from the CDC. While age-adjusted rates do not apply for the latter indicator, the authors used age-adjusted rates for the first four indicators to allow for a fairer comparison between states with different age distributions.

Information regarding intimate partner gun homicides of women was obtained from the FBI *Supplementary Homicide Report*, using cases with one victim and one aggressor. Information on mass shootings was obtained from *USA TODAY*, which maintains a real-time database of these incidents beginning in 2006 that has been used by other researchers.⁴⁴ Data on police feloniously killed with a firearm were obtained from the FBI *Law Enforcement Officers Killed and Assaulted* reports. Finally, data on fatal shootings by police were obtained from *The Guardian*, which since 2015 has maintained a real-time database of these incidents. While *The Washington Post* also monitors and collects real time information regarding these incidents, the authors relied on *The Guardian's* project because it presented broader information.⁴⁵ Data on crime-gun exports was drawn from the ATF annual trace data reports.

With respect to calculating rates, the authors obtained the rate directly from the CDC for the following categories: overall gun deaths, gun suicides, gun homicides, fatal gun accidents, and gun deaths among people younger than age 21. For the remaining categories, the authors calculated the rates using population data available from the CDC through 2014, which is consistent with population data available from the U.S. Census Bureau. Because the CDC does not provide population data for 2015 or 2016, for those categories that include data from those years, the authors used the population data available from previous years. In order to obtain the rate of mass shootings from 2006 to 2015, the authors used the population from 2005 to 2014. Similarly, to obtain the rate of fatal shootings by police from 2015 to 2016, the authors used the 2013 and 2014 population. Finally, for the rate of crime guns from 2010 to 2015, the authors used the 2014 population from the CDC as an approximation of the 2015 population. The authors are confident that year-to-year variations in population do not significantly change rates based on constant raw numbers.

The authors recognized that the rates of police officers feloniously killed with a firearm and mass shootings are based on a small number of cases. However, given the impact that these forms of gun violence have on the community, the authors decided to include them as key indicators of gun violence.

To create the Gun Violence Index, the authors ranked each state according to their rate of each indicator of gun violence. The state with the lowest level of gun violence per indicator was given a zero and the state with the highest level was given a 100. All remaining states that fall in between were given numbers between 0 and 100 in proportion to their placement within the range. The result for each state in each category was then averaged to obtain one aggregate Gun Violence Index number for each state.

For those states that did not present data for a particular indicator, the authors calculated the overall Gun Violence Index score by averaging the other nine indicators without considering that particular category. For example, data were not available on the rate of intimate partner gun homicides of women in Florida or for the rate of accidental gun deaths in Delaware, Hawaii, Maine, Rhode Island, and Vermont. Therefore, the authors did not consider these particular indicators when calculating the final Gun Violence Index number for these states. Moreover, if a source indicated that a state presented zero cases on a particular indicator, the state was scored with a zero, indicating the lowest level of gun violence. For example, according to the FBI data, there were no reported cases of police officers feloniously killed with a gun in Wyoming, Vermont, Nebraska, Maine, and Connecticut. Therefore, these states were scored with a zero.

This ranking presents a relative comparison among states. This report does not suggest that states with lower scores on the Gun Violence Index cannot improve their gun violence outcomes.

The majority of the indicators in this report are presented per every 100,000 people. However, indicators such as mass shootings, police officers feloniously killed with a gun, fatal shootings by police, and accidental gun deaths involved relatively low raw numbers and were instead presented per every 1 million people. The rate of intimate partner gun homicides against women was presented per every 1 million women. Additionally, the rate of gun deaths for people younger than age 21 was estimated per every 100,000 people younger than age 21.

National rates or averages were obtained directly from the CDC for gun deaths, gun suicides, gun homicides, fatal gun accidents, and gun deaths for people younger than age 21. However, as other sources did not provide national rates for the remaining categories, these were obtained by averaging the rates of the 50 states.

If states presented the same rate in a particular indicator, they were ranked equally. This is why some states present the same ranking number. Some differences in rates may not be illustrated due to decimal rounding.

Finally, it is important to note that some of the indicators may be underreported. For example, crime gun trace data obtained from the ATF does not account for all crime guns. This is because not all crime guns are recovered and not all those that are recovered are later traced. Information on intimate partner gun homicides against women is obtained from the FBI *Supplementary Homicide Report*, however, many states report partial information into this dataset. Despite this limitation, this indicator is the best source for intimate partner gun homicides against women for a state-level analysis. Data on fatal gun accidents, categorized by the CDC as “unintentional” gun deaths, suffer from inconsistent coding across states, making it difficult to compare states on this measure.

Measuring the strength of state gun laws

To assess the strength of each state’s laws, this report relies on the 2015 annual “Gun Law State Scorecard” prepared by the Law Center to Prevent Gun Violence.⁴⁶ This organization considers 34 different categories of state laws and awards points to states for enacting strong policies, such as requiring background checks for all gun sales, prohibiting individuals who pose an increased risk to public safety from buying or possessing guns, and regulating gun dealers. It also deducts points for laws that weaken public safety, such as allowing concealed carry of guns without a permit, expansive self-defense laws that eliminate any duty to retreat, and allowing guns to be carried in sensitive locations, including schools, bars, and houses of worship.⁴⁷ The scores range from zero being the weakest gun laws to 100 being the strongest gun laws.⁴⁸ However, for the purpose of presenting a positive association, this report will use the inverse of these scores.⁴⁹ Consequently, gun law scores used in this report will range from zero, indicating the strongest gun laws to 100, indicating the weakest gun laws.

The Law Center to Prevent Gun Violence also provides a state ranking, as well as an alphabetical grading system ranging from F to A+ that can be transformed into a grade point average, or GPA. For this analysis, the authors chose to rely on the inverse of the number of points awarded to a state, rather than the grade, because doing so yields a more precise measure of the strength of a state's gun laws and allows one to observe variations in a state's score that are not apparent from its letter grade. For example, 26 states were awarded an F, yet the points awarded to these states ranged from 2 to 17.⁵⁰

In conducting the analysis in this report, the authors did not include the District of Columbia, primarily because the Law Center to Prevent Gun Violence does not provide a score for the strength of gun laws in the District of Columbia. Additionally many state-level reports exclude the District of Columbia because it is more comparable to metropolitan areas or cities than to states.⁵¹

Correlation analysis

A correlation coefficient presents a measurement of the strength of the linear relationship between two variables. It also measures the direction of this relation. If it is a positive association, both variables would tend to decrease or increase at the same time. However, a negative association means that while one variable increases, the other variable tends to decrease, or that while one variable decreases, the other tends to increase. Correlation coefficients are always presented with values between -1 and 1. In this regard, correlation does not prove causation and this report does not conclude that gun violence is solely explained by weak gun laws. Nonetheless, a strong association, measured by the correlation coefficient, does suggest a potential causal relationship.

About the authors

Chelsea Parsons is the Vice President of Guns and Crime Policy at the Center for American Progress. Her work focuses on advocating for progressive laws and policies relating to gun violence prevention and the criminal justice system at the federal, state, and local levels. In this role, she has helped develop measures to strengthen gun laws and reduce gun violence that have been included in federal and state legislation and as part of President Barack Obama's January 2016 executive action announcement on gun violence prevention. Prior to joining the Center, Parsons was general counsel to the New York City criminal justice coordinator, a role in which she helped develop and implement criminal justice initiatives and legislation in areas including human trafficking, sexual assault, family violence, firearms, identity theft, indigent defense, and justice system improvements. She previously served as an assistant New York state attorney general and a staff attorney law clerk for the 2nd U.S. Circuit Court of Appeals.

Eugenio Weigend is the Senior Policy Analyst for the Guns and Crime Policy team at the Center for American Progress. His work has focused on public security. He has conducted research on arms trafficking, organized crime and violence, firearm regulations in the United States, and the illegal flow of weapons into Mexico. He has a Ph.D from Tecnologico de Monterrey and a master's degree in public affairs from Brown University.

Acknowledgements

The authors would like to thank Arkadi Gerney for his contributions to this report.

Endnotes

- 1 Estimates of gun ownership in the United States are based on survey data. See for example Bindu Kalesan and others, "Gun Ownership and social gun culture," *Injury Prevention* (2015): 1-5, available at <http://injury-prevention.bmj.com/content/early/2015/06/09/injury-prev-2015-041586.full.pdf?keytype=ref&ijkey=doj6vx0laFZMsQ2>; Kate Masters, "Why a New Survey From Harvard and Northeastern Is the Most Authoritative Assessment of American Gun Ownership in 20 Years," *The Trace*, September 19, 2016, available at <https://www.thetrace.org/2016/09/harvard-northeastern-gun-ownership-survey-research/>.
- 2 Eric W. Fleegler and others, "Firearm Legislation and Firearm-Related Fatalities in the United States," *JAMA Internal Medicine* 173 (9) (2013): 732–740.
- 3 Richard Florida, "The Geography of Gun Deaths," *The Atlantic*, January 13, 2011, available at <http://www.theatlantic.com/national/archive/2011/01/the-geography-of-gun-deaths/69354/>.
- 4 Daniel Webster, Cassandra Kercher Crifasi, and Jon S. Vernick, "Effects of the Repeal of Missouri's Handgun Purchaser Licensing Law on Homicides," *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 91 (3) (2014): 293–302; Daniel Webster, Cassandra Kercher Crifasi, and Jon S. Vernick, "Erratum to: Effects of the Repeal of Missouri's Handgun Purchaser Licensing Law on Homicides," *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 91 (3) (2014): 598–601.
- 5 Everytown for Gun Safety, "Gun Background Checks Reduce Crime and Saves Lives" (2015), available at <http://everytown.org/documents/2014/10/background-checks-reduce-crimes-and-save-lives.pdf>.
- 6 Arkadi Gerney, Chelsea Parsons, and Charles Posner, "America Under the Gun: A 50-State Analysis of Gun Violence and Its Link to Weak State Gun Laws" (Washington: Center for American Progress, 2013), available at <https://www.americanprogress.org/wp-content/uploads/2013/04/AmericaUnderTheGun-3.pdf>.
- 7 Law Center to Prevent Gun Violence, "Summary of Enacted Laws since Newtown," available at <http://smartgunlaws.org/summary-of-enacted-laws-since-newtown/> (last accessed October 2016).
- 8 Law Center to Prevent Gun Violence, "Concealed Weapons Permitting," available at <http://smartgunlaws.org/gun-laws/policy-areas/firearms-in-public-places/concealed-weapons-permitting/> (last accessed October 2016).
- 9 Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data," available at http://www.cdc.gov/injury/wisqars/fatal_injury_reports.html (last accessed September 2016); Estimations are based on 2014 gun death figures.
- 10 Rebecca S. Spicer, and Ted R. Miller, "Suicide Acts in 8 States: Incidence and Case Fatality Rates by Demographics and Method," *American Journal of Public Health* 90 (12) (2000): 1885-1891, available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1446422/pdf/11111261.pdf>; Harvard T.H. Chan School of Public Health, "Lethality of Suicide Method," available at <https://www.hsph.harvard.edu/means-matter/means-matter/case-fatality/> (last accessed October 2016).
- 11 Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data."
- 12 Ibid.
- 13 Ibid.
- 14 Ibid.
- 15 Erin Grinshteyn and David Hemenway, "Violent Death Rates: The US Compared with Other High-Income OECD Countries, 2010," *The American Journal of Medicine* 219 (3) (2016): 266-273, available at <http://www.ncbi.nlm.nih.gov/pubmed/26551975>.
- 16 Morriah Kaplan and Sophia Kerby, "Top 10 Reasons Why Communities of Color Should Care About Stricter Gun-Violence Prevention Laws," Center for American Progress, January 17, 2013, available at <https://www.americanprogress.org/issues/race/news/2013/01/17/49885/top-10-reasons-why-communities-of-color-should-care-about-stricter-gun-violence-prevention-laws/>.
- 17 Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data."
- 18 Ibid.
- 19 Ibid.
- 20 Ibid.; Jennifer Mascia, "It's Easy for Most American Kids to Get a Gun — Even If Their Parents Believe Otherwise," *The Trace*, February 18, 2016, available at <https://www.thetrace.org/2016/02/child-gun-access-arizona-shooting/>; Michael Luo and Mike McIntire, "Children and Guns: The Hidden Toll," *The New York Times*, September 28, 2013, available at <http://www.nytimes.com/2013/09/29/us/children-and-guns-the-hidden-toll.html?pagewanted=all>.
- 21 Benjamin Powers, "Toddlers Involved in More Shootings than Terrorists in 2015," *The Huffington Post*, November 29, 2015, available at http://www.huffingtonpost.com/benjamin-powers/toddlers-involved-in-more_b_8650536.html.
- 22 See, e.g., Everytown for Gun Safety, "Innocents Lost" (2014), available at https://everytownresearch.org/reports/innocents_lost/; Maggie Koerth-Baker, "What Counts As An Accident?" *FiveThirtyEight*, available at <http://fivethirtyeight.com/features/gun-accidents/> (last accessed October 2016).
- 23 Center for American Progress analysis of Centers for Disease Control and Prevention, "Injury Prevention & Control: Data & Statistics (WISQARS): Fatal Injury Data."
- 24 Amy P. Cohen, Deborah Azrael, and Matthew Miller, "Rate of Mass Shootings Has Tripled Since 2011, Harvard Research Shows," *Mother Jones*, October 15, 2014, available at <http://www.motherjones.com/politics/2014/10/mass-shootings-increasing-harvard-research>.
- 25 *USA Today*, "Behind the Bloodshed," available at <http://www.gannett-cdn.com/GDContent/mass-killings/index.html#explore> (last accessed October 2016).
- 26 Arthur L. Kellermann and others, "Gun ownership as a risk factor for homicide in the home," *New England Journal of Medicine* 329(15) (1993): 1084-1091.

- 27 Arkadi Gerney and Chelsea Parsons, "Women Under the Gun: How Gun Violence Affects Women and 4 Policy Solutions to Better Protect Them" (Washington: Center for American Progress, 2014), available at <https://www.americanprogress.org/issues/guns-crime/report/2014/06/18/91998/women-under-the-gun/>.
- 28 Chris Christoff and Ilan Kolet, "American Gun Deaths to Exceed Traffic Fatalities by 2015," *Bloomberg Business*, December 19, 2012, available at <http://www.bloomberg.com/news/articles/2012-12-19/american-gun-deaths-to-exceed-traffic-fatalities-by-2015>; Chelsea Parsons and Anne Johnson, "Young Guns: How Gun Violence is Devastating the Millennial Generation" (Washington: Center for American Progress and Generation Progress, 2014), available at <https://www.americanprogress.org/issues/guns-crime/report/2014/02/21/84491/youngguns-how-gun-violence-is-devastating-the-millennial-generation>.
- 29 Mark Berman, "Americans are much, much more likely to be killed by guns than people in other countries," *The Washington Post*, February 3, 2016, available at https://www.washingtonpost.com/news/post-nation/wp/2016/02/03/americans-are-much-more-likely-to-be-killed-by-guns-than-people-in-other-countries/?utm_term=.ebc7a7db0c91. Young people in this study are defined by those between 15 and 24 years of age.
- 30 National Law Enforcement Officers Memorial Fund, "Law Enforcement Facts," available at <http://www.nleomf.org/facts/enforcement/> (last accessed October 2016).
- 31 *Ibid.*
- 32 *Ibid.*; Center for American Progress analysis of Federal Bureau of Investigation, "Uniform Crime Reports: Law Enforcement Officers Killed & Assaulted," available at <https://www.fbi.gov/about-us/cjis/ucr/leoka> (last accessed June 2016).
- 33 The Associated Press, "New Virginia Officers Killed on Domestic Violence Call," *The New York Times*, February 28, 2016, available at http://www.nytimes.com/2016/02/29/us/new-virginia-officer-killed-on-domestic-violence-call.html?_r=0; Andy Sullivan, "Obama tells police after killings: 'We have your backs,'" *Reuters*, July 20, 2016, available at <http://www.reuters.com/article/us-usa-police-idUSKCN0Z0MX>.
- 34 For a discussion of the history of the intersection of policing and race, see Danyelle Solomon, "The Intersection of Policing and Race" (Washington: Center for American Progress, 2016), available at <https://www.americanprogress.org/issues/race/report/2016/09/01/143357/the-intersection-of-policing-and-race/>.
- 35 Michele Jawando and Chelsea Parsons, "4 Ideas That Could Begin to Reform the Criminal Justice System and Improve Police-Community Relations" (Washington: Center for American Progress, 2014), available at <https://www.americanprogress.org/issues/civil-liberties/report/2014/12/18/103578/4-ideas-that-could-begin-to-reform-the-criminal-justice-system-and-improve-police-community-relations/>.
- 36 *The Guardian*, "The Counted: People killed by police in the US," available at <http://www.theguardian.com/us-news/ng-interactive/2015/jun/01/the-counted-police-killings-us-database#> (last accessed August 2016); *The Washington Post*, "People shot dead by police this year," available at <https://www.washingtonpost.com/graphics/national/police-shootings/> (last accessed August 2016).
- 37 For example, *The Washington Post* review of its 2015 data revealed that, of the 965 people fatally shot by police in 2015, 564 were armed with a gun and 281 were armed with another weapon; black men accounted for 40 percent of unarmed men fatally shot by police in 2015. Kimberly Kindy and others, "A Year of Reckoning: Police Fatally Shot Nearly 1,000," *The Washington Post*, December 26, 2015, available at <http://www.washingtonpost.com/sf/investigative/wp/2015/12/26/2015/12/26/a-year-of-reckoning-police-fatally-shoot-nearly-1000/>. An analysis by *The Guardian* of their 2015 data on all killings by police officers—not just shootings—found that young black men were nine times more likely to be killed by police officers than any other group. Jon Swaine and others, "Young black men killed by US police at higher rate in year of 1,134 deaths," *The Guardian*, December 31, 2015, available at <https://www.theguardian.com/us-news/2015/dec/31/the-counted-police-killings-2015-young-black-men>.
- 38 Center for American Progress' analysis of Bureau of Alcohol, Tobacco, Firearms and Explosives, "Firearms Trace Data" (2010-2015), available at <https://www.atf.gov/resource-center/data-statistics> (last accessed July 2016).
- 39 Mayors Against Illegal Guns, "Trace the Guns" (2010), available at <http://tracetheguns.org/report.pdf>.
- 40 Law Center to Prevent Gun Violence, "2015 Gun Law State Scorecard" (2015), available at <http://gun-lawscorecard.org/>; Personal communication from Garrett McDonough, communications director, Law Center to Prevent Gun Violence, December 21, 2015.
- 41 This difference was statistically significant at a 95 percent confidence level.
- 42 Positive correlations between weak gun laws and each of the 10 indicators of gun violence further support this finding. The correlation between weak gun laws and the ten indicators are as following: overall rate of gun deaths (0.72); rate of gun suicides (0.80); rate of gun homicides (0.13); rate of fatal gun-related accidents (0.57); rate of mass shootings (0.40); rate of intimate partner gun homicides of women (0.61); rate of gun deaths among people younger than age 21 (0.44); rate of law enforcement officers feloniously killed with a firearm (0.43); rate of fatal shootings by police (0.41); crime gun export rate (0.66).
- 43 The White House, "Remarks by the President on Common-Sense Gun Safety Reform," Press release, January 5, 2016, available at <https://www.whitehouse.gov/the-press-office/2016/01/05/remarks-president-common-sense-gun-safety-reform>.
- 44 For example, Matt Rocheleau, "How many mass shootings so far in 2016?," *The Boston Globe*, April 22, 2016, available at <https://www.bostonglobe.com/metro/2016/04/22/how-many-mass-shootings-have-there-been-far/Njdb2kV2BRa6dYjh3li9GJ/story.html>.
- 45 The authors did a separate analysis using information from *The Washington Post*. The results are consistent and do not change significantly.
- 46 Law Center to Prevent Gun Violence, "2015 Gun Law State Scorecard."
- 47 *Ibid.*; Personal communication from Garrett McDonough, communications director, Law Center to Prevent Gun Violence, December 21, 2015.
- 48 *Ibid.*

49 In this report, the authors used the inverse of scores provided by the Law Center to Prevent Gun Violence in order to measure gun laws. Consequently, the authors' scores will range from zero, indicating the strongest gun laws, to 100, indicating the weakest gun laws. For example, the Law Center reports that California has a score of 93.5; however, for the purposes of this report, the authors will use its inverse of 6.5—100 minus 93.5.

50 Law Center to Prevent Gun Violence, "2015 Gun Law State Scorecard."

51 See for example, Albert Hermalin and Lisa Neidert, "Lifetime Migration in the United States as of 2006-2010: Measures, Patterns, and Application" (Ann Arbor, MI: Population Studies Center, 2014), available at <http://www.psc.isr.umich.edu/pubs/pdf/rr14-832.pdf>.

Our Mission

The Center for American Progress is an independent, nonpartisan policy institute that is dedicated to improving the lives of all Americans, through bold, progressive ideas, as well as strong leadership and concerted action. Our aim is not just to change the conversation, but to change the country.

Our Values

As progressives, we believe America should be a land of boundless opportunity, where people can climb the ladder of economic mobility. We believe we owe it to future generations to protect the planet and promote peace and shared global prosperity.

And we believe an effective government can earn the trust of the American people, champion the common good over narrow self-interest, and harness the strength of our diversity.

Our Approach

We develop new policy ideas, challenge the media to cover the issues that truly matter, and shape the national debate. With policy teams in major issue areas, American Progress can think creatively at the cross-section of traditional boundaries to develop ideas for policymakers that lead to real change. By employing an extensive communications and outreach effort that we adapt to a rapidly changing media landscape, we move our ideas aggressively in the national policy debate.

Center for American Progress



EXHIBIT 61

JAMA Internal Medicine | [Original Investigation](#)

State Firearm Laws and Interstate Firearm Deaths From Homicide and Suicide in the United States

A Cross-sectional Analysis of Data by County

Elinore J. Kaufman, MD, MSHP; Christopher N. Morrison, PhD, MPH; Charles C. Branas, PhD; Douglas J. Wiebe, PhD

IMPORTANCE Firearm laws in one state may be associated with increased firearm death rates from homicide and suicide in neighboring states.

OBJECTIVE To determine whether counties located closer to states with lenient firearm policies have higher firearm death rates.

DESIGN, SETTING, AND PARTICIPANTS This cross-sectional study of firearm death rates by county for January 2010 to December 2014 examined data from the US Centers for Disease Control and Prevention for firearm suicide and homicide decedents for 3108 counties in the 48 contiguous states of the United States.

EXPOSURES Each county was assigned 2 scores, a state policy score (range, 0-12) based on the strength of its state firearm laws, and an interstate policy score (range, -1.33 to 8.31) based on the sum of population-weighted and distance-decayed policy scores for all other states. Counties were divided into those with low, medium, and high home state and interstate policy scores.

MAIN OUTCOMES AND MEASURES County-level rates of firearm, nonfirearm, and total homicide and suicide. With multilevel Bayesian spatial Poisson models, we generated incidence rate ratios (IRR) comparing incidence rates between each group of counties and the reference group, counties with high home state and high interstate policy scores.

RESULTS Stronger firearm laws in a state were associated with lower firearm suicide rates and lower overall suicide rates regardless of the strength of the other states' laws. Counties with low state scores had the highest rates of firearm suicide. Rates were similar across levels of interstate policy score (low: IRR, 1.34; 95% credible interval [CI], 1.11-1.65; medium: IRR, 1.36, (95% CI, 1.15-1.65; and high: IRR, 1.43; 95% CI, 1.20-1.73). Counties with low state and low or medium interstate policy scores had the highest rates of firearm homicide. Counties with low home state and interstate scores had higher firearm homicide rates (IRR, 1.38; 95% CI, 1.02-1.88) and overall homicide rates (IRR, 1.32; 95% CI, 1.03-1.67). Counties in states with low firearm policy scores had lower rates of firearm homicide only if the interstate firearm policy score was high.

CONCLUSIONS AND RELEVANCE Strong state firearm policies were associated with lower suicide rates regardless of other states' laws. Strong policies were associated with lower homicide rates, and strong interstate policies were also associated with lower homicide rates, where home state policies were permissive. Strengthening state firearm policies may prevent firearm suicide and homicide, with benefits that may extend beyond state lines.

JAMA Intern Med. 2018;178(5):692-700. doi:10.1001/jamainternmed.2018.0190
Published online March 5, 2018. Corrected on March 12, 2018.

[← Editor's Note page 701](#)

[+ Supplemental content](#)

[+ CME Quiz at jamanetwork.com/learning and CME Questions page 736](#)

Author Affiliations: Department of Surgery, New York-Presbyterian Weill Cornell Medicine, New York (Kaufman); Penn Injury Science Center, Department of Biostatistics, Epidemiology and Informatics, University of Pennsylvania, Philadelphia (Morrison); Department of Epidemiology, Columbia University, New York, New York (Branas); Penn Injury Science Center, Department of Biostatistics, Epidemiology and Informatics, University of Pennsylvania, Philadelphia (Wiebe).

Corresponding Author: Elinore J. Kaufman, MD, MSHP, Department of Surgery, New York-Presbyterian Weill Cornell Medical Center, 525 E 68th St, New York, NY 10065 (ejk9003@nyp.org).

jamainternalmedicine.com

Firearm injuries caused 36 252 deaths in the United States in 2015, including 22 018 (60.7%) from suicides and 12 979 (35.8%) from homicides. Despite decreases in violent deaths in the 1990s, the rate of deaths from firearm injuries remained steady from 1999 through 2015, with an increase in the firearm suicide rate from 5.96 to 6.48 per 100 000 population in the same period.^{1,2} Firearms account for over 50% of suicides and two-thirds of homicides,³ and firearm injuries and deaths are an important public health issue.⁴⁻¹⁰

States regulate how firearms are bought, sold, and tracked, as well as who may purchase them.^{11,12} Stronger firearm policy environments have been associated with lower rates of firearm deaths,¹²⁻¹⁴ as have specific laws, such as licensing and inspection of firearm dealers,^{15,16} licensing and background checks for handgun sales,¹⁶⁻²³ including private sales^{24,25} and laws regulating the availability of inexpensive handguns.¹⁸ Laws, however, vary widely among states, and evidence of their impact is limited.^{7,26,27}

Firearms may move across state lines, presenting a challenge to effective state policies. Evidence from Federal Bureau of Investigation firearm traces indicates that in states with strict firearm laws, many crimes are committed using firearms that originated out-of-state.^{28,29} To investigate the effect of home state and out-of-state firearm laws on firearm death rates, we conducted a cross-sectional study of firearm deaths in United States counties from January 2010 to December 2014. We hypothesized that counties located in states with more restrictive firearm laws would have lower rates of firearm suicide and homicide, and that firearm death rates would be higher in counties near adjoining states with more lenient laws.

Methods

Study Sample

The units of analysis for this study were United States counties. We excluded counties in Alaska and Hawaii because our measure of interstate policy impact assumed that the effect of distance was uniform among localities, and travel from these noncontiguous states differs. We excluded Washington, DC, because there are no applicable state laws. Our final sample was 3108 counties in 48 states. This study received a waiver of review from the Weill Cornell Medicine institutional review board.

Dependent Measures

The dependent measures were counts of deaths for the years from January 2010 to December 2014, according to *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)* classification. Using Compressed Mortality Data records from the Centers for Disease Control,³⁰ we calculated counts of firearm homicide (*ICD-10* codes U014, X93-X95), nonfirearm homicide (*ICD-10* codes U011, U012, X85-X92, X96-X99, Y00-Y05, Y060-Y062, Y068-Y073, Y078, Y079, Y08, Y09, Y871), firearm suicide (*ICD-10* codes X72-X74), and nonfirearm suicide (*ICD-10* codes U030, X60-X71, X75-84, Y870). We calculated total homicides and suicides by summing firearm and nonfirearm deaths.

Key Points

Question Are state firearm laws associated with increases in interstate firearm deaths from homicide and suicide?

Findings In this cross-sectional study, strong firearm laws in a state were associated with lower firearm suicide rates and lower overall suicide rates in the state regardless of the strength of the laws in other states. Strong firearm laws in a state were associated with lower rates of firearm homicide. Counties in states with weak laws had lower rates of firearm homicide only when surrounding states had strong laws.

Meaning Strengthening firearm policies at the state level could help to reduce the incidence of both firearm suicide and homicide, with benefits that extend across state lines.

Policy Metric

The Law Center to Prevent Gun Violence (LCPGV) provided detailed data describing firearm laws for every state for 2010.¹¹ We reviewed the literature and identified 6 categories of laws for which evidence best supports an association with firearm death or interstate movement of firearms (Table 1). Dealer practices and standards may vary between and within states, and laws mandating strict licensing requirements or increased law enforcement oversight of dealers have been associated with up to 50% lower rates of firearm homicide.^{15,16} We included laws requiring background checks for private sales of firearms (including gun show sales), because states with these laws have been shown to have lower rates of firearm death.^{12,24,25} Laws that require individuals to obtain licenses to purchase or own firearms have been associated with lower rates of death.^{17,22} Regulations setting minimum design standards for firearms limit the availability of inexpensive handguns (“Saturday night specials”) and have been associated with 6.8% to 11.5% fewer firearm homicides.¹⁸ Two types of laws focus on preventing diversion of legally purchased firearms to homicide and other crimes. Laws restricting multiple purchases of guns are designed to prevent “straw purchasers” from buying excess firearms on behalf of those who could not legally purchase a firearm. Twenty percent of firearms used in crime originate in multiple purchases, and these laws have been shown to reduce diversion of firearms by up to two-thirds.³¹⁻³³ Firearms used in crime may be legally purchased but then lost or stolen. Laws requiring owners to report loss and theft have been associated with a 30% decrease in firearms diversion.²⁴ Increased rates of firearm ownership have been associated with higher firearm suicide rates at the state level,³⁴ and presence of firearms in the home is associated with firearm suicide risk at the individual level,³⁵ but few studies have examined the association of firearm policies and firearm suicide. Licensing laws, however, have been associated with a 15% to 23% decrease in firearm suicide.^{23,36} Studies have yet to establish the efficacy of other legal strategies for preventing suicide, such as gun restraining orders.³⁶ Based on the LCPGV methodology, we rated each state 0 to 2 in each of 6 areas, with stronger policies receiving 2 points and more lenient regulations receiving 1 point (Table 1). We summed these scores to a cumulative measure, with possible values of 0 to 12.

Table 1. Firearm Control Laws Included in the State Firearm Policy Scale

Law	Description ^a	Scoring
Dealer regulation ^{15,16}	Laws regulating record keeping, security practices, and licensing for firearms dealers	1 point: Ban residential dealers, require security measures, or require reporting of sales, losses and thefts to law enforcement 2 points: Require dealer license
Background checks for private sales ^{24,25}	Laws requiring background checks for firearms sales made by individuals who are not federally licensed dealers	1 point: select firearms or only required at gun shows 2 points: required for all private sales
License to purchase or own ^{17,22}	Laws that require an individual to obtain a license prior to purchasing or owning a firearm	1 point: Require license for select firearms only, require safety training or testing, limit duration of license to ≤1 y 2 points: Require license for purchase or possession of all firearms
Junk gun regulation ¹⁸	Laws that require firearms to meet design and manufacturing standards	1 point: Allow sale of only a list of approved guns 2 points: Require specific design and safety standards
Reporting requirement for lost or stolen guns ²⁴	Laws that require individuals to report the loss or theft of their firearms within a specified period of time	2 points: Require reporting of lost or stolen firearms
Multiple purchases ³¹	Laws that restrict the number of firearms an individual can purchase within a given timeframe	2 points: restrict multiple purchases or sales

^a The Law Center to Prevent Gun Violence (LCPGV) provided detailed data describing firearm laws for every state for 2010. Based on the LCPGV methodology, we rated each state 0 to 2 in each of 6 areas, with stronger policies receiving 2 points and more lenient regulations receiving 1 point. These scores were summed to a cumulative measure, with possible values of 0 to 12.

For each county, we calculated an interstate policy score. Borrowing concepts from transport geography,³⁷ we assumed that the strength of an interstate policy association would be greatest between places located close to one another.^{38,39} For example, a county located in New York state adjacent to the border of Pennsylvania would be more likely to be affected by Pennsylvania laws than Vermont laws. Therefore, the interstate policy score includes an inverse-distance decay term. We assumed a state with a larger population would have greater potential to serve as a source of firearms, and so weighted the interstate policy score by population, consistent with established methods.³⁷ We standardized the score with a mean of 0 and standard deviation of 1, resulting in a range of scores from -1.33 to 8.31, with higher scores indicating stricter laws in nearby states. Further details about the interstate policy score are available eMethods in the [Supplement](#).

To understand the combined influence of home state and interstate policy scores, we divided counties into 3 groups by home state policy score, with counties in the low group having 0 included state policies (22 states); those in the medium group having 1 to 2 (15 states); and those in the high group having 3 to 10 (11 states). No state had a score of more than 10 included state policies. These cutoffs were chosen to create 3 groups close to equal size. However, as more than one-third of counties had a home state policy score of 0, the groups are uneven in size. We also divided the interstate policy score for

counties into tertiles of 1036 counties each. Interstate policy scores in the low tertile ranged from -1.33 to -0.46. Interstate policy scores in the medium tertile ranged from -0.46 to -0.01. Interstate policy scores in the high tertile ranged from -0.01 to 8.31. Considered together, these variables yielded a primary exposure variable with 9 categories encompassing both exposures ([Figure](#)).

Covariates

We used 5-year estimates from the American Community Survey for January 2010 to December 2014 to describe county demographic characteristics,⁴⁰ including population size, median age, median household income, sex, and race/ethnicity. We included 4 measures of neighborhood disadvantage related to violence: the unemployment rate, the proportion age 25 years or older without a high school diploma, households receiving public assistance, and female-headed households.⁴¹ We controlled for rates of crimes against persons and against property using data from the Federal Bureau of Investigation Uniform Crime Reporting System.⁴²

Statistical Analysis

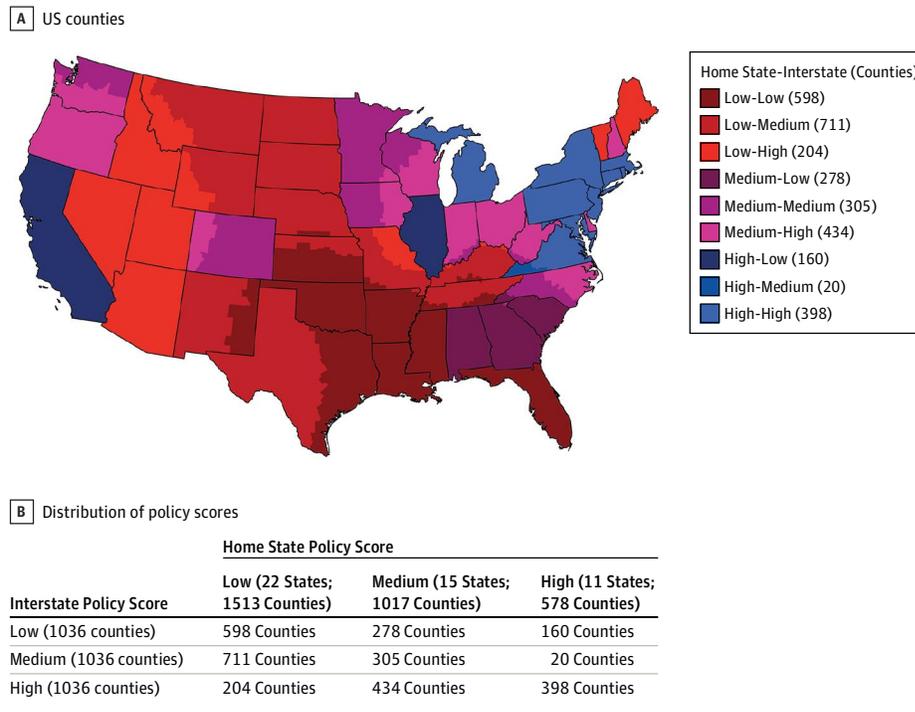
Using established techniques in epidemiology, we constructed multilevel spatial Poisson models.⁴³⁻⁴⁵ A first group of models assessed relationships for homicides, and a second group of models assessed relationships for suicides. For both homicides and suicides, we conducted separate analyses for firearm deaths, nonfirearm deaths, and all deaths.

We fitted the Poisson models using a Bayesian procedure in WinBUGS v14 (University of Cambridge).⁴⁶ To account for spatial autocorrelation (the concept that places closer to one another are likely more similar than those that are far apart), all models included a conditional autoregressive random effect that smoothed the effect of outliers and controlled for overdispersion of the count data. In addition, this modeling strategy accounted for unmeasured, spatially structured, regional characteristics that may cause counties in the same region to have similar policies and similar mortality rates, without requiring us to include a categorical variable to control for region explicitly (southeast vs southwest, etc) (eMethods in the [Supplement](#)).^{43,47} Because counties in the same state may be more similar to each other than counties in different states, models included a state-level random effect. This approach yields an incidence rate ratio (IRR), which provides an estimate of how observed death rates in each group differ from a specified reference group, for the firearm policy variable, or for a 1-unit difference in the exposure variable, such as for the demographic variables. The IRR is situated within a 95% credible interval (CI), which is analogous to a 95% confidence interval in conventional regression analyses. We performed geospatial processing using ArcGIS 10.3 (Esri Inc), and nonspatial data management using Stata v14 (StataCorp).

Sensitivity Analyses

We conducted multiple tests to minimize the likelihood that our results were artifacts of model or variable specification (eTable 1 in the [Supplement](#)). We conducted a sensitivity analysis using inverse distance squared to allow geographic rela-

Figure. Geographic Distributions of Combined Home State and Interstate Policy Scores



A, Map of US counties showing home state and interstate policy scores. B, Distribution of US counties into low, medium, and high home state and interstate policy scores.

tionships to fall off more quickly. We reconstructed all 6 Poisson models, replacing the dependent variables with deaths from 2010 only, to account for possible variation in trends over time between counties. We also replaced the 2010 home state and interstate policy scores with similar scores calculated using: (1) 2012 policies; (2) complete scores proposed by the LCPGV, including 35 firearm laws, rather than the 6 areas selected for our primary analysis¹¹; and (3) scores developed using iterative principal components analyses. The principle components analysis aimed to identify correlations among all 35 laws for which the LCPGV collected data. We calculated Eigenvectors for these laws, removing laws with Eigenvectors less than 0.3 (highly correlated with other laws), and then taking a count of laws in a final analysis in which all laws had Eigenvectors greater than 0.3.⁴⁸ We evaluated the home state and interstate policy variables separately, and tested an interaction between the home state and interstate policy scores as continuous variables.

Results

Table 2 shows descriptive statistics for the 3108 counties. The mean (SD) county firearm suicide rate was 10.04 (6.10) per 100 000 population per year, and the mean (SD) county firearm homicide rate was 2.56 (3.21). Geographic distributions of firearm homicide and suicide rates are presented in the eFigure in the Supplement. The Figure shows geographic distributions of combined home state policy scores and interstate policy scores. California had the strongest firearm control laws

(10 out of 12). However, because California is adjacent to states with low policy scores, many California counties had low interstate policy scores.

Table 3 shows results of the Bayesian, conditional, autoregressive, Poisson models for suicide deaths. Table 4 shows comparable results for homicide deaths. Both Table 3 and Table 4 also show analyses of suicide and homicide deaths, respectively, for various demographic characteristics of the counties. The reference group for the IRR was counties with high home state and high interstate policy scores.

As shown in Table 3, model 1A, counties with low-strength home state policy laws had the highest rates of firearm suicide. Rates were similar across levels of interstate policy score (low: IRR, 1.35; 95% CI, 1.11-1.65; medium: IRR, 1.36; 95% CI, 1.15-1.65; and high: IRR, 1.43; 95% CI 1.20-1.73). Counties with medium-strength home state policy scores had slightly lower rates of firearm suicide; counties with high-strength home state policy scores had the lowest rates. Firearm suicide rates for counties with medium-strength policy scores were also similar across levels of interstate policy score. Counties with high home state policy scores had equivalent rates of firearm suicide, regardless of interstate policy score level. These relationships carried over, though attenuated, to the total suicide rate, as shown in model 1C. There was no association between either state or interstate policy scores and nonfirearm suicide, as shown in model 1B. Factors associated with higher suicide rates in counties, firearm and otherwise, included a higher median age of residents and a higher proportion of male residents. Factors associated with lower suicide rates included higher percentages of black or Hispanic resi-

Table 2. Characteristics of US Counties (N = 3108) Included in the Study

Characteristic	Mean (SD) [Range]
Deaths, average annual rate per 100 000 population ^a	
Firearm suicides	10.04 (6.10) [0.00 to 72.90]
Nonfirearm suicides	6.05 (4.14) [0.00 to 63.08]
All suicides	16.09 (7.59) [0.00 to 97.21]
Firearm homicides	2.56 (3.21) [0.00 to 38.10]
Nonfirearm homicides	1.50 (1.82) [0.00 to 30.63]
All homicides	4.06 (4.12) [0.00 to 42.17]
Firearm Policy Scales, 2010 data	
Home state policy scale	1.53 (2.30) [0.00 to 10.00]
Interstate policy scale, standardized	0.00 (1.00) [-1.33 to 8.31]
Census Characteristics, 2010-2014 mean	
Population	100 179.70 (321 005.30) [89.00 to 9 974 203.00]
Area, square miles	990.85 (1323.11) [2.00 to 20 105.40]
Male, %	50.01 (2.35) [37.36 to 71.66]
Median age, y	40.75 (5.20) [21.60 to 64.50]
Black, %	8.94 (14.46) [0.00 to 85.91]
Hispanic, %	8.69 (13.47) [0.00 to 95.68]
Annual median household income, \$	46 347.14 (11 938.71) [19 146.00 to 123 966.00]
Households receiving public assistance, %	2.54 (1.63) [0.00 to 24.83]
Population aged ≥16 who are unemployed, %	4.65 (3.09) [0.00 to 100.00]
Households with female heads of house, %	16.93 (6.52) [0.00 to 52.09]
Population aged ≥25 y without high school diploma, %	15.06 (6.76) [1.27 to 53.28]
Crime per 100 population, 2010 data	
Property crimes	2.24 (4.84) [0.00 to 109.04]
Violent crimes	0.26 (0.76) [0.00 to 24.11]

^a Calculated from total count of deaths from January 2010 to December 2014.

dents. Counties with higher percentages of households headed by women had lower firearm suicide rates but higher rates of nonfirearm suicide rates and overall suicide.

For homicides, as shown in Table 4, model 2A, counties with low home state and low or medium interstate policy scores had the highest rates of firearm homicide. Findings for non-homicide and overall homicide rates are shown in model 2B and model 2C, respectively. Compared with counties with high home state and interstate policy scores, counties with low home state and interstate scores had higher firearm homicide rates (IRR, 1.38; 95% CI, 1.02-1.88) and overall homicide rates (IRR, 1.32; 95% CI, 1.03-1.67) but not nonfirearm homicides (IRR, 1.24; 95% CI, 0.99-1.57). Counties with low home state scores and medium interstate policy scores had higher rates of firearm homicide (IRR, 1.33; 95% CI, 1.02-1.75), nonfirearm homicide (IRR, 1.29; 95% CI, 1.04-1.60), and overall homicide (IRR, 1.28; 95% CI, 1.03-1.59). In contrast, counties with low state policy scores and high interstate policy scores did not have higher firearm homicide rates (IRR, 1.18; 95% CI, 0.89-1.54), nonfirearm homicide rates (IRR, 0.97; 95% CI, 0.78-1.20), or overall homicide (IRR, 1.07; 95% CI, 0.86-1.32). For counties with medium or high home state scores, homicide rates (firearm, nonfirearm, and overall) were not associated with the interstate policy score, regardless of whether it was low, medium, or high.

Factors associated with higher firearm homicide rates in counties included higher percentages of black or Hispanic residents, more households receiving public assistance, more

households headed by women, and higher percentages of residents without a high school diploma. Higher rates of firearm homicides were associated with higher rates of property crimes and violent crimes and were inversely associated with higher median household income.

Results of the sensitivity analyses for suicide or homicide are available in eTable 2 and eTable 3 in the [Supplement](#), respectively. Results for suicide were not substantively different from those in the main analyses. For homicide, only the main analyses demonstrated an association between either home state or interstate firearm policies and homicides.

Discussion

In a national, cross-sectional analysis of state firearm policies, we found that counties in states with high firearm policy scores had the lowest rates of firearm suicide and overall suicide, regardless of the strength of the firearm policies of other states. We also found that counties in states with high firearm policy scores had lower rates of firearm homicide. Counties in states with low firearm policy scores had lower rates of firearm homicide only if the interstate firearm policy score was high.

Prior studies have provided indirect evidence for interstate spillover effects of state firearm laws and firearm death rates. In 2006, Webster et al⁴⁹ found that the proportion of out-of-state firearms recovered in crimes in US cities was associ-

Table 3. Multilevel Bayesian Conditional Autoregressive Poisson Models for Counts of Suicide by Firearms (January 2010-December 2014) for Counties (N = 3108) Nested Within Contiguous US States (N = 48)

Description	IRR (95% CI)		
	Model 1A: Firearm Suicide	Model 1B: Nonfirearm Suicide	Model 1C: All Suicide
Firearm Policies			
Low home state, low interstate	1.35 (1.11-1.65) ^a	1.02 (0.89-1.18)	1.19 (1.05-1.35) ^a
Low home state, medium interstate	1.36 (1.15-1.65) ^a	1.04 (0.92-1.18)	1.23 (1.10-1.39) ^a
Low home state, high interstate	1.43 (1.20-1.73) ^a	1.06 (0.95-1.20)	1.23 (1.10-1.34) ^a
Medium home state, low interstate	1.35 (1.07-1.71) ^a	0.96 (0.82-1.13)	1.16 (1.00-1.35) ^a
Medium home state, medium interstate	1.24 (1.06-1.49) ^a	1.05 (0.94-1.18)	1.17 (1.01-1.27) ^a
Medium home state, high interstate	1.22 (1.06-1.45) ^a	1.06 (0.96-1.169)	1.11 (1.01-1.23) ^a
High home state, low interstate	0.91 (0.71-1.16)	1.00 (0.87-1.16)	0.93 (0.79-1.10)
High home state, medium interstate	1.19 (0.98-1.45)	0.99 (0.79-1.25)	1.11 (0.95-1.29)
High home state, high interstate	1 [Reference]	1 [Reference]	1 [Reference]
Census Characteristics			
Population (model offset)			
Area (1000 sq miles)	1.02 (1.01-1.03) ^a	1.01 (1.00-1.02)	1.01 (1.01-1.02) ^a
Male ^b	1.01 (1.01-1.02) ^a	1.02 (1.01-1.03) ^a	1.02 (1.01-1.02) ^a
Median age (for each 10 y increase)	1.31 (1.27-1.35) ^a	1.16 (1.12-1.20) ^a	1.24 (1.21-1.28) ^a
Black ^b	0.92 (0.90-0.94) ^a	0.82 (0.80-0.83) ^a	0.88 (0.86-0.89) ^a
Hispanic ^b	0.89 (0.88-0.91) ^a	0.94 (0.92-0.96) ^a	0.91 (0.90-0.92) ^a
Median household income (for each additional \$10 000)	0.92 (0.90-0.93) ^a	1.01 (1.00-1.03)	0.96 (0.95-0.97) ^a
Households receiving public assistance ^b	0.99 (0.89-1.10)	1.26 (1.13-1.40) ^a	1.12 (1.04-1.21) ^a
Population aged ≥16 y who are unemployed ^b	1.17 (1.08-1.26) ^a	1.04 (0.94-1.14)	1.11 (1.04-1.17) ^a
Households with female heads of house ^b	0.92 (0.88-0.96) ^a	1.40 (1.33-1.47) ^a	1.11 (1.07-1.15) ^a
Population aged ≥25 y without high school diploma ^b	1.01 (0.98-1.05)	0.81 (0.84-0.91) ^a	0.97 (0.94-1.00) ^a
Crime			
Property crimes (1 per 100 population)	1.01 (1.00-1.01) ^a	1.02(1.01-1.03) ^a	1.01 (1.01-1.02) ^a
Violent crimes (1 per 100 population)	1.03 (0.98-1.07)	1.00 (0.96-1.05)	1.02 (0.98-1.05)

Abbreviations: CI, credible interval; IRR, incidence rate ratio.

^a Estimates have credible intervals that do not include an IRR of 1.0. Parameter estimates for county population constrained to an IRR of 1.0.

^b For each 10% of population.

ated with proximity to states with permissive firearm policies. Law enforcement firearm trace data has consistently shown that states with stronger firearm control policies are the source of proportionately fewer firearms used in crimes.²⁹ Likewise, a Virginia law limiting handgun purchases to 1 per month was associated with a decreased proportion of Virginia firearms recovered in crime nationwide.³¹ The Federal Assault Weapons Ban was passed in 1994, prohibiting the manufacture, possession and sale of certain military-style, semiautomatic firearms and large-capacity ammunition magazines in the United States. This ban expired automatically in 2004. Dube et al⁵⁰ evaluated the effect of this expiration on firearm violence in Mexican towns, finding an increase in firearm-related homicides near the Texas, Arizona, and New Mexico border. California had a 1989 state assault weapons ban in place, so there was no effective policy change in California in 2004, and Dube et al⁵⁰ found no increase in homicides near the California border.

Suicides account for two-thirds of all firearm-related deaths in the United States.^{3,51} We found that stronger home-state firearm policies were associated with lower firearm suicide rates, independent of the strength of the firearm policies of other states. We identified a partial substitution effect, as nonfirearm suicide rates were higher in counties with higher interstate policy scores, but overall suicide rates remained lower,

consistent with prior studies.^{17,23,52-58} Because suicidal ideation is often transient, and because firearms are a highly lethal method of suicide, access to firearms is an important risk factor for completed suicide attempts.^{35,53} Considered in the context of prior studies, our findings provide evidence that stronger state firearm laws could help to prevent firearm suicides, without an equivalent increase in suicide by other methods.^{17,54,55}

We found no relationship between firearm suicide rates in counties and the strength of the firearm laws of nearby states. This finding is consistent with prior studies showing that most firearm suicides are committed by firearm owners or their family members, and likely involve legally purchased firearms obtained for other purposes.^{35,53,54,59}

We found the highest rates of firearm homicide and overall homicide in counties with low state and interstate policy scores. Counties with low state policy scores had lower firearm homicide rates when the interstate policy scores were high. In contrast, counties in states with high policy scores had lower rates of firearm homicide even when the interstate policy score was low. Prior studies have had mixed results with regard to the relationship between state firearm laws and firearm homicides.^{7,13,58,60-63} We did not identify a difference in homicide rates between counties in states with medium and high firearm policy scores. Flegler et al,¹³ however, found an as-

Table 4. Multilevel Bayesian Conditional Autoregressive Poisson Models for Counts of Homicide by Firearms (January 2010-December 2014) for Counties (N = 3108) Nested Within Contiguous US States (N = 48)

Description	IRR (95% CI)		
	Model 2A: Firearm Homicide	Model 2B: Nonfirearm Homicide	Model 2C: All Homicide
Firearm Policies			
Low home state, low interstate	1.38 (1.02-1.88) ^a	1.24 (0.99-1.57)	1.32 (1.03-1.67) ^a
Low home state, medium interstate	1.33 (1.02-1.75) ^a	1.29 (1.04-1.60) ^a	1.28 (1.03-1.59) ^a
Low home state, high interstate	1.18 (0.89-1.54)	0.97 (0.78-1.20)	1.07 (0.86-1.32)
Medium home state, low interstate	1.22 (0.88-1.70)	1.17 (0.90-1.53)	1.22 (1.00-1.49)
Medium home state, medium interstate	1.22 (0.95-1.56)	1.16 (0.95-1.41)	1.13 (1.01-1.27)
Medium home state, high interstate	1.15 (0.94-1.39)	1.09 (0.91-1.29)	1.13 (0.96-1.32)
High home state, low interstate	1.13 (0.84-1.53)	1.11 (0.84-1.45)	1.11 (0.95-1.29)
High home state, medium interstate	1.11 (0.74-1.65)	0.95 (0.64-1.39)	1.07 (0.78-1.48)
High home state, high interstate	1 [Reference]	1 [Reference]	1 [Reference]
Census Characteristics			
Population (model offset)			
Area (1000 sq miles)	1.03 (1.01-1.06) ^a	1.35 (1.11-1.65) ^a	1.04 (1.02-1.06) ^a
Male ^b	0.98 (0.96-1.00) ^a	1.04 (1.02-1.05) ^a	1.00 (0.99-1.01)
Median age (for each 10 y increase)	1.13 (1.04-1.24) ^a	1.07 (1.01-1.13) ^a	1.09 (1.03-1.16) ^a
Black ^b	1.20 (1.15-1.25) ^a	0.98 (0.95-1.02)	1.12 (1.08-1.15) ^a
Hispanic (for each 10% of population)	1.06 (1.01-1.11) ^a	0.94 (0.91-0.97) ^a	1.01 (0.98-1.04)
Median household income (for each additional \$10 000)	0.94 (0.90-0.98) ^a	0.97 (0.94-1.00) ^a	0.95 (0.92-0.98) ^a
Households receiving public assistance ^b	1.75 (1.42-2.14) ^a	1.34 (1.15-1.66) ^a	1.66 (1.42-1.95) ^a
Population aged ≥16 y who are unemployed ^b	0.88 (0.72-1.08)	0.952 (0.787-1.141)	0.90 (0.77-1.06)
Households with female heads of house ^b	1.29 (1.16-1.41) ^a	1.57 (1.44-1.71) ^a	1.41 (1.29-1.52) ^a
Population aged ≥25 y without high school diploma ^b	1.08 (1.00-1.18) ^a	1.11 (1.04-1.19) ^a	1.08 (1.02-1.15) ^a
Crime			
Property crimes (1 per 100 population)	1.04 (1.03-1.06) ^a	1.03 (1.02-1.04) ^a	1.04 (1.02-1.05) ^a
Violent crimes (1 per 100 population)	1.15 (1.06-1.26) ^a	1.14 (1.06-1.3) ^a	1.15 (1.07-1.22) ^a

Abbreviations: CI, credible interval; IRR, incidence rate ratio

^a Estimates have credible intervals that do not include an IRR of 1.0. Parameter estimates for county population constrained to an IRR of 1.0.

^b For each 10% of population.

sociation between strong state firearm laws and lower rates of firearm-related fatalities. Firearm laws in the United States are generally lenient. Thus, in our geographic analysis there may have been insufficient variation between states to discern such an effect. Adjustment for county demographics may also have obscured a state-level association, as found in other studies. We did find higher rates of nonfirearm homicide in counties with low state policy scores and medium interstate policy scores, although not in those with low or high interstate policy scores. Possible explanations include an increase in general violent activity associated with increases in firearm homicide, or an unrecognized confounder that we were unable to identify. Our sensitivity analyses did not identify an association between firearm policies and firearm homicide rates. Analyses were consistent for suicide, likely because there is a continuous effect between home state policy strength and firearm suicide, with no effect from interstate policy strength. For homicide, we identified a nonlinear interaction between the home state and interstate policy scores. No other model that we tested allowed for either a nonlinear effect or a nonlinear interaction, which may explain why we did not detect a relationship between home or interstate policy score and homicide in these other models.

Limitations

Our analysis has limitations. First, because US state firearm laws are generally more lenient than in the other countries, and with only a few states with strict laws, our ability to detect an effect of the strictest laws may have been limited.^{10,26,55,64,65} Second, we used distance as a proxy for the ability of firearms to travel from one location to another. However, Federal Bureau of Investigation trace data indicated that firearms discovered in crime often originate in distant states, not adjoining states, an observation that held low weight in our analysis (based on inverse distance).²⁹ Mail and internet commerce may mitigate the barrier of distance, as may cultural affinities between locations. Firearms may travel across state borders in specific ways, such as on interstate highways.^{29,66} Further research should consider such dynamics. Third, our cumulative policy score might mask the effect of a particular law, as seen in prior studies.^{12,15,28,62} The laws we analyzed cannot completely eliminate gun theft or illegal, deceptive purchases, and we could not account for differences in law enforcement between counties or states. Fourth, in a cross-sectional analysis, we were unable to test for a causal relationship between state policies and firearm deaths. Fifth, certain municipalities have stronger firearm restrictions than

their states, and our analysis does not account for this. Sixth, confounding factors may vary between homicide and suicide, but we included broadly relevant variables, such as age and sex, to avoid overadjustment.⁶⁷ Seventh, an unmeasured variable may contribute to both the adoption of state firearm laws and death rates. Finally, limitations to available data required us to use counties as spatial units of analysis. County boundaries are nonrandom, arbitrary, and include populations of up to 10 million. We used land area and population to calculate population density, but it is possible that certain counties have low population density but are very close to high-density centers and thus have distinctive properties. Future research on the impact of firearm policies should continue to assess both local and distant effects.

Conclusions

In this study of the geographic dynamics of firearm policy, stronger home state policies were associated with lower rates of firearm suicide and overall suicide regardless of the strength of other states' laws. Stronger home state laws were associated with lower rates of firearm homicide, while counties in states with weaker laws had lower rates of firearm homicide only when surrounding states had stronger laws. Our findings support strengthening state firearm policies to reduce the incidence of both firearm suicide and homicide, with benefits that may extend across state lines.

ARTICLE INFORMATION

Accepted for Publication: January 9, 2018.

Correction: This article was corrected on March 12, 2018, for a typographical error in the Importance paragraph in the abstract.

Published Online: March 5, 2018.
doi:10.1001/jamainternmed.2018.0190

Author Contributions: Dr Kaufman had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: All authors.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Kaufman.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Kaufman, Morrison.

Obtained funding: Branas.

Administrative, technical, or material support: Morrison, Branas, Wiebe.

Study supervision: Branas, Wiebe.

Conflict of Interest Disclosures: None reported.

Funding/Support: Dr Morrison was supported by a grant from the National Center for Injury Control and Prevention, Centers for Disease Control and Prevention (grant No. R49CE002474).

Role of the Funder/Sponsor: The funder/sponsor had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Additional Contributions: The authors thank Jon Vernick, JD, of Johns Hopkins Bloomberg School of Public Health for his input on the components of the policy score; Dr Vernick was not compensated.

REFERENCES

1. Wintemute GJ. The epidemiology of firearm violence in the twenty-first century United States. *Annu Rev Public Health*. 2015;36(1):5-19. doi:10.1146/annurev-publhealth-031914-122535
2. Steinbrook R, Stern RJ, Redberg RF. Firearm injuries and gun violence: call for papers. *JAMA Intern Med*. 2016;176(5):596-597. doi:10.1001/jamainternmed.2016.0937
3. U. S. Centers for Disease Control and Prevention. National Vital Statistics Reports, Volume 65,

Number 4.; 2016. http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_04.pdf. Accessed November 21, 2016.

4. Wahowiak L. Public health taking stronger approach to gun violence: APHA, Brady team up on prevention. <http://thenationshealth.phapublications.org/content/45/10/1.3.full>. Accessed November 21, 2016.

5. Obama B. Whitehouse.gov. Remarks by the president on common-sense gun safety reform. <https://www.whitehouse.gov/the-press-office/2016/01/05/remarks-president-common-sense-gun-safety-reform>. Published January 5, 2016. Accessed May 15, 2016.

6. Stewart RM, Kuhls DA. Firearm injury prevention: a consensus approach to reducing preventable deaths. *J Trauma Acute Care Surg*. 2016;80(6):850-852. doi:10.1097/TA.0000000000001036

7. Lee LK, Fleegele EW, Farrell C, et al. Firearm laws and firearm homicides: a systematic review. *JAMA Intern Med*. 2017;177(1):106-119. doi:10.1001/jamainternmed.2016.7051

8. Steinbrook R, Stern RJ, Redberg RF. Firearm violence: a *JAMA Internal Medicine* series. *JAMA Intern Med*. 2017;177(1):19-20. doi:10.1001/jamainternmed.2016.7180

9. Alcorn T. Trends in research publications about gun violence in the United States, 1960 to 2014. *JAMA Intern Med*. 2017;177(1):124-126. doi:10.1001/jamainternmed.2016.7076

10. Hemenway D, Miller M. Public health approach to the prevention of gun violence. *N Engl J Med*. 2013;368(21):2033-2035. doi:10.1056/NEJMs1302631

11. Law Center to Prevent Gun Violence - Annual Gun Law State Scorecard. 2015. <http://gunlawscorecard.org/>. Accessed May 15, 2016.

12. Kalesan B, Mobily ME, Keiser O, Fagan JA, Galea S. Firearm legislation and firearm mortality in the USA: a cross-sectional, state-level study. *Lancet*. 2016;387(10030):1847-1855. doi:10.1016/S0140-6736(15)01026-0

13. Fleegele EW, Lee LK, Monuteaux MC, Hemenway D, Mannix R. Firearm legislation and firearm-related fatalities in the United States. *JAMA Intern Med*. 2013;173(9):732-740. doi:10.1001/jamainternmed.2013.1286

14. Sumner SA, Layde PM, Guse CE. Firearm death rates and association with level of firearm purchase

background check. *Am J Prev Med*. 2008;35(1):1-6. doi:10.1016/j.amepre.2008.03.023

15. Irvin N, Rhodes K, Cheney R, Wiebe D. Evaluating the effect of state regulation of federally licensed firearm dealers on firearm homicide. *Am J Public Health*. 2014;104(8):1384-1386.

16. Vernick JS, Webster DW, Bulzacchelli MT, Mair JS. Regulation of firearm dealers in the United States: an analysis of state law and opportunities for improvement. *J Law Med Ethics*. 2006;34(4):765-775. doi:10.1111/j.1748-720X.2006.00097.x

17. Crifasi CK, Meyers JS, Vernick JS, Webster DW. Effects of changes in permit-to-purchase handgun laws in Connecticut and Missouri on suicide rates. *Prev Med*. 2015;79:43-49. doi:10.1016/j.ypmed.2015.07.013

18. Webster DW, Vernick JS, Hepburn LM. Effects of Maryland's law banning "Saturday night special" handguns on homicides. *Am J Epidemiol*. 2002;155(5):406-412.

19. Webster D, Crifasi CK, Vernick JS. Effects of the repeal of Missouri's handgun purchaser licensing law on homicides. *J Urban Health*. 2014;91(2):293-302. doi:10.1007/s11524-014-9865-8

20. Sen B, Panjamapirom A. State background checks for gun purchase and firearm deaths: an exploratory study. *Prev Med*. 2012;55(4):346-350. doi:10.1016/j.ypmed.2012.07.019

21. Ruddell R, Mays GL. State background checks and firearms homicides. *J Crim Justice*. 2005;33(2):127-136. doi:10.1016/j.jcrimjus.2004.12.004

22. Rudolph KE, Stuart EA, Vernick JS, Webster DW. Association between Connecticut's permit-to-purchase handgun law and homicides. *Am J Public Health*. 2015;105(8):e49-e54. doi:10.2105/AJPH.2015.302703

23. Loftin C, McDowall D, Wiersma B, Cottey TJ. Effects of restrictive licensing of handguns on homicide and suicide in the District of Columbia. *N Engl J Med*. 1991;325(23):1615-1620. doi:10.1056/NEJM199112053252305

24. Webster DW, Vernick JS, eds. *Reducing Gun Violence in America: Informing Policy with Evidence and Analysis*. Baltimore, Maryland: Johns Hopkins University Press; 2013.

25. Wintemute GJ, Braga AA, Kennedy DM. Private-party gun sales, regulation, and public safety. *N Engl J Med*. 2010;363(6):508-511. doi:10.1056/NEJMp1006326

26. Hahn RA, Bilukha O, Crosby A, et al; Task Force on Community Preventive Services. Firearms laws and the reduction of violence: a systematic review. *Am J Prev Med*. 2005;28(2)(suppl 1):40-71. doi:10.1016/j.amepre.2004.10.005
27. Santaella-Tenorio J, Cerdá M, Villaveces A, Galea S. What do we know about the association between firearm legislation and firearm-related injuries? *Epidemiol Rev*. 2016;38(1):140-157. doi:10.1093/epirev/mxv012
28. Webster DW, Vernick JS, Hepburn LM. Relationship between licensing, registration, and other gun sales laws and the source state of crime guns. *Inj Prev*. 2001;7(3):184-189.
29. Mayors AIG. Trace the Guns. <https://tracetheguns.org/report.pdf>. Published September 2010. Accessed January 17, 2018.
30. Centers for Disease Control and Prevention. CDC WONDER. <https://wonder.cdc.gov/>. Accessed May 12, 2016.
31. Weil DS, Knox RC. Effects of limiting handgun purchases on interstate transfer of firearms. *JAMA*. 1996;275(22):1759-1761.
32. Bureau of Alcohol Tobacco and Firearms. *Youth Crime Gun Interdiction Initiative, Crime Gun Trace Reports (2000)*. Washington, DC; U.S. Department of the Treasury; 2002.
33. Wright MA, Wintemute GJ, Webster DW. Factors affecting a recently purchased handgun's risk for use in crime under circumstances that suggest gun trafficking. *J Urban Health*. 2010;87(3):352-364. doi:10.1007/s11524-010-9437-5
34. Siegel M, Rothman EF. Firearm ownership and suicide rates among US men and women, 1981-2013. *Am J Public Health*. 2016;106(7):1316-1322. doi:10.2105/AJPH.2016.303182
35. Wiebe DJ. Homicide and suicide risks associated with firearms in the home: a national case-control study. *Ann Emerg Med*. 2003;41(6):771-782. doi:10.1067/mem.2003.187
36. Vernick JS, Alcorn T, Horwitz J. Background checks for all gun buyers and gun violence restraining orders: state efforts to keep guns from high-risk persons. *J Law Med Ethics*. 2017;45(1, suppl):98-102. doi:10.1177/1073110517703344
37. Rodrigue J-P, Comtois C, Slack B. *The Geography of Transport Systems*. 2nd ed. London, New York: Routledge; 2009.
38. Fotheringham AS. Spatial structure and distance-decay parameters. *Ann Assoc Am Geogr*. 1981;71(3):425-436.
39. Fotheringham AS. A new set of spatial-interaction models: the theory of competing destinations. *Environ Plann A*. 1983;15(1):15-36. doi:10.1068/a150015
40. United States Census Bureau. Census.gov. <https://www.census.gov/>. Accessed May 15, 2016.
41. Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science*. 1997;277(5328):918-924. doi:10.1126/science.277.5328.918
42. United States Department of Justice. Federal Bureau of Investigation. Uniform Crime Reporting Program Data: County-Level Detailed Arrest and Offense Data, 2012 (ICPSR 35019). 2014. <http://www.icpsr.umich.edu/icpsrweb/NACJD/studies/35019>. Accessed November 29, 2016. 10.3886/ICPSR35019.v1.
43. Waller LA, Gotway CA. *Applied Spatial Statistics for Public Health Data*. Hoboken, NJ: John Wiley & Sons; 2004.
44. Best N, Richardson S, Thomson A. A comparison of Bayesian spatial models for disease mapping. *Stat Methods Med Res*. 2005;14(1):35-59. doi:10.1191/0962280205sm388oa
45. Impraliou M-IM, Qudus M, Pitfield DE, Lord D. Re-visiting crash-speed relationships: a new perspective in crash modelling. *Accid Anal Prev*. 2016;86:173-185. doi:10.1016/j.aap.2015.10.001
46. Lunn DJ, Thomas A, Best N, Spiegelhalter D. WinBUGS—a Bayesian modelling framework: concepts, structure, and extensibility. *Stat Comput*. 2000;10(4):325-337.
47. Lord D, Washington SP, Ivan JN. Poisson, Poisson-gamma and zero-inflated regression models of motor vehicle crashes: balancing statistical fit and theory. *Accid Anal Prev*. 2005;37(1):35-46. doi:10.1016/j.aap.2004.02.004
48. Duntelman GH. *Principal Components Analysis. Nachdr*. Newbury Park, CA: Sage Publishing; 2006.
49. Webster DW, Vernick JS, Bulzacchelli MT. Effects of a gun dealer's change in sales practices on the supply of guns to criminals. *J Urban Health*. 2006;83(5):778-787. doi:10.1007/s11524-006-9073-2
50. Dube A, Dube O, García-Ponce O. Cross-border spillover: U.S. gun laws and violence in Mexico. *Am Polit Sci Rev*. 2013;107(03):397-417. doi:10.1017/S0003055413000178
51. Fowler KA, Dahlberg LL, Haileyesus T, Annett JL. Firearm injuries in the United States. *Prev Med*. 2015;79:5-14. doi:10.1016/j.jypmed.2015.06.002
52. Ludwig J, Cook PJ. Homicide and suicide rates associated with implementation of the Brady Handgun Violence Prevention Act. *JAMA*. 2000;284(5):585-591.
53. Swanson JW, Bonnie RJ, Appelbaum PS. Getting serious about reducing suicide: more "how" and less "why." *JAMA*. 2015;314(21):2229-2230. doi:10.1001/jama.2015.15566
54. Anestis MD, Khazem LR, Law KC, et al. The association between state laws regulating handgun ownership and statewide suicide rates. *Am J Public Health*. 2015;105(10):2059-2067.
55. Chapman S, Alpers P, Agho K, Jones M. Australia's 1996 gun law reforms: faster falls in firearm deaths, firearm suicides, and a decade without mass shootings. *Inj Prev*. 2015;21(5):355-362. doi:10.1136/ip.2006.013714rep
56. Miller M, Azrael D, Hepburn L, Hemenway D, Lippmann SJ. The association between changes in household firearm ownership and rates of suicide in the United States, 1981-2002. *Inj Prev*. 2006;12(3):178-182. doi:10.1136/ip.2005.010850
57. McCourt AD, Vernick JS, Betz ME, Brandspiegel S, Runyan CW. Temporary transfer of firearms from the home to prevent suicide: legal obstacles and recommendations. *JAMA Intern Med*. 2017;177(1):96-101. doi:10.1001/jamainternmed.2016.5704
58. Rosengart M, Cummings P, Nathens A, Heagerty P, Maier R, Rivara F. An evaluation of state firearm regulations and homicide and suicide death rates. *Inj Prev*. 2005;11(2):77-83. doi:10.1136/ip.2004.007062
59. Barber C, Frank E, Demicco R. Reducing Suicides through partnerships between health professionals and gun owner groups—beyond Docs vs Glocks. *JAMA Intern Med*. 2017;177(1):5-6. doi:10.1001/jamainternmed.2016.6712
60. Beaver BL, Woo S, Voigt RW, et al. Does handgun legislation change firearm fatalities? *J Pediatr Surg*. 1993;28(3):306-308. doi:10.1016/0022-3468(93)90222-7
61. Hepburn L, Miller M, Azrael D, Hemenway D. The effect of nondiscretionary concealed weapon carrying laws on homicide. *J Trauma*. 2004;56(3):676-681. doi:10.1097/01.TA.0000068996.01096.39
62. Crandall M, Eastman A, Violano P, et al. Prevention of firearm-related injuries with restrictive licensing and concealed carry laws: an Eastern Association for the Surgery of Trauma systematic review. *J Trauma Acute Care Surg*. 2016;81(5):952-960. doi:10.1097/TA.0000000000001251
63. Kalesan B, Vasan S, Mobily ME, et al. State-specific, racial and ethnic heterogeneity in trends of firearm-related fatality rates in the USA from 2000 to 2010. *BMJ Open*. 2014;4(9):e005628-e005628. doi:10.1136/bmjopen-2014-005628
64. Grinshteyn E, Hemenway D. Violent death rates: the US Compared with other high-income OECD countries, 2010. *Am J Med*. 2016;129(3):266-273. doi:10.1016/j.amjmed.2015.10.025
65. Sloan JH, Kellermann AL, Reay DT, et al. Handgun regulations, crime, assaults, and homicide: a tale of two cities. *N Engl J Med*. 1988;319(19):1256-1262. doi:10.1056/NEJM19881103191905
66. Aisch G, Keller J. How Gun Traffickers Get Around State Gun Laws. *New York Times*. <https://www.nytimes.com/interactive/2015/11/12/us/gun-traffickers-smuggling-state-gun-laws.html>. Published November 13, 2015. Accessed August 5, 2017.
67. Schisterman EF, Cole SR, Platt RW. Overadjustment bias and unnecessary adjustment in epidemiologic studies. *Epidemiology*. 2009;20(4):488-495. doi:10.1097/EDE.0b013e3181a819a1

EXHIBIT 62

The Impact of State Firearm Laws on Homicide and Suicide Deaths in the USA, 1991–2016: a Panel Study

Michael Siegel¹, Molly Pahn¹, Ziming Xuan¹, Eric Fleegler², and David Hemenway³



¹Department of Community Health Sciences, Boston University School of Public Health, Boston, MA, USA; ²Division of Emergency Medicine, Boston Children's Hospital, Boston, MA, USA; ³Harvard T.H. Chan School of Public Health, Boston, MA, USA.

BACKGROUND: Firearm injuries are a major cause of mortality in the USA. Few recent studies have simultaneously examined the impact of multiple state gun laws to determine their independent association with homicide and suicide rates.

OBJECTIVE: To examine the relationship between state firearm laws and overall homicide and suicide rates at the state level across all 50 states over a 26-year period.

DESIGN: Using a panel design, we analyzed the relationship between 10 state firearm laws and total, age-adjusted homicide and suicide rates from 1991 to 2016 in a difference-in-differences, fixed effects, multivariable regression model. There were 1222 observations for homicide analyses and 1300 observations for suicide analyses.

PARTICIPANTS: Populations of all US states.

MAIN MEASURES: The outcome measures were the annual age-adjusted rates of homicide and suicide in each state during the period 1991–2016. We controlled for a wide range of state-level factors.

KEY RESULTS: Universal background checks were associated with a 14.9% (95% CI, 5.2–23.6%) reduction in overall homicide rates, violent misdemeanor laws were associated with a 18.1% (95% CI, 8.1–27.1%) reduction in homicide, and “shall issue” laws were associated with a 9.0% (95% CI, 1.1–17.4%) increase in homicide. These laws were significantly associated only with firearm-related homicide rates, not non-firearm-related homicide rates. None of the other laws examined were consistently related to overall homicide or suicide rates.

CONCLUSIONS: We found a relationship between the enactment of two types of state firearm laws and reductions in homicide over time. However, further research is necessary to determine whether these associations are causal ones.

KEY WORDS: community health; firearms; health policy; injury; prevention; public health.

J Gen Intern Med 34(10):2021–8

DOI: 10.1007/s11606-019-04922-x

© Society of General Internal Medicine 2019

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s11606-019-04922-x>) contains supplementary material, which is available to authorized users.

Received January 30, 2018

Revised August 21, 2018

Accepted January 10, 2019

Published online March 28, 2019

INTRODUCTION

From 1991 to 2016, the average annual firearm death rate in the USA was 11.4 per 100,000 individuals.¹ This amounts to 859,871 lives lost due to a single cause of preventable death over a 26-year period.¹ Although numerous studies have evaluated the impact of state firearm laws on homicide or suicide rates (Online Supplemental Tables S1, S2), a major limitation is that most examined the impact of only one type of policy. Because states that enact one type of law are also more likely to enact others,² it is difficult to isolate the effect of one law without considering the simultaneous impact of other policies.

To improve our ability to draw causal inferences, a stronger study design would examine the relationship between the enactment of *multiple* types of state firearm laws over time and differences in fatality rates between states. However, we are aware of only one multi-year panel study of homicide rates that examined multiple laws and included data from the past decade; this study was conducted at the level of urban counties, and only 34 states were included.³ We are not aware of any panel study at the state level that used data within the past decade to assess simultaneously the effect of multiple state firearm laws on homicide or suicide death rates.

One reason why many previous studies have focused on a single type of law is the absence of a comprehensive national database of state firearm laws. For most previous studies, researchers had to track down the status of state firearm laws by conducting their own legal research, a painstaking process that precluded a single study of a large range of gun-related policies. We recently created a novel database in which we recorded, quantified, and classified the largest-to-date compilation of firearm provisions by state over a 26-year period.² In this study, we examine the simultaneous impact of 10 different types of state firearm laws on overall homicide and suicide rates over a 26-year period using the same model specification.

METHODS

Data Sources

We ascertained the annual presence or absence of 10 state firearm laws in all 50 states from 1991 to 2016 using the State Firearm Law Database, which provides a panel of firearm-related laws in each state, for each year.² The database was

compiled using the Thompson Reuters Westlaw database of state statutes and session laws and a database assembled by Everytown for Gun Safety.⁴

We obtained homicide and suicide mortality data from the Centers for Disease Control and Prevention Web-Based Injury Statistics Query and Reporting System (WISQARS), which are derived from the vital statistics death registry of the National Center for Health Statistics.¹ WISQARS reports annual state-specific, age-adjusted fatality rates for homicide and suicide.

Study Population

We assembled annual, state-specific age-adjusted total homicide and suicide rates in each state from 1991 to 2016. We excluded homicides due to legal intervention (1% of firearm deaths), unintentional firearm fatalities (2.5% of firearm deaths), and fatalities of undetermined intent (1% of firearm deaths) from our analysis.

Outcome Measures

The main outcome measures were the annual, age-adjusted homicide rate and age-adjusted suicide rate in each state over the study period. Because there were 50 states and 26 years, the total number of possible observations was 1300. However, the CDC does not report death rates when the absolute number of deaths in a state during a given year is less than 10. For this reason, we did not have a complete panel of homicide data for three states: North Dakota, Vermont, and Wyoming. We therefore excluded these states from the homicide analyses, yielding a total of 1222 observations. There were no missing data for suicide death rates, so there were 1300 observations for analyses involving this outcome.

Main Predictor Variables

From the state law database, we selected 10 laws to analyze based on several considerations: (1) laws that are currently being considered by state legislatures; (2) laws that have been examined in prior research; and (3) laws that were enacted by at least two states during the study period. We analyzed the following 10 laws (defined in detail in Table 1): (1) universal background checks, either through point-of-purchase checks or a permit to purchase requirement; (2) ban on handgun possession for people convicted of a violent misdemeanor; (3) age 21 limit for handgun possession; (4) “shall issue” laws; (5) permitless carry laws; (6) prohibition against gun trafficking; (7) ban on “junk guns”; (8) “stand your ground” laws; (9) assault weapons ban; and (10) ban on large-capacity ammunition magazines. Laws were lagged by 1 year in the analysis; that is, we considered the potential effect of a law only in the full first year after its enactment.

Data Analysis

Unlike many earlier analyses in the public health literature, we employed a difference-in-differences approach to the analysis

of policy outcomes,^{5, 6} an approach that is widely used in the econometric and criminology literature on the effect of state firearm laws and was first introduced by Lott and Mustard in their classic 1997 paper.⁷ Using multivariable linear regression, we evaluated the association between the firearm law provisions in each state (which were time-varying) and the homicide and suicide rates over the study period, while controlling for several other time-varying state-level factors. We included year and state fixed effects and estimated cluster-robust standard errors, which account for the clustering of observations, serial autocorrelation, and heteroskedasticity.⁸ By including state fixed effects, our analysis focuses on the time series of observations within each state, comparing changes in homicide or suicide rates within a state from before to after the implementation of a particular firearm law, using states without that law as controls. Because the outcome variables are not normally distributed but skewed, we log-transformed the homicide and suicide rates.

Our final model was as follows:

$$\ln(\mu_{st}) = \alpha + (B_* LAW_{st}) + (C_* CONTROL_{st}) + S + T + e,$$

where μ_{st} is the homicide or suicide rate in state s in year t , LAW_{st} is a dummy variable for the presence or absence of a particular state firearm law in state s in year t , $CONTROL_{st}$ is a vector of control variables, S represents state fixed effects, and T represents year fixed effects.

We controlled for the following time-varying state-level factors, chosen because of their association with homicide or suicide rates in the published literature and their association with both death rates and the adoption of firearm laws in our data set: (1) the percent of the population that is black; (2) the percent of population ages 15–29 that is male; (3) per capita law enforcement officers; (4) the violent crime rate (excluding homicide); (5) the divorce rate; (6) the unemployment rate; (7) the poverty rate; (8) per capita alcohol consumption; (9) the incarceration rate; (10) population density; (11) log of population; and (12) household gun ownership percentage.

Because annual survey data of household gun ownership at the state level are not available, most previous studies have used the ratio of firearm suicides to all suicides (FS/S) as a proxy for household firearm ownership.⁹ This proxy is highly correlated ($r = 0.80$) with state-specific measures of firearm ownership on a cross-sectional basis.¹⁰ Recently, we developed a new proxy measure that improves the correlation with survey-measured gun ownership from 0.80 to 0.95.¹⁰ This new proxy measure incorporates a state’s hunting license rate in addition to FS/S.¹⁰ In this study, we used this new proxy.

Per capita law enforcement officers and violent crime rates were obtained from the FBI Uniform Crime Reports;¹¹ incarceration rates were obtained from the Bureau of Justice Statistics;¹² and per capita alcohol consumption was obtained from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) for 1991–2015¹³ and from Statistica¹⁴ for 2016. Hunting licensing data were obtained from the U.S. Fish and Wildlife Service.¹⁵ The remaining variables were obtained

Table 1 Description of State Firearm Laws Examined

Law	Brief description	Detailed description	States with law in 1991	Additional states with law in 2016	Law changes from 1991 to 2016
Universal background checks	Background checks conducted through permit requirement for all firearm sales or through required background checks for all sales)	Individuals must undergo a background check to purchase any type of firearm, either at the point of purchase or through a license/permit application. This may or may not include exemptions for buyers who have already undergone a background check for a concealed carry permit or other licensing requirements.	CA, IL, MA, NJ, RI	CO, CT, DE, HI, NY, OR, WA	7
Violent misdemeanor is prohibiting for handgun possession	Handgun possession is prohibited for people who have committed a violent misdemeanor punishable by less than 1 year of imprisonment	Must cover possession of handguns, not just purchase. Must cover assault, not just aggravated assault. Must extend beyond domestic violence-related misdemeanors, restraining orders, and stalking. Must not require that misdemeanor be punishable by imprisonment of more than 1 year. Must not require that misdemeanor involve use of a firearm or result in injury.	CA, HI, NY	CT, MD	2
Age 21 limit for handgun possession	No possession of handguns until age 21	You must be 21 to possess a handgun. No exemption for parental consent. Exclusions for adult-supervised hunting, sporting, or training activities are OK. Exception for possession on private premises NOT OK unless minor required to be under adult supervision.	IA, RI, SC	CT, HI, MD, MA, NJ, NY (SC repealed)	7
Shall issue law	Law provides no discretion to law enforcement authorities in deciding whether to grant a concealed carry permit.	A permit must be issued unless the applicant meets pre-established disqualifying criteria.	FL, GA, ID, IN, IA, ME, MS, MT, NH, ND, OR, PA, SD, WA, WV	AL, AR, CO, IL, KY, LA, MI, MN, MO, NE, NV, NM, NC, OH, OK, SC, TN, TX, UT, VA, WA, WI (WV moved to permitless carry)	23
Permitless carry	No permit is required to carry a concealed handgun.	Age restrictions may apply, and a voluntary permitting system may still be in place.	VT	AK, AZ, ID, KS, ME, MS, WV, WY	8
Trafficking prohibited	No person may purchase a firearm with the intent to re-sell to a person who is prohibited from buying or possessing a firearm	The law prohibits the purchase of a firearm with the intent to re-sell to a prohibited person. We make no distinction between whether the trafficker (original purchaser) must actually know or have reason to believe that the buyer is prohibited. An exemption for sale to relatives is acceptable.	FL, MA, ND, OH, VA	CA, CO, CT, DE, IL, MN, NY, UT, VA	9
Junk gun ban	Ban on junk guns (sometimes called “Saturday night specials”)	The law prohibits the sale of handguns that fail to meet one or more of the following requirements: (1) Passes drop testing and firing testing; (2) Passes a melting point test; (3) Possesses specific handgun safety features; (4) Appears on a list of approved handguns. This may or may not apply to private sellers.	HI, IL, MD, MN, SC	CA, MA (SC repealed)	3
Stand your ground law	A “stand your ground” law is in place	Use of deadly force is allowed to be a first resort if you are threatened in a public place in which you have the right to be present. There is no duty to retreat. Does not count as stand your ground law if it only	None	AL, AK, AZ, FL, GA, IN, KS, KY, LA, MI, MS, MO, MT, NV, NH, NC, OK, PA, SC, SD, TN, TX, UT, WV	24

(continued on next page)

Table 1. (continued)

Law	Brief description	Detailed description	States with law in 1991	Additional states with law in 2016	Law changes from 1991 to 2016
Assault weapons ban	Ban on sale of assault weapons beyond just assault pistols	applies when person is in a vehicle. Law bans the sale of both assault pistols and other assault weapons.	CA, NJ	CT, MD, MA, NY	4
Large capacity ammunition magazine ban	Ban on sale large capacity magazines beyond just ammunition for pistols	Law bans the sale of both assault pistol ammunition and other large-capacity magazines.	NJ	CA, CO, CT, MD, MA, NY	6

from the U.S. Census. We conducted the analysis using Stata version 15 (StataCorp LP, College Station, TX).

Because the outcome variables are log-transformed, the regression coefficients can be interpreted as the percentage change in the firearm homicide or suicide rate associated with the presence of a particular law by exponentiating the coefficient, subtracting 1, and then multiplying by 100 (i.e., a coefficient of 0.10 for a given law would indicate a 10.5% increase in the mortality rate associated with that law).

To test the plausibility of any observed associations between firearm laws and overall homicide or suicide rates, we conducted a falsification test: we analyzed the relationship between these laws and firearm compared to non-firearm mortality rates. These laws would be expected to primarily affect only the firearm-related rates.

In a final sensitivity analysis, we modeled the secular time trend in firearm homicide or suicide rates by including year as a continuous variable in the model rather than as a fixed effect.

RESULTS

Over the 26-year study period, there was a substantial variation in the violent death rates across states. In 2016, overall homicide rates ranged from a low of 1.3 per 100,000 in Maine and New Hampshire to a high of 14.2 per 100,000 in Louisiana (Table 2). In 2016, overall suicide rates ranged from a low of 7.2 per 100,000 in New Jersey to a high of 26.0 per 100,000 in Montana. Across the study period, there were a total of 93 law changes among the 10 laws studied (Table 1).

When examined individually, universal background checks and violent misdemeanor laws were significantly associated with lower overall homicide rates and “shall issue” laws were significantly associated with higher homicide rates (Table 3). After simultaneously controlling for all 10 firearm laws, universal background checks were associated with 14.9% lower overall homicide rates (95% confidence interval [CI], 5.2%–23.6%); violent misdemeanor laws were associated with 18.1% lower homicide rates (95% CI, 8.1–27.1%); and “shall issue” laws were associated with 9.0% higher homicide rates (95% CI, 1.1%–17.4%). None of the other seven laws were significantly associated with overall homicide rates. In a

falsification test, each of these three laws was found to be significantly associated only with the firearm-related homicide rate, not the non-firearm-related homicide rate (Online Supplemental Table S3).

In the fully adjusted model, household gun ownership was not associated with overall rates of homicide (Table 3). Factors that were significant positive predictors of overall homicide rates were the percentage of males, the violent crime rate, and population density. Overall population was negatively associated with homicide rates.

When examined individually, four of the 10 firearm laws were significantly associated with overall suicide rates (Table 4). However, after simultaneously controlling for all 10 firearm laws, only two laws were significantly related to suicide rates: bans on junk guns were associated with 6.4% lower suicide rates (95% CI, 3.5–9.2%) and permitless carry laws were associated with 5.1% higher suicide rates (95% CI, 0.2–10.4%). Both laws failed the falsification test, as both were significantly related to non-firearm as well as firearm homicide rates (Online Supplemental Table S4). None of the other laws were significantly associated with overall suicide rates.

In the fully adjusted model, household gun ownership was not associated with overall rates of suicide (Table 4). Factors that were significant positive predictors of suicide rates were the violent crime rate, unemployment rate, poverty rate, and per capita alcohol consumption. Overall population was negatively related to suicide rates.

Entering year as a continuous variable instead of as a fixed effect had no appreciable impact on the results (Online Supplemental Table S5).

DISCUSSION

To the best of our knowledge, this is the first study using data from within the past decade to simultaneously model the effect of multiple state firearm laws on homicide and suicide rates at the state level using a multi-year panel design. Using a difference-in-differences analysis, we found that laws requiring universal background checks and those prohibiting firearm possession by people with a conviction for a violent

Table 2 Status of State Firearm Laws and Violent Death Rates, 2016

State	UBC	VM	21	SI	PC	TP	JG	SYG	AW	LCM	Age-adjusted overall homicide rate (per 100,000)	Age-adjusted overall suicide rate (per 100,000)
Louisiana				√				√			14.2	14.1
Mississippi				√	√			√			12.0	12.7
Alabama				√				√			11.8	15.6
Maryland		√	√	√			√		√	√	10.0	9.3
Missouri				√				√			9.9	18.3
New Mexico				√				√			9.5	22.5
Illinois	√			√		√	√				9.2	10.7
South Carolina				√				√			9.0	15.7
Tennessee				√				√			8.7	16.3
Arkansas				√				√			8.7	18.2
Oklahoma				√				√			8.6	20.9
Georgia				√				√			7.9	13.3
Alaska				√	√			√			7.5	25.4
Indiana				√				√			7.5	15.4
North Carolina				√				√			7.4	13.0
Nevada				√				√			7.4	21.4
Kentucky				√				√			7.1	16.8
Delaware	√			√		√		√			7.0	11.5
Florida				√		√		√			6.8	13.9
Michigan				√				√			6.6	13.3
Ohio				√		√		√			6.5	14.1
West Virginia				√	√			√			6.3	19.5
Arizona				√	√			√			6.3	17.6
Pennsylvania				√				√			6.0	14.7
Texas				√				√			6.0	12.6
Virginia				√		√		√			5.5	13.2
Kansas				√	√			√			5.3	17.9
California	√	√		√		√	√		√	√	5.2	10.5
Wisconsin				√				√			4.8	14.6
South Dakota				√				√			4.7	20.5
New Jersey	√		√	√					√	√	4.6	7.2
Montana				√				√			4.3	26.0
Colorado	√			√		√				√	4.2	20.5
New York	√	√	√	√		√			√	√	3.5	8.1
Nebraska				√							3.3	13.0
Oregon	√			√							3.2	17.8
Wyoming				√	√						3.0	25.2
Washington	√			√							2.9	14.8
Iowa			√	√							2.8	14.5
Hawaii	√	√	√	√			√				2.8	12.0
Connecticut	√	√	√	√		√			√	√	2.6	10.0
Utah				√		√		√			2.5	21.8
Minnesota				√		√	√				2.4	13.2
Rhode Island	√		√	√							2.3	11.1
North Dakota				√		√					2.2	19.0
Massachusetts	√		√	√		√	√		√	√	2.0	8.7
Idaho				√	√						2.0	21.3
Vermont				√	√						1.9	17.3
New Hampshire				√			√				1.3	17.3
Maine				√	√						1.3	15.7

Includes the following 10 laws: UBC, universal background checks; VM, violent misdemeanor prohibitor; 21, age 21 limit for handgun purchase; SI, shall issue; PC, permitless carry; TP, trafficking prohibited; JG, junk gun ban; SYG, stand your ground law; AW, assault weapons ban; LCM, large capacity magazine ban

misdemeanor were associated with significant reductions in the overall homicide rate, while “shall issue” laws were associated with a significant increase in the homicide rate. There was no significant association between homicide and the other laws studied, and we did not find consistent relationships between any of the laws and overall suicide rates.

This study has several strengths. First, it is one of the first studies to clearly define each law with attention to the detailed provisions of the law, including its scope, exceptions, and exemptions. One reason for some of the conflicting results of previous studies (Online Supplemental Tables S1, S2) may be the inconsistent definition of state statutes.

Second, using a difference-in-differences approach helps to address the major threat to validity in this type of research: states with lower homicide rates to begin with may be more likely to enact stronger gun laws. By including state and year fixed effects, we are using a “within-estimator” that assesses differences within states over time.^{5, 6} Studies that do not include state fixed effects are also assessing differences across states at a given time (“between effects”), which may reflect different propensities of states with lower or higher homicide rates to enact laws, rather than law effects. Thus, the difference-in-differences approach is less subject to the possibility of “reverse causation” (i.e., it is the level of the homicide

Table 3 Linear Regression Model Results: Factors Affecting Homicide Rates, 1991–2016

	Regression coefficient for state firearm laws entered one at a time (95% CI)	Regression coefficient, fully adjusted model [all laws entered together] (95% CI)
Percent black		0.043 (−0.004, 0.089)
Percent male among population ages 15–29		<i>0.100*</i> (0.021, 0.179)
Per capita law enforcement officers		−0.023 (−0.079, 0.033)
Violent crime rate		<i>0.054*</i> (0.026, 0.081)
Divorce rate		−0.030 (−0.066, 0.005)
Unemployment rate		0.002 (−0.015, 0.019)
Poverty rate		0.002 (−0.005, 0.010)
Per capita alcohol consumption		0.138 (−0.021, 0.298)
Incarceration rate (per 1000 population)		−0.025 (−0.058, 0.008)
Population density (per 0.1 mile ²)		<i>0.032*</i> (0.010, 0.054)
Log of population		−0.629* (−1.081, −0.177)
Proxy for household gun ownership percentage		0.001 (−0.004, 0.007)
Firearm laws		
Universal background checks	−0.173* (−0.299, −0.048)	−0.161* (−0.269, −0.053)
Violent misdemeanor is prohibiting for handgun possession	−0.155* (−0.276, −0.033)	−0.200* (−0.316, −0.084)
Age 21 limit for handgun possession	−0.117 (−0.245, 0.010)	−0.068 (−0.200, 0.064)
Shall issue law	<i>0.082*</i> (0.018, 0.146)	<i>0.086*</i> (0.011, 0.160)
Permitless carry law	−0.063 (−0.152, 0.027)	0.015 (−0.101, 0.131)
Trafficking prohibited	−0.045 (−0.133, 0.044)	0.005 (−0.050, 0.061)
Junk gun ban	−0.028 (−0.177, 0.121)	−0.010 (−0.136, 0.116)
Stand Your Ground law	0.020 (−0.042, 0.083)	0.009 (−0.050, 0.067)
Ban on assault weapons	−0.143 (−0.300, 0.013)	−0.092 (−0.222, 0.039)
Ban on large capacity ammunition magazines	−0.089 (−0.205, 0.027)	0.038 (−0.036, 0.112)
R ²		0.94

Outcome variable is the log of the age-adjusted total homicide rate. All models include year and state fixed effects. Standard errors are robust and adjusted for state-level clustering

CI, confidence interval

*Coefficient is statistically significant from zero ($p < 0.05$). Also shown in italic

rates that are affecting the law enactment, not the other way around). The inclusion of state fixed effects has the added advantage of controlling for any differences between states in time-invariant factors.

Third, including a large panel of time-varying state factors as independent variables helps address the problem of omitted variable bias. Nevertheless, it is still possible that states which were experiencing large declines in homicide were more likely to enact a particular law; even the within-estimator may not be sufficient to rule out the possibility of reverse causation.

Our finding of a negative association between universal background checks (including permit requirements) and homicide rates is consistent with several other studies.^{3, 16–20} Our finding of a negative association between violent misdemeanor laws and homicide rates is consistent with one other recent study, which reported a 24% reduction in intimate partner homicide in states with these laws.²¹ However, caution should be exercised when interpreting this finding because only two states implemented violent misdemeanor laws during the study period. While historically the literature on the impact of concealed carry-permitting laws has been inconsistent and several studies have found an association between “shall issue” laws and reduced murder rates,^{7, 22–29} the three most recent studies to examine these laws found a positive association with homicide rates.^{3, 30, 31}

Our finding that there was no association between stand your ground laws and homicide rates conflicts with the findings of two previous studies on these laws.^{32, 33} However, both of these studies examined only the decade of 2000–2010.

When we restrict our analysis to that decade, we obtain similar results.

A second important finding of this study is that changes in household gun ownership were not found to be significantly associated with homicide or suicide rates, a result that differs from several previous studies.^{34, 35} The discrepancy in these results could possibly be due to our inclusion of state fixed effects. It is possible that although there is a strong cross-sectional relationship between the prevalence of firearm ownership and homicide and suicide rates, small changes in firearm ownership that are observed over time are not sufficient enough to result in measurable differences in overall population homicide or suicide rates. Even if we had survey-based measures of household gun ownership, the margin of error is probably greater than the actual change in gun ownership levels from year to year. There is too much noise in our measure of gun ownership and too little variability in true levels of household gun ownership to determine if changes in gun ownership are related to differences in homicide or suicide rates. Few of the previous studies included state fixed effects. Because of the conflict with the existing literature, further study is required before any definitive conclusion is drawn.

It is important to note that the absence of an observed association of a law and overall homicide or suicide rates does not necessarily mean that these laws are ineffective. It may also be that the laws are not broad enough to affect overall population death rates or that the laws are not being adequately enforced.

Table 4 Linear Regression Model Results: Factors Affecting Suicide Rates, 1991–2016

	Regression Coefficient for State Firearm Laws Entered One at a Time (95% CI)	Regression Coefficient, Fully Adjusted Model [All Laws Entered Together] (95% CI)
Percent black		−0.015 (−0.033, 0.003)
Percent male among population ages 15–29		0.018 (−0.014, 0.049)
Per capita law enforcement officers		0.006 (−0.015, 0.027)
Violent crime rate		<i>0.018*</i> (<i>0.007, 0.029</i>)
Divorce rate		−0.008 (−0.028, 0.012)
Unemployment rate		<i>0.008*</i> (<i>0.001, 0.016</i>)
Poverty rate		<i>0.004*</i> (<i>0.000, 0.007</i>)
Per capita alcohol consumption		<i>0.075*</i> (<i>0.012, 0.138</i>)
Incarceration rate (per 1000 population)		0.007 (−0.011, 0.025)
Population density (per 0.1 mile ²)		−0.001 (−0.010, 0.007)
Log of population		<i>−0.349*</i> (<i>−0.601, −0.097</i>)
Proxy for household gun ownership percentage		0.001 (−0.001, 0.003)
Firearm laws		
Universal background checks	0.008 (−0.034, 0.050)	−0.010 (−0.033, 0.053)
Violent misdemeanor is prohibiting for handgun possession	−0.024 (−0.064, 0.016)	−0.043 (−0.090, 0.004)
Age 21 limit for handgun possession	<i>−0.040*</i> (<i>−0.078, −0.001</i>)	−0.030 (−0.070, 0.010)
Shall issue law	0.000 (−0.025, 0.024)	0.004 (−0.022, 0.029)
Permitless carry law	<i>0.063*</i> (<i>0.006, 0.120</i>)	<i>0.050*</i> (<i>0.002, 0.099</i>)
Trafficking prohibited	−0.013 (−0.047, 0.021)	−0.002 (−0.043, 0.038)
Junk gun ban	<i>−0.074*</i> (<i>−0.101, −0.047</i>)	<i>−0.066*</i> (<i>−0.097, −0.036</i>)
Stand Your Ground law	−0.014 (−0.033, 0.006)	−0.018 (−0.037, 0.001)
Ban on assault weapons	−0.037 (−0.081, 0.006)	0.001 (−0.063, 0.066)
Ban on large-capacity ammunition magazines	<i>−0.052*</i> (<i>−0.099, −0.005</i>)	−0.004 (−0.053, 0.046)
R ²		0.94

Outcome variable is the log of the age-adjusted total suicide rate. All models include year and state fixed effects. Standard errors are robust and adjusted for state-level clustering

CI confidence interval

*Coefficient is statistically significant from zero ($p < 0.05$). Also shown in italic

Several other limitations deserve mention. First, the firearm ownership proxy has been validated with cross-sectional data, but not with longitudinal data.³⁶ It is not clear whether this proxy is able to accurately measure changes in household gun ownership over time.

Second, while we controlled for a range of state-level factors associated with homicide death rates, there may be unidentified omitted variables. For example, in the early 1990s, firearm homicide rates were very high in many cities, seemingly related to the crack cocaine epidemic.^{37, 38} Nevertheless, when we restrict the analysis to the period 2000–2016, our results remain essentially unchanged, although the precision of the estimates decreases.

Third, we accounted only for the presence or absence of firearm law provisions, not for the implementation and enforcement of these laws. Fourth, trying to incorporate the most important explanatory variables in a large regression almost invariably leads to some multicollinearity. For example, when we use all the other independent variables to explain variations in the gun ownership proxy, the adjusted R^2 is 0.69.

Finally, we do not disaggregate homicide rates by the age or other characteristics of either the offender or victim, which could mask the effect of laws intended to affect a particular subpopulation. For example, age restrictions on gun possession would only be expected to affect youth suicide rates, not adult rates.

In conclusion, this study provides evidence that universal background checks and laws prohibiting gun ownership by people with a history of a violent misdemeanor are associated with lower overall homicide rates, while laws that provide no

discretion to law enforcement officials in approving concealed carry permits are associated with higher homicide rates. Further research on the impact of state firearm laws is necessary to assess causality and should rely upon detailed definitions of each law.

Corresponding Author: Michael Siegel, Department of Community Health Sciences, Boston University School of Public Health, 801 Massachusetts Avenue, 4th Floor, Boston, MA 02118, USA (e-mail: mbsiegel@bu.edu).

Funding Information: Support for this research was provided by the Robert Wood Johnson Foundation, Evidence for Action Program (grant 73337).

Compliance with Ethical Standards:

Conflict of Interest: The authors declare that they do not have a conflict of interest.

Disclaimer: The views expressed here do not necessarily reflect the views of the Robert Wood Johnson Foundation.

REFERENCES

- Centers for Disease Control and Prevention. Web-based Inquiry Statistics Query and Reporting System (WISQARS). Atlanta, GA: National Center for Injury Prevention and Control; 2018. <https://webappa.cdc.gov/sasweb/ncipc/mortrate.html>. Accessed 14 Dec 2018.
- Siegel M, Pahn M, Xuan Z, et al. Firearm-related laws in all 50 US states, 1991–2016. *Am J Public Health*. 2017;107(7):1122–9.

3. **Crifasi CK, Merrill-Francis M, McCourt A**, et al. Association between firearm laws and homicide in urban counties. *J Urban Health*. 2018;95(3):383–90.
4. Everytown for Gun Safety. Gun law navigator. New York: Everytown for Gun Safety; 2018. <https://everytownresearch.org/navigator/index.html>. Accessed 14 Dec 2018.
5. **Wooldridge JM**. Introductory Econometrics: a Modern Approach (5th edition). Mason, OH: South-Western Cengage Learning; 2013.
6. **Wooldridge JM**. Econometric analysis of cross section and panel data (2nd edition). Cambridge, MA: MIT Press; 2010.
7. **Lott JR, Mustard DB**. Crime, deterrence, and right-to-carry concealed handguns. *J Legal Stud*. 1997;26:1–67.
8. **White H**. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*. 1980;48(4):817–38.
9. **Azrael D, Cook PJ, Miller M**. State and local prevalence of firearm ownership: measurement, structure, and trends. *J Quant Criminol*. 2004;20(1):43–62.
10. **Siegel M, Ross CS, King C**. A new proxy measure for state-level gun ownership in studies of firearm injury prevention. *Inj Prev*. 2014;20:204–7.
11. Federal Bureau of Investigation. Uniform crime reporting statistics. Washington, DC: U.S. Department of Justice; 2016. <http://www.ucrdatatool.gov>. Accessed 14 Dec 2018.
12. U.S. Bureau of Justice Statistics. Prison Population Counts. Washington, DC: U.S. Department of Justice; 2018. <http://www.bjs.gov/index.cfm?ty=tp&tid=131>. Accessed 14 Dec 2018.
13. **LaVallee, RA, Yi H**. Apparent per capita alcohol consumption: national, state, and regional trends, 1977–2010. Arlington, VA: CSR, Incorporated and National Institute on Alcohol Abuse and Alcoholism; 2012.
14. Statista. Alcohol consumption per capita from all beverages in the U.S. in 2016, by state. New York: Statista; 2018. <https://www.statista.com/statistics/442848/per-capita-alcohol-consumption-of-all-beverages-in-the-us-by-state/>. Accessed 14 Dec 2018.
15. U.S. Fish & Wildlife Service. Historical hunting license data. <http://wsfprograms.fws.gov/Subpages/LicenseInfo/Hunting.htm>. Accessed 14 Dec 2018.
16. **Fleegler EW, Lee LK, Monuteaux MC, Hemenway D, Mannix R**. Firearm legislation and firearm-related fatalities in the United States. *JAMA Intern Med*. 2013;173(9):732–40.
17. **Rudolph KE, Stuart EA, Vernick JS, Webster DW**. Association between Connecticut's permit-to-purchase handgun law and homicides. *Am J Public Health*. 2015;105(8):e49–54.
18. **Webster D, Crifasi CK, Vernick JS**. Effects of the repeal of Missouri's handgun purchaser licensing law on homicides. *J Urban Health*. 2014;91(2):293–302.
19. **Sumner SA, Layde PM, Guse CE**. Firearm death rates and association with level of firearm purchase background check. *Am J Prev Med*. 2008;35(1):1–6.
20. **Ruddell R, Mays GL**. State background checks and firearms homicides. *J Crim Justice*. 2005;33:127–36.
21. **Zeoli AM, McCourt A, Buggs S, Frattaroli S, Lilley D, Webster DW**. Analysis of the strength of legal firearm restrictions for perpetrators of domestic violence and their association with intimate partner homicide. *Am J Epidemiol*. 2018;187(7):1449–55.
22. **Gius M**. An examination of the effects of concealed weapons laws and assault weapons bans on state-level murder rates. *Appl Econ Lett*. 2014;21(4):265–7.
23. **Moody CE, Marvell TB, Zimmerman PR, Alemante F**. The impact of right-to-carry laws on crime: an exercise in replication. *Review of Economics & Finance*. 2014;4(1):33–43.
24. **Lott JR**. More guns, less crime: understanding crime and gun-control laws. Chicago, IL: The University of Chicago Press; 2010.
25. **Olson DE, Maltz MD**. Right-to-carry concealed weapon laws and homicide in large U.S. counties: the effect on weapon types, victim characteristics, and victim-offender relationships. *J Law Econ*. 2001;44:747–70.
26. **Lott JR, Jr., Whitley JE**. Safe-storage gun laws: accidental deaths, suicides, and crime. *J Law Econ*. 2001;44:659–89.
27. **Dezhbakhah H, Rubin PH**. Lives saved or lives lost? The effects of concealed-handgun laws on crime. *AEA Papers and Proceedings*. 1998;88(2):468–74.
28. **Bronars SG, Lott JR, Jr.** Criminal deterrence, geographic spillovers, and the right to carry concealed handguns. *AEA Papers and Proceedings*. 1998;88(2):475–9.
29. **Lott JR, Whitley JE**. Abortion and crime: unwanted children and out-of-wedlock births. *Econ Inquiry*. 2006;45:304–24.
30. **Donohue JJ, Aneja A, Weber KD**. Right-to-carry laws and violent crime: a comprehensive assessment using panel data, the LASSO, and a state-level synthetic controls analysis. NBER working paper no. 23510. Cambridge, MA: National Bureau of Economic Research; 2017. <http://www.nber.org/papers/w23510>. Accessed 14 Dec 2018.
31. **Siegel M, Xuan Z, Ross CS**, et al. Easiness of legal access to concealed firearm permits and homicide rates in the United States. *Am J Public Health*. 2017;107(12):1923–9.
32. **McClellan CB, Tekin E**. Stand your ground laws, homicides, and injuries. NBER working paper no. 18187. Cambridge, MA: National Bureau of Economic Research; 2012. <http://www.nber.org/papers/w18187>. Accessed 14 Dec 2018.
33. **Cheng C, Hoekstra M**. Does strengthening self-defense law deter crime or escalate violence? Evidence from expansions to Castle Doctrine. *J Hum Resour*. 2013;48(3):821–54.
34. **Hepburn LM, Hemenway D**. Firearm availability and homicide: a review of the literature. *Aggress Violent Behav*. 2004;9(4):417–40.
35. **Miller M, Hemenway D**. The relationship between firearms and suicide: a review of the literature. *Aggress Violent Behav*. 1999;4(1):59–75.
36. **Kleck G**. Measures of gun ownership levels for macro-level crime and violence research. *J Res Crime Delinq*. 2004;41(1):3–36.
37. **Blumstein A, Rosenfeld R**. Explaining recent trends in US homicide rates. *J Crim Law Criminol*. 1998;88(4):1175–1216.
38. **Cook P, Laub J**. The unprecedented epidemic in youth violence. In Tony M, ed. *Crime and justice: an annual review of research*. Chicago: University of Chicago Press; 1998:26–64.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

EXHIBIT 63

What Do We Know About the Association Between Firearm Legislation and Firearm-Related Injuries?

Julian Santaella-Tenorio*, Magdalena Cerdá, Andrés Villaveces, and Sandro Galea

* Correspondence to Dr. Julian Santaella-Tenorio, Department of Epidemiology, Mailman School of Public Health, Columbia University, 722 West 168th Street, Room 515, New York, NY 10032 (e-mail: js4222@cumc.columbia.edu).

Accepted for publication September 4, 2015.

Firearms account for a substantial proportion of external causes of death, injury, and disability across the world. Legislation to regulate firearms has often been passed with the intent of reducing problems related to their use. However, lack of clarity around which interventions are effective remains a major challenge for policy development. Aiming to meet this challenge, we systematically reviewed studies exploring the associations between firearm-related laws and firearm homicides, suicides, and unintentional injuries/deaths. We restricted our search to studies published from 1950 to 2014. Evidence from 130 studies in 10 countries suggests that in certain nations the simultaneous implementation of laws targeting multiple firearms restrictions is associated with reductions in firearm deaths. Laws restricting the purchase of (e.g., background checks) and access to (e.g., safer storage) firearms are also associated with lower rates of intimate partner homicides and firearm unintentional deaths in children, respectively. Limitations of studies include challenges inherent to their ecological design, their execution, and the lack of robustness of findings to model specifications. High quality research on the association between the implementation or repeal of firearm legislation (rather than the evaluation of existing laws) and firearm injuries would lead to a better understanding of what interventions are likely to work given local contexts. This information is key to move this field forward and for the development of effective policies that may counteract the burden that firearm injuries pose on populations.

death; firearms; homicide; legislation; suicide; weapons; wounds and injuries

Abbreviations: NCHS, National Center for Health Statistics; NFA, National Firearms Agreement; UCR, Uniform Crime Reports.

INTRODUCTION

Firearms account for a substantial number of external causes of death across the world. In 2000, for example, it has been estimated that globally between 196,000 and 229,000 persons died from nonconflict firearm-related injuries (1). Global estimates from 2010 indicate that the rates of firearm homicides and unintentional firearm injuries for this year were 2.5 and 0.7 per 100,000, respectively (2). Although less clear estimates for global firearm suicide rates are available, among high-income countries, the United States has one of the highest rates (5.8 per 100,000) (3). In the United States, 31,672 persons died from firearm injuries in 2010, at an age-adjusted rate of 10.1 per 100,000, and this has remained relatively unchanged since 2000 (4, 5).

Governments around the world have adopted a range of approaches to regulate the access and use of firearms in the general population, aiming to reduce firearm-related crime and

mortality rates (Table 1). The variety of laws is matched by the diversity of ways in which laws are implemented, the heterogeneity in law enforcement efforts, and the severity of penalties associated with legal violations.

This heterogeneity in approaches and implementation methods makes it critical to identify approaches that are less likely to be effective and to identify which strategies, looking forward, may be more likely to work (5–8). In addition, examining the associations between specific policies and firearm-related deaths across countries can improve our understanding about which types of laws are more likely to be successful in reducing firearm mortality rates in similar contexts or within diverse legal frameworks. This review aimed to examine the association between firearm-related laws and the rate of firearm-related suicides, homicides, and unintentional injuries and deaths worldwide. Previous literature reviews assessing this issue (6–11) have focused mainly on US studies.

Table 1. Categorization of Firearm-Related Laws^a

Categories	Types of Laws
Use	Right to carry or shall issue laws
	Hunting laws
	Stand your ground and castle doctrine laws
	Ordinances against publicly firing a gun
Sales	Licensing and inspections of dealers
	Record-keeping requirements
	Background checks
	Waiting periods
	Requirement to report multiple sales
	One-handgun per month laws
	Zoning ordinances barring gun shows on public property
Ownership	Bans on purchases or possession by felons, youths, other presumably high-risk groups, and those with mental conditions
	Licensing for owners and permits for firearms
	Required training on safe firearm use
	Requirement to notify police of stolen firearms
Safer storage	Child access prevention laws
	Other safe storage requirements
Firearms and ammunition	Bans on automatic and semiautomatic firearms; high-capacity ammunition magazines; and inexpensive, poor-quality firearms (e.g., Saturday night specials)
Punishment for firearm offenders	Penalties and sentences for firearm misuse
Voluntary rendition of firearms	Firearm buyback programs

^a Adapted from Cook and Goss (146).

We conducted a systematic literature review of empirical studies directly assessing the association between firearm-related laws at the local, regional, and national levels and the rate of firearm-related homicides, suicides, and unintentional injuries/deaths. We defined firearm-related laws as any law on regulations or restrictions on the use, sale, ownership, storage of firearms, those banning specific types of firearms or ammunition, those modifying the penalties and sentences for firearm misuse, and those promoting voluntary rendition of firearms through buyback programs.

METHODS

We reviewed peer-reviewed and non-peer-reviewed published studies between 1950 and 2014. Given the fact that laws are enacted and implemented in social contexts and are not controlled by researchers as in an experimental study, evidence of the consequences of these laws is likely to be generated from observational ecological cross-sectional or longitudinal studies. Although these studies have limitations related to confounding, the uncertainty of a temporal sequence, and

variation in the laws and enforcement across units of observation, they provide an alternative when it is not feasible to conduct randomized controlled trials for policy interventions. Therefore, our inclusion criteria included observational ecological studies examining the association between firearm-related laws and firearm-related suicides, homicides, and unintentional injuries/deaths at the national or local level. No randomized trials were available on this topic.

We searched the PubMed, Scopus, and Web of Knowledge databases to capture evidence from cross-sectional and longitudinal studies in diverse fields including the social, medical, political, and criminology sciences. We also searched for studies cited in previous literature reviews and books on this topic, as well as studies cited in the reference lists of the original articles identified through our search.

The search was conducted in the English language but covered studies in other languages (e.g., French, Spanish, or Portuguese) if abstracts were available in English so they could be detected in our search or if studies were cited in reviewed studies. We used keywords/Medical Subject Headings terms for the searches that included a combination of the following: 1) firearm terms (firearms, weapons, gun, handgun); 2) gun-control law terms (law enforcement, storage, trafficking, safety, carry, permit, ban, legislation, regulation, control, formal, background check, child safety locks, childproof handguns); and 3) health outcome terms (impact, assessment, trends, mortality, wounds, injuries, suicide, homicide). We also searched citations in primary studies and literature reviews on the topic.

We excluded studies that did not assess the association between firearm-related laws and homicides, suicides, or unintentional injuries/deaths; studies in which firearm deaths were reported as part of a combined outcome but specific results for firearm death rates were not reported; longitudinal studies reporting only average rate comparisons in pre/post law periods; or those reporting descriptive changes in rates but not using any statistical method to compare rates.

A total of 5,039 studies were retrieved by using the Medical Subject Headings/keywords terms in selected search engines: PubMed ($n = 1,120$), Scopus ($n = 2,197$), and Web of Science ($n = 1,722$). After exclusion of duplicates and those not meeting the inclusion or exclusion criteria after title screening ($n = 2,861$) and after reading the abstract or text ($n = 852$), a total of 90 primary studies were identified. In addition, we identified 40 articles cited in selected studies or in reviews that met our inclusion or exclusion criteria for a total of 130 primary studies. A description of the number of studies that were included or excluded in our study is presented in Figure 1.

Design suitability and quality of execution of studies were assessed following criteria from the *Guide to Community Preventive Services* (12, 13). Although there are other instruments, such as the environmental health perspectives tool or the Cochrane risk of bias assessment tool, we used the criteria from this *Guide* given its applicability to the evaluation of ecological studies and because it has been used to examine studies on the effectiveness of firearm laws (9). In this review, assessments of studies were conducted by one of the coauthors. Longitudinal prospective or retrospective cohort studies with a concurrent comparison group and multiple pre/post intervention measurements were classified as having “greatest” design

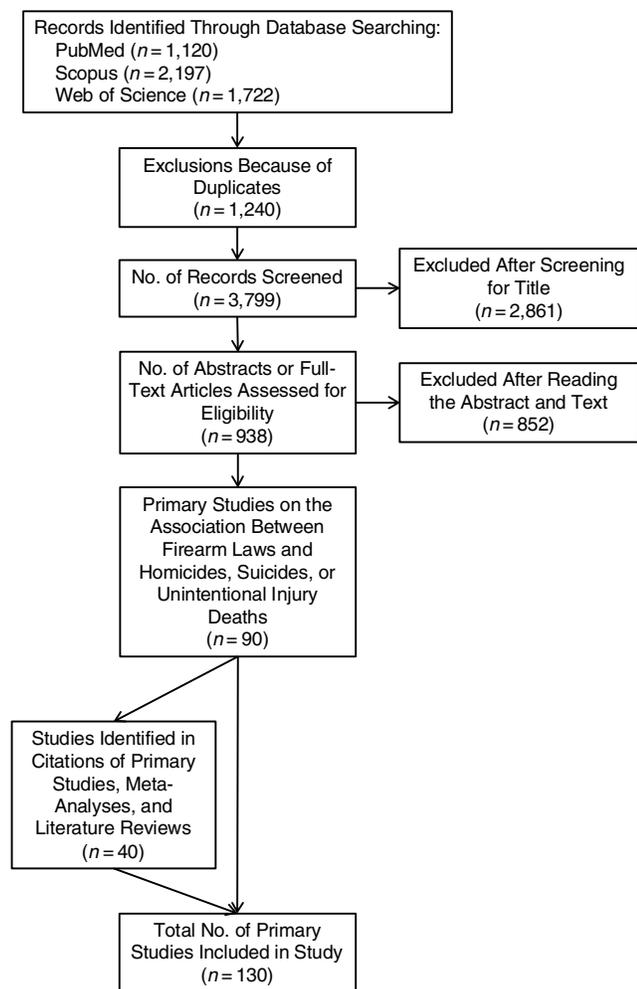


Figure 1. Process of selecting studies examining the effects of firearm-related laws with firearm homicides, suicides, and unintentional deaths.

suitability; longitudinal studies without a concurrent comparison group but with multiple pre/post intervention measurements were classified as “moderate”; and cross-sectional studies or longitudinal studies without a concurrent comparison group and with only single pre/post intervention measurements or with only postintervention measurements were classified as “least” design suitability (Web Table 1 available at <http://aje.oxfordjournals.org/>). Potential limitations that could threaten the internal validity of studies are also presented in Web Table 1 (a description of limitations is provided in Table 2).

The reporting and description of findings from included studies adhere to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines (14).

FINDINGS

Results are presented and described according to categories of firearm laws (Table 1) and then according to specific

types of laws within these categories. A summary of different laws evaluated by studies in this review is provided in Table 3. A description of studies reviewed here, including data, study design ratings, results, and potential limitations, is summarized in the Web Table 1. Most studies used a cross-sectional time-series design to compare rates and rate trends between pre/post-law periods. The majority of studies conducted in the United States compared states with and without laws over time while controlling for potential confounders. In addition, US cross-sectional studies frequently used an index of strictness of firearm laws to examine the association between laws and firearm deaths (Web Table 1). Most international studies assessed the association between combinations of laws being simultaneously implemented and different outcomes using pre/post-law period comparisons at the national level without a control group. Of all studies, 47.69% fit the “greatest,” 20% fit the “moderate,” and 32.31% fit the “least” design criteria.

We also provide a summary of results from some studies in Figures 2–4. Results are grouped according to the laws being examined across studies and the different outcomes. A summary of results for the association between laws restricting firearm use and homicides is shown in Figure 2. The results for the association between all other laws and homicides and suicides/unintentional deaths are shown in Figures 3 and 4, respectively.

Laws targeting firearms use

Licenses to carry concealed firearms or “shall issue” laws. These laws allow qualified individuals to carry concealed firearms (Table 3). In the United States, Lott and Mustard (15) using a times-series design approach and data from the Federal Bureau of Investigation’s Uniform Crime Reports (UCR) (1977–1992) identified that shall issue laws were associated with lower rates of homicides at the county and state levels. Bronars and Lott (16) also noted evidence that shall issue laws were associated with an apparent increase in the rate of homicides in adjacent counties without shall issue laws (16). Seven other studies (17–23) supported Lott and Mustard’s findings. However, others found inconsistent results when using different modeling strategies (24–31) and suggested the presence of errors in the data used in this study (32). Ayres and Donohue (33–35) used Lott and Mustard’s data and found, after recoding the data and varying model specifications, that shall issue laws were not associated with reductions in homicide rates. Particularly, they demonstrated that using county data introduced severe bias and that results were not robust to model specifications (such as including more year data or weighting strategies). Wellford et al. (36) from the National Research Council reached similar conclusions. In addition, Grambsch (37) found that controlling for regression to the mean diluted the association between shall issue laws and homicides. Using additional data from the National Center for Health Statistics (NCHS), Rosengart et al. (38) and Hepburn et al. (39) showed no association between these laws and overall and firearm homicides. Studies comparing cities with a population of 100,000 or more (40) and others using samples of large cities in the United States (41, 42) found similar findings. Another study (43) looking at injury data from southern Arizona found higher

Table 2. Potential Limitations in the Execution of Studies That Could Threaten Their Internal Validity

Category	Specific Items
Descriptions	The study population not well described
Sampling	Limited year data (period studied) to identify the effects of the intervention County level covariates with missing data excluding counties from analysis No clear description of the units (e.g., states) included in analyses Convenience sample No clear description of the criteria used for inclusion of units (e.g., states) in the study
Exposure measurement	No clear details on source of the exposure variable No validated scale for exposure classification Exposure variable with some percentage of missing data Coding errors in exposure variable No clear description of the laws that were being examined
Outcome measurement	No clear details on source of the outcome variable Outcome variable with some percentage of missing data No reliable county data Other relevant outcomes not examined
Data analysis	No use of alternative analytical strategies to account for dynamic trends of time-series data ^a Inappropriate or unclear operationalization of variables No information on statistical strategies used in analyses Statistical testing model not appropriate to answer question No alternative strategies to test for robustness of findings given other model specifications ^b Covariates with large percentage of missing data
Confounders ^c	No adjustment for other potential confounders No information on covariates used in analyses Risk of collinearity because of adjustment for a vast number of confounders No clear details on source of the covariates
Follow-up period	Not applicable for studies included in this review
Other	Results from statistical tests not presented Disaggregated results for single units not provided Results of some analyses described in methods not provided in the text Subpopulation being studied not a target of the laws

^a Alternative analytical strategies to account for dynamic trends of time-series data: strategies to examine whether trends are abrupt, delayed, gradual, or constant, with comparison of slopes in pre- and postlaw periods, as well as hybrid models (both dummy and spline/trends specifications).

^b Alternative strategies to test for robustness of findings given other model specifications: inclusion/exclusion of years of data, different sets of covariates, fixed year effects, fixed state effects, state-specific trend effects, lag of intervention or covariates, years of available pre- and postlaw data across states or cities, exclusion of states/cities with unusually high rates of the outcome, weights for population size, clustering of errors at the state level, and log transformations of covariates.

^c Potential confounders of the laws-homicides association: baseline state-level firearm prevalence; percent of population that is white, black, or Hispanic; percent of males aged 10–24 or 15–24 years; state average median family income; percentage of the population residing in a metropolitan area; unemployment rate; alcohol consumption rates; percentage living under poverty threshold; incarceration rates; law enforcement officers per capita; and other laws and concurrent events influencing the use and availability of firearms during the period of observation. Potential confounders of the laws-suicides association: baseline state-level firearm prevalence, marriage rates and divorce rates, unemployment rates, state average median family income, and the percentage of males aged 15–24 years, and other laws and concurrent events influencing the use and availability of firearms during the period of observation.

proportions of firearm injuries/deaths associated with shall issue laws.

In recent years, studies by Strnad (44) using a Bayesian approach and by Moody and Marvell (45, 46), Lott (47), and

Gius (48) showed that shall issue laws were associated with reductions in homicide rates (extending data to 2000). Ayres and Donohue (49, 50) responded to the studies by Moody and Marvell (45, 46) showing the inconsistency of results when

Table 3. Laws Examined in Primary Studies

Firearm Law	Date of Enactment	Description
"Shall issue" or "right to carry" laws (United States)	Different enactment dates for each state	These laws allow qualified individuals to carry concealed firearms. Qualified individual criteria require that eligible individuals have no felony convictions, no pending domestic violence orders, no drug or alcohol disorders or charges, and no hospitalizations in a mental institution. Individuals usually must also have American citizenship, state citizenship, and county residency; have met the minimum age requirement; and have a certificate of completion of a firearm safety course. In addition, some states have may-issue laws, which are laws containing language suggesting that a qualified individual could be denied the permit to carry concealed firearms (36).
Gun Control Act of 1968 (United States)	October 22, 1968	This law banned the sale of Saturday night specials (handguns), blocked the importation of firearms that did not meet criteria for being classified for sporting or scientific purposes, prohibited dealers from shipping firearms to other states and prohibited the sale of firearms to buyers without state identification, implemented license requirements for firearm sellers and owners, and banned possession and purchasing of firearms by minors (under 18 years for rifles and 21 years for handguns) and high-risk-group individuals (persons convicted of a felony, mental health problems, or illegal drug users) (147).
Florida felony firearm law (United States)	October 1, 1975	This law mandated a 3-year sentence for possessing a firearm or destructive device while committing or attempting to commit any of the specified felonies in the law (including murder, sexual battery, robbery, burglary, and aggravated assault). Sentences could not be suspended, deferred, or withheld, and the defendant could not be eligible for parole until the minimum 3 years had been served (85).
Massachusetts gun control law (United States)	April 1, 1975	This law mandated a 1-year minimum prison term for the unlicensed carrying of firearms. In addition, the law required a Firearms Owner Identification card to own or possess either firearms or ammunition. Sentences could not be suspended, and the defendant could not be eligible for parole until at least 1 year had been served (79).
District of Columbia 1976 law (United States)	July 23, 1976	This law required that every person who owned and had firearms should register them under the provision of the 1968 law and should reregister them with the Metropolitan Police Department 60 days after the effective date of the Act. New rifles and shotguns could be registered if purchased from a licensed dealer and after passing a background check for criminal records and history of substance use or mental health problems. The law also strengthened safe storage requirements, including keeping firearms unloaded or bound by a trigger-locking device (97, 148).
Michigan Felony Firearm Law (United States)	February 11, 1976 (effective date: January 1, 1977)	This law mandated a 2-year sentence for possessing a firearm for felonies committed with or in possession of firearms. Sentences could not be suspended, deferred, or withheld, and the defendant could not be eligible for parole until the minimum 2 years had been served (84).
New Jersey "Graves Amendment" (United States)	February 12, 1981	This law mandated a minimum sentence of imprisonment for any person involved in a crime who was in possession of a firearm. The minimum sentence also applied to those convicted of possession of a firearm with intention to use against another person. Sentences could not be suspended, and the defendant could not be eligible for parole until the mandatory sentence had been served. The minimum sentence was one third to one half of the total sentence imposed or 3 years, whichever was greater, for first, second, and third degree crimes and 18 months for fourth degree crimes (87).
1986 Detroit law (United States)	November 26, 1986	This law imposed mandatory jail sentences of 30–90 days and a fine of \$100–\$500, depending on whether or not it was a first conviction under the ordinance, on anyone convicted of unlawfully concealing a pistol or carrying a firearm (88).
1994 Brady Handgun Violence Prevention Act (United States)	November 30, 1993	The Brady Act instituted federal background checks on firearm purchasers from a federally licensed dealer, manufacturer, or importer. Prohibitions applied to an individual convicted in any court of a crime punishable by imprisonment for a term exceeding 1 year, fugitives from justice, unlawful user of or addicted to any controlled substance, persons with mental conditions or committed to a mental institution, a person being unlawfully in the United States, a person with a court restraining order for domestic violence, or convicted in any court of a misdemeanor crime of domestic violence (149).
1994 Federal assault weapons ban (The Public Safety and Recreational Firearms Use Protection Act) (United States)	September 13, 1994	This law banned the manufacture, transfer, sale, and possession of certain semiautomatic weapons and large-capacity ammunition magazines. Semiautomatic weapons fire a bullet each time the trigger is squeezed, loading the next bullet after each shot. Weapons already in possession at the time of the law's enactment were grandfathered. The law was enacted in 1994 and expired in 2004. None of the attempts to renew it has prospered (76).
Maryland Gun Violence Act (United States)	Effective date: October 1, 1996	This law set stronger restrictions to prevent firearm purchases including background checks and registration of handguns sold by private gun owners, 1 handgun purchase per month, and greater authority given to police and judges to confiscate firearms from domestic violence offenders (77).

Table continues

Table 3. Continued

Firearm Law	Date of Enactment	Description
Castle doctrine laws and stand your ground laws (United States)	Different enactment dates for each state	These laws include those eliminating the duty to retreat before using lethal force against an assailant in one's own home and a list of other places and those removing any civil liability for those acting under that law and under the principle of self-defense (53, 54).
Bill C-51 (Canada)	August 5, 1977	This law increased sentences (1–14 year consecutive sentence for the actual use of a firearm to commit an indictable offense; stricter penalties for firearm homicides) and required permits for firearm sellers and certificates for buyers; the law also included provisions dealing with new offenses, search and seizure powers, and prohibitions to sell fully automatic weapons unless registered as restricted weapons before January 1, 1978. In addition, the law included specific procedures to store firearms and the elimination of permits to carry guns to defend property (150).
Bill C-17 (Canada)	December 5, 1991	This law implemented stricter storage requirements and stricter restrictions to purchase firearms including photographs and personal references. A 28-day waiting period and mandatory courses for safe handling and storage for new gun owners were also required. The law also included new restrictions for prohibited weapons, including automatic, semiautomatic, and military firearms and those with large-capacity cartridge magazines. In addition, the law also increased penalties for crimes committed with firearms (150).
Bill C-68 (Canada)	December 5, 1995	This law included minimum sentences for individuals committing crimes while carrying firearms, a more organized regulatory process for licensing and registration of firearms, a license to purchase firearms and ammunition, a requirement for spousal notification, and registration of all firearms including rifles and shotguns (150).
The 1996 National Firearms Agreement (Australia)	Government's agreement date: May 10, 1996	The National Firearms Agreement included banning the importation, ownership, sale, transfer, possession, manufacture, or use of all self-loading center rifles, all self-loading and pump action shotguns, and all self-loading rim fire rifles. The law included the following: implementation of a buyback program for prohibited firearms; mandatory registration of all firearms; licensing requirements proving genuine reason for owning a firearm; being at least 18 years of age to buy guns; a 28-day waiting period to purchase a firearm; requirement of a separate permit for each firearm purchased; certification of being mentally and physically fit to own, possess, and use a firearm; required background checks for gun sales; for recreational and hunting purposes, required membership of an authorized shooting club or permission from a hunting land owner; strict firearm storage requirements; licenses for firearm dealers and all records of sales to be provided to the police; restrictions to purchase ammunition (quantities within a time period) and only for the licensed firearms owned by the buyer; and an accredited training course certificate in firearm safety for new applicants (151, 152).
National "Army XXI" reform (Switzerland)	January 1, 2004	The national reform that reduced by half the number of active soldiers, increased the fee to purchase a military gun, and implemented license requirements for gun owners (68).
1977 South Australia Firearms Act (Australia)	May 12, 1977	This regulation required a license for firearm purchases; new owners were required to pass an examination on the handling and safety of weapons. The law also included increments in the severity of penalties for firearm offenders and registration of all firearms (153).
Estatuto do Desarmamento (Brazil)	December 22, 2003	This law tightened restrictions on the possession and commercialization of firearms and ammunition, banned the carrying of firearms, implemented requirements for the registration of firearms, increased firearm costs, and established stronger penalties for illegal trafficking of firearms. In addition, background checks were implemented for firearm sales that included checking for criminal and mental health records. The minimum age to purchase was increased to 25 years (154).
The 1997 firearm law (Austria)	July 1997	This law included background checks for category B weapons (handguns, semiautomatic firearms, repeating firearms, or single shot firearms with center fire percussion) in addition to psychological testing; also, the law required a 3-day "cooling-off" waiting period for category C and D weapons including long firearms with a smooth bore and rifled barrels and other semiautomatic long firearms. The law increased the minimum age to purchase to 21 years and also included safer firearm storage regulations (123).
Amendment to the Arms Act (New Zealand)	October 27, 1992	The law required licensing for dealers and licensing for firearm owners that included the following: passing a test on knowledge of the Firearms Code and rules of firearm safety; police assessments of the applicant and the applicant's home that include checks for firearm storage, security, and social arrangements; and interviews with 2 referees of whom one was a partner or parent in a process that could take 8–12 weeks. The law also included stricter safe storage requirements with ammunition being kept separately from firearms (125).
Firearms Control Act (South Africa)	October 2000	This law required firearm licenses for firearm purchases; the licensing process required background checks (criminal and mental health records) of applicants to be submitted to the registrar, completion of training, and passing a test on the efficient and safe handling of firearms. The law also required an additional license per each gun owned. Fully automatic guns were banned, and the minimum age to purchase and carry firearms was increased to 21 years (155, 156).

Downloaded from https://academic.oup.com/epirev/article-abstract/38/1/140/2754868 by White & Case LLP user on 30 December 2019

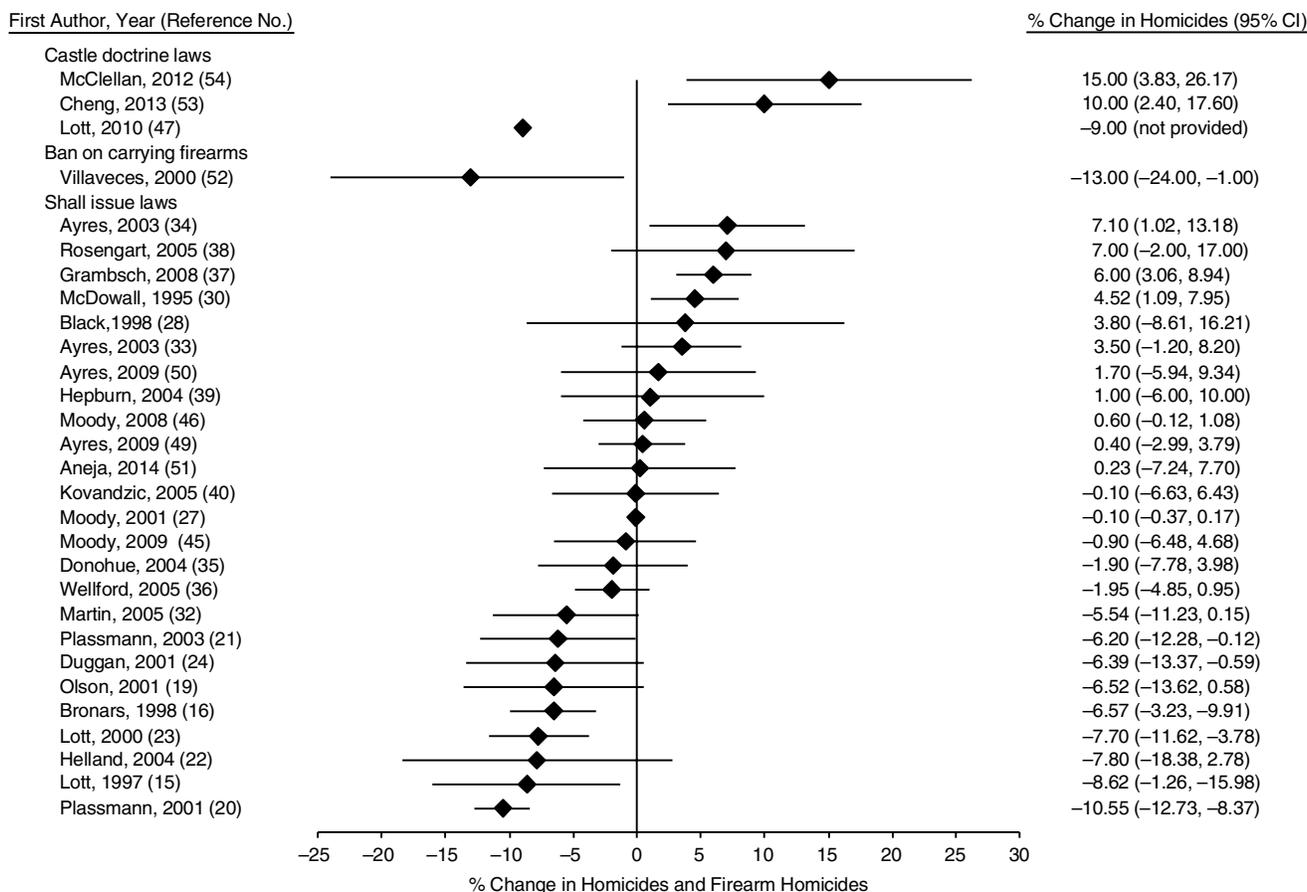


Figure 2. Summary of results from studies examining the effects of laws targeting firearms use (shall issue or right to carry laws, bans on carrying laws, and castle doctrine and stand your ground laws) on homicides and firearm homicides. We present only a single estimate from each study because of space limitations. We selected the estimates from models that, to our consideration, included the most important model specifications. We present the results from studies with comparable results in terms of percent change in firearm deaths (when not provided, we calculated the percent change if there was available information for calculations). Stand your ground laws are presented with castle doctrine laws. The estimate in Grambsch (37) represents the percent annual change in the rate of homicides in the postlaw period compared with the prelaw period. CI, confidence interval.

using alternative model specifications and suggesting that county data should not be used. The study by Aneja et al. (51) that included different model specifications also suggested that shall issue laws were not associated with reduction of homicides. A summary of study results for the association between shall issue laws and homicides is shown in Figure 2.

In Colombia, Villaveces et al. (52) examined the association between laws banning the carrying of firearms during weekends after paydays, holidays, and election days in Cali and Bogota and the rate of homicides. In an interrupted time series with multiple replications comparing the rates of homicides on days with and without the restriction, these authors identified a 14% reduction in all homicide rates in Cali during intervention days compared with days without it. The intervention was associated with a 13% reduction in firearm homicides in Bogota.

“Castle doctrine” laws and “stand your ground” laws. These laws eliminate the duty to retreat before using lethal force against an assailant in one’s own home and remove

civil liability for those acting under the principle of self-defense (Table 3). Lott (47), using time-series models and data over the 1977–2005 period, observed that castle doctrine laws were associated with a 9% reduction in homicide rates. In contrast, Cheng and Hoekstra (53) compared states during the 2000–2010 period using a differences-in-difference approach (UCR data) and found that these laws were associated with a 6%–11% increase in homicide rates. With a similar approach to that of Cheng and Hoekstra (53) but using NCHS monthly data (2000–2010), McClellan and Tekin (54) found that stand your ground laws were associated with a 6.8% increase in homicide rates, mainly driven by increments (14.7%) in homicide rates among white males; other self-defense provisions were not consistently associated with homicides.

Laws targeting firearms sales

Cross-sectional studies assessing the association between background checks/waiting periods and firearm deaths provide

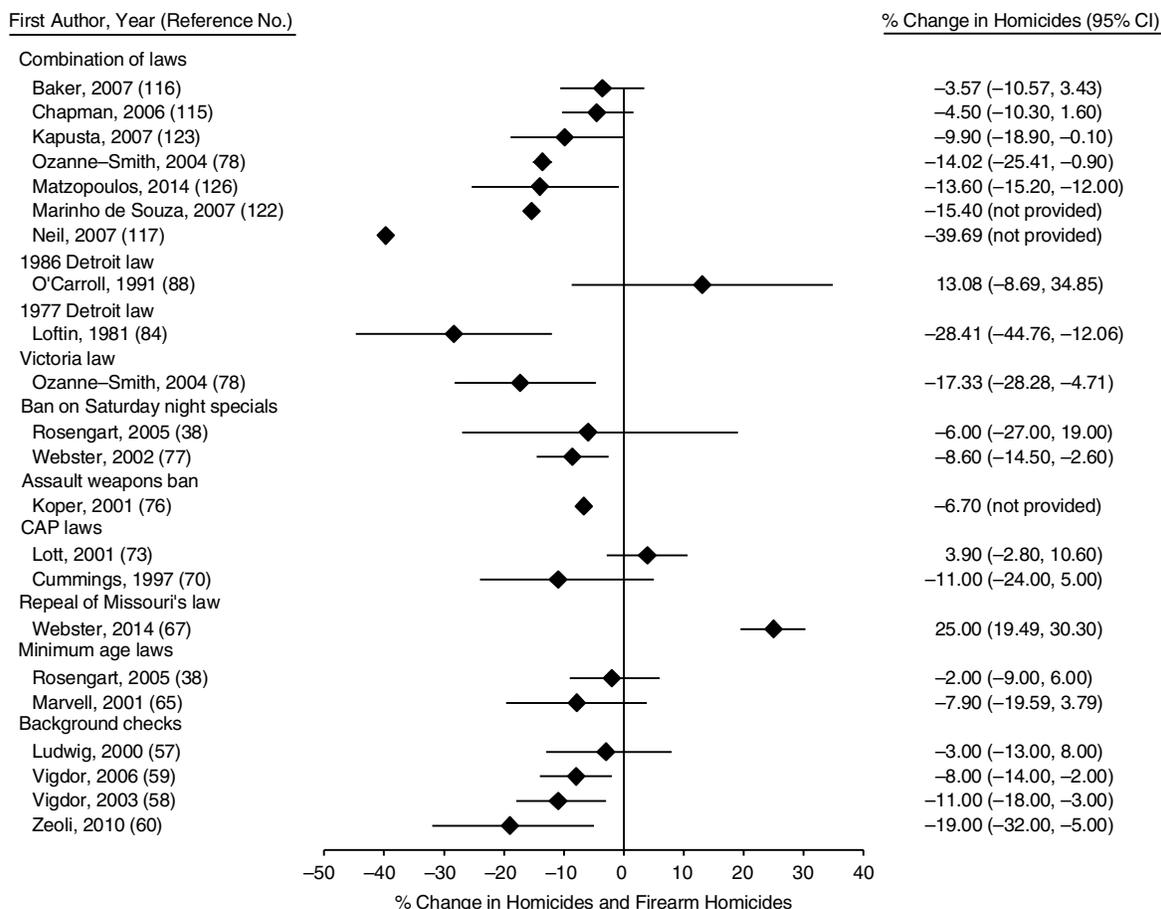


Figure 3. Summary of results from studies examining the effects of firearm laws (firearms sales, firearms ownership, firearms storage regulations, laws targeting specific firearms and ammunition, sentences and punishment for gun offenders, and combinations of laws being simultaneously implemented) on homicides and firearm homicides. We present only a single estimate from each study because of space limitations. We selected the estimates from models that, to our consideration, included the most important model specifications. We present the results from studies with comparable results in terms of percent change in firearm deaths (when not provided, we calculated the percent change if there was available information for calculations). The estimate in Chapman (115) represents the ratio between pre- and postlaw trends; the estimate in Kapusta (123) represents the difference between pre- and postlaw trends; the estimate in Ozanne-Smith (78) represents the percent change in the rate of firearm deaths; and the estimate in Matzopoulos (126) represents the percent annual change in the rate of firearm homicides in the postlaw period. CAP, child access prevention; CI, confidence interval.

mixed results. Kleck and Patterson (7) used data from 170 US cities (1979–1981) and found no association between waiting periods and homicides or suicides; however, firearm purchase bans for those with mental health conditions were associated with fewer homicides. Ruddell and Mays (55) using a scale to rate the state’s ability to screen individuals found that more stringent background checks were associated with reductions in firearm homicides. Sumner et al. (56) wrote that local checks (as opposed to federal) for local mental health and court restraining records were associated with lower suicide rates, but not with homicide rates, among adults aged 21 years or older.

Longitudinal studies have also examined these laws. Lott and Mustard (15) using time-series analyses and UCR data from counties and states in the United States found no associations between waiting periods and homicide rates at the state level (inconsistent results at the county level). Similar

findings were previously reported by McDowall et al. (30) using data from 5 cities. Ludwig and Cook (57) compared 32 “treatment” states directly affected by the Brady Act against 18 “control” states that already had similar restrictions (NCHS data, 1985–1997). No associations between the Brady Act and firearm homicides among adults (aged 21 years or older and 55 years or older) were observed. However, in states that included changes in waiting periods, the law was associated with fewer firearm suicides only among those aged 55 years or older. More recently, Lott (47) using state-level data found no significant associations between the Brady Act and homicide rates. In contrast, La Valle (41), comparing 20 large cities in the United States by using UCR data (1990–2000), found that the Brady Act was associated with reductions in all and firearm homicide rates.

Other studies examined specific aspects of these laws. Vigdor and Mercy (58, 59), using UCR data (1982–1998),

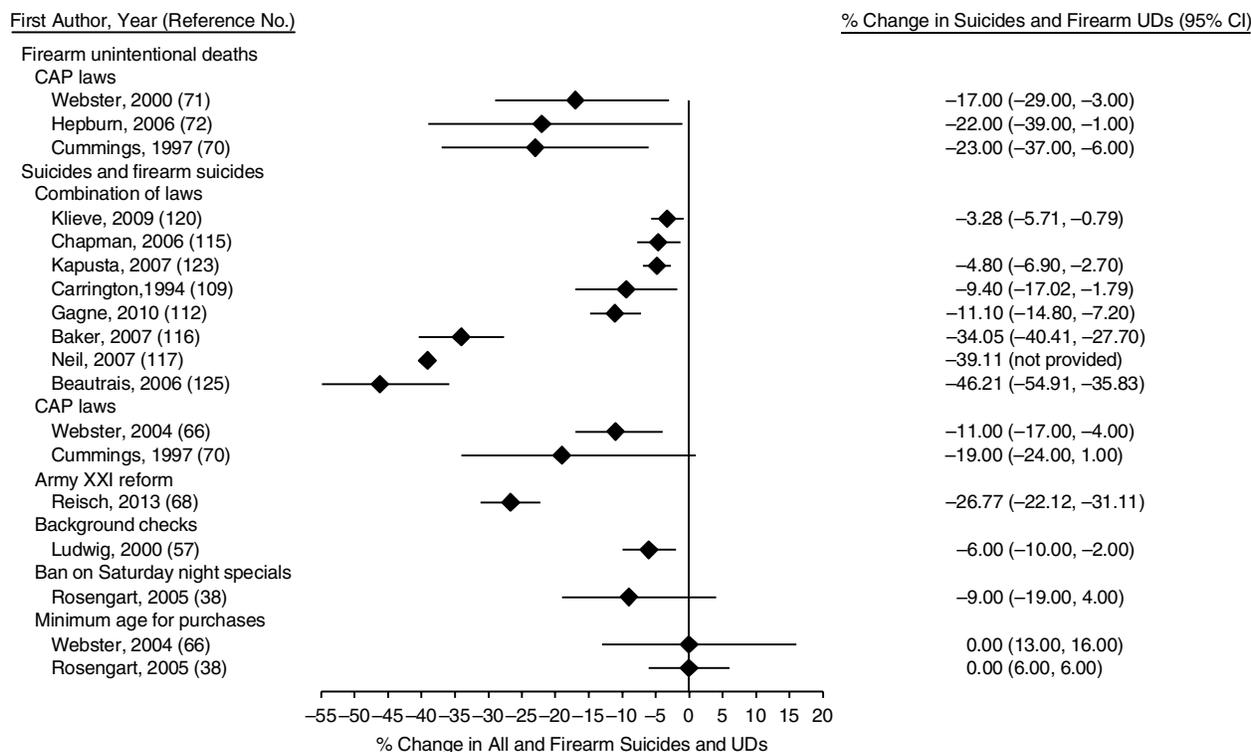


Figure 4. Summary of results from studies examining the effects of firearm laws (firearms sales, firearms ownership, firearms storage regulations, laws targeting specific firearms and ammunition, and combinations of laws being simultaneously implemented) on suicides and firearm suicides and unintentional deaths. We present only a single estimate from each study because of space limitations. We selected the estimates from models that, to our consideration, included the most important model specifications. We present the results from studies with comparable results in terms of percent change in firearm deaths (when not provided, we calculated the percent change if there was available information for calculations). The estimates from Klieve (120) and Chapman (115) represent the ratio between pre- and postlaw trends; the estimate from Kapusta (127) represents the difference between pre- and postlaw trends; and the estimate from Gagne (112) represents the percent annual change in the rate of firearms in the postlaw period. CAP, child access prevention; CI, confidence interval; UD, unintentional death.

found that states with laws preventing subjects with domestic violence restraining orders from owning/purchasing firearms had a 9% reduction in the rates of intimate partner, female intimate partner, and female intimate partner firearm homicides; however, there was no association between these outcomes and restrictions for those convicted of domestic violence misdemeanors. Zeoli and Webster (60) also described similar findings using data from 46 of the largest cities in the United States (1979–2003). In addition, Rodríguez Andrés and Hempstead (61), using NCHS data from 1995 to 2004, found that purchasing restrictions for mental health issues and domestic violence convictions were associated with lower rates of male suicides in some age groups. Sen and Panjamapirom (62), using NCHS data from 1996 to 2005, found that, compared with states checking for criminal backgrounds only, there were lower homicide rates in states additionally checking for restraining orders and lower suicide rates in states also checking for mental conditions, fugitive status, and misdemeanors.

Particularly on laws regarding licensing of dealers, Kleck and Patterson (7) in a cross-sectional study found an association between these laws and reductions in homicide rates but not in suicide rates. Moreover, Irvin et al. (63), using NCHS data

(1995–2010) in adjusted models, found that licensing requirements for dealers were associated with firearm homicide reductions.

Laws targeting firearms ownership

Two cross-sectional studies (7, 64) found that permits and licenses to purchase firearms were associated with lower rates of firearm suicides. In a longitudinal study using NCHS data (1970–1998), Marvell (65) found that laws restricting juvenile access to firearms were not associated with all or firearm homicide or suicide rates among youth. Studies using times-series analyses from Webster et al. (66) and Rosengart et al. (38) did not find evidence of reductions in firearm deaths associated with state and federal laws raising the legal age to 18 or 21 years for handgun purchases/possession. Rodríguez Andrés and Hempstead (61) in unadjusted models found that minimum age requirements were associated with fewer suicides among males.

Interestingly, Webster et al. (67) examined the association between Missouri’s 2007 repeal of the permit-to-purchase handgun law, which required all handgun purchasers to have a valid license to purchase handguns, and homicide rates.

Using NCHS (1999–2010) and UCR (1999–2012) data, these authors found that repeal of the law was associated with a 25% increase in firearm homicide rates in Missouri.

In Switzerland, Reisch et al. (68) examined the association between the national army XXI reform and suicide rates; this reform reduced by half the number of active soldiers, increased the fee to purchase a military gun, and implemented license requirements for gun owners (Table 3). The overall suicide and firearm suicide rates were lower than predicted among males aged 18–43 years (targeted population), without changes among control groups (women aged 18–44 years and males aged 44–53 years). In Norway, Gjertsen et al. (69) examined different firearm laws using piecewise regression models (1969–2009 data). Their findings suggested that the 1990 restrictions requiring permits for firearm purchases were the only firearm ownership laws likely contributing to reductions in suicides rates.

Laws targeting firearms storage regulations

Cummings et al. (70) examined the association between child access prevention laws and firearm deaths using an ecological time-series design and NCHS data (1979–1994). These authors found that child access prevention laws were associated with fewer unintentional firearm deaths among children under the age of 15 years, but not among older ones. Results were pronounced in 3 states that allowed felony prosecution of law offenders, especially Florida and California. Similar results were found by Webster and Starnes (71) using NCHS data (1979–1997) and Hepburn et al. (72) using NCHS data (1979–2000) in more complex models, with Florida driving most of the association (the authors suggest that the low number of unintentional deaths in some states may have resulted in limited power to identify significant associations (72)). Only Lott and Whitley's (73) study using UCR data (1977–1996) in time-series weighted tobits analyses found that child access prevention laws were not associated with unintentional firearm deaths.

Regarding suicides and homicides, no clear association between child access prevention laws on these outcomes was observed by Lott and Whitley (73), who indicated that Poisson models suggested a decline in firearm suicides and an increment in homicides, or by Lott (47) (with homicides). In contrast, Webster et al. (66) found that child access prevention laws were associated with a reduction in all suicide and firearm suicide rates among individuals aged 14–17 years (8.3% and 10.8% reduction, respectively) and those aged 18–20 years (11% and 13%, respectively). Cummings et al. (70) observed a reduction of 19% in firearm suicides and 11% in firearm homicides among children aged 15 years or younger, almost reaching significance (95% confidence intervals: 0.66, 1.01 and 0.76, 1.05, respectively).

Other studies focused on hospital discharge data. A cross-sectional study by Lee et al. (74) found that child access prevention laws were associated with increments in firearm injuries. A longitudinal study by DeSimone et al. (75) using information from 11 states, of which 7 passed child access prevention laws between 1988 and 2003, found that child access prevention laws were associated with lower nonfatal firearm injuries among individuals under the age of 18 years.

In Norway, Gjertsen et al. (69) found that the 2003 home guard firearm law implementing safer storage requirements was likely contributing to reductions in homicide rates among males.

Laws targeting specific firearms and ammunition

1994 Federal assault weapons ban, United States. This law banned the sales and ownership of semiautomatic firearms and large-capacity ammunition magazines. Koper and Roth (76) using UCR data (1980–1995) found no association between the law and homicide rates in 15 states after adjusting for the presence of other firearm laws and crime laws in New York and California. A recent study by Gius (48) showed that the federal assault weapons ban was associated with higher rates of firearm homicides.

Saturday night specials, United States. Saturday night specials are inexpensive poor-quality guns commonly used in crime activity. In a cross-sectional study, Kleck and Patterson (7) found no associations between these laws and homicide rates. Webster et al. (77) studied the 1988 Maryland law banning these firearms in time-series analyses using 2 neighboring states as controls and NCHS data (1975–1998). These authors found the law was associated with a 6.8%–11.5% reduction in homicide rates when assuming a delayed effect model but not an immediate and constant model. Rosengart et al. (38) found no association of the law with reductions in firearm or all homicides rates when assuming an immediate and constant model. A reduction in suicide rates, but not in firearm suicide rates, was associated with the law.

The 1988 Victoria state law, Australia. Ozanne-Smith et al. (78) examined the Victoria law that tightened restrictions on semiautomatic long-arms and pump action guns, by comparing pre- versus posttrends of annual death rates in Victoria compared with other states in Australia. The law was associated with a 17.3% decrease in the rate of firearm deaths and lower rates of firearm suicides, but not with firearm homicides (78).

Laws targeting sentences and punishment for gun offenders

Deutsch and Alt (79) examined the 1975 Bartley-Fox amendment to Massachusetts' gun control law that mandated a 1-year minimum prison term for carrying firearms without a license and a 2-year sentence for crimes committed while in possession of a firearm. Examining the following 6 months postimplementation, these authors found no association between the law and homicide rates. Similar results were observed by Berk et al. (80) and by Hay and McCleary (81) using UCR data up to 1976. Pierce and Bowers (82) using other cities as controls and data up to 1976 found a reduction of 55.7% in the rate of homicides, a reduction not observed in other control cities. In a posterior study, Deutsch (83) found the law to be associated with fewer homicides after adding more years of data.

Loftin and McDowall (84) examined the 1977 Michigan Felony Firearm Law, with 2-year mandatory sentences for felonies committed with or in possession of firearms. They found, in unadjusted autoregressive integrated moving average

models, that the law was associated with a 10.86% reduction in the number of firearm homicides in Detroit. These authors also observed similar results in 1 of 3 cities in Florida in regard to the state felony firearm law (3-year sentence for possessing a firearm while committing or attempting to commit a felony) (85) and also reductions in Pittsburgh and Philadelphia associated with legislation in Pennsylvania (5-year minimum sentence for violent crimes committed with firearms) (86). Fife and Abrams (87) also found similar results while examining the 1981 New Jersey “Graves Amendment” requiring minimum sentences of imprisonment without parole for possessing a firearm while committing a crime. O’Carroll et al. (88) found that the 1986 Detroit law (mandatory jail sentence for unlawfully carrying a firearm in public) was associated with higher rates of firearm indoor and nonfirearm homicides but not with firearm homicides or those committed outside.

Marvell and Moody (89) criticized previous studies for not adjusting models for confounders; in time-series analyses adjusting for state and year effects and state-level covariates, they found that laws requiring minimum sentences or additions to sentences for crimes committed with guns (1970–1993 data) were not associated with state-level homicide or firearm homicide rates; they confirmed only Deutsch’s findings for the Massachusetts law (83). La Valle (90), using data from 20 major cities (1970–2005 data), found that additional jail time was associated with reductions in firearm homicide rates, and minimum sentencing enhancements were associated with higher firearm homicide rates.

With regard to Project Exile from Richmond, Virginia (considered a sentence enhancement program as felons arrested for gun possession were brought to federal courts where sentences were more severe), Raphael and Ludwig (91) using UCR data (1994–1999) did not find strong evidence suggesting that the program was associated with reductions in firearm homicide rates once 1997 (a year with unusual high rates) was excluded. Rosenfeld et al. (92) added more years (1992–2001) and used adjusted multilevel models, and they observed a 22% yearly reduction in firearm homicides; however, this reduction was only marginal ($P < 0.10$) when 1997 was excluded and replaced by the average of 1996 and 1998 values.

Laws promoting voluntary rendition of firearms

Rosenfeld (93) found no association between firearm buyback programs implemented in St. Louis, Missouri (1991 and 1994) and firearm homicides. More recently, Phillips et al. (94) found that yearly firearm buyback programs implemented in Buffalo, New York, from 2007 to 2012 were not associated with reductions in firearm homicides. Leigh and Neill (95) evaluated the 1997 Australian gun buyback program and found no association between the program and firearm homicides but a reduction in suicide rates associated with the number of firearms that were bought back.

Simultaneous implementation of laws targeting multiple elements of regulations

US Gun Control Act of 1968. This law restricted the sale of some handguns, blocked the importation of firearms not

meeting specific criteria, prohibited the sale of firearms to buyers without state identification, implemented licenses for firearm sellers and for owners, and banned the possession/purchasing of firearms by high-risk-group individuals (Table 3). Magaddino and Medoff (96), using data for the period 1947–1977 in structural models adjusted by state characteristics, found that the law was not associated with changes in homicide rates.

District of Columbia 1976 law. This law banned residents from owning automatic and semiautomatic firearms and handguns, placed stronger requirements for home firearm storage, and required registration of all firearms. Loftin et al. (97), using NCHS data (1968–1987) from the District of Columbia and adjacent metropolitan areas of Maryland and Virginia, found an abrupt reduction in homicide and suicide rates with no similar changes in control areas. Similar results for suicides were found by McDowall et al. (98) comparing the District of Columbia with Boston, Massachusetts, Memphis, Tennessee, and Baltimore, Maryland. Britt et al. (99, 100) questioned the selection of controls in the study by Loftin et al. (97), given the differences in homicide rates in the pre-law period; using Baltimore as the control area, Britt et al. found that the law was not associated with abrupt or gradual changes in homicide rates (no estimates for the law-suicide rates association were reported).

1996 Maryland Gun Violence Act. This law set stronger regulations including background checks and registration of handguns sold by private gun owners, 1 handgun purchase per month, and greater authority given to police and judges to confiscate firearms from domestic violence offenders. Webster et al. (77) examined the law in models adjusted for sociodemographics and trends in neighboring states (1975–1998 NCHS data) and found that the law was associated with reductions (from 10.3% to 11.4%) in firearm homicide rates in Maryland, assuming an immediate or delayed start, and constant/gradual effects.

Canadian firearm-related bills. Table 3 contains a summary of the 3 Canadian firearm bills. Regarding the variability in homicides rates, Leenaars and Lester (101) found that the 1977 bill C-51 was no longer associated with reductions in firearm homicide rates, as previously suggested (102, 103), after controlling for other socioeconomic indicators (101); however, reductions in homicide rates remained associated with the bill (101). Mauser and Holmes (104) found no associations between bill C-51 and all homicides in dummy models adjusted for covariates and time trends. Blais et al. (105) in models adjusted for potential confounders (1974–2004 data) found that bill C-51 was associated with reductions in firearm homicide rates. In this study, bill C-17 from 1991 was not associated with all or firearm homicides, but bill C-68 from 1995 was associated with lower firearm homicide rates.

More recently, Langmann (106) analyzed data from 1974 to 2008 using different modeling strategies and found no association of any of the 3 bills with firearm homicide rates and also no association between bills C-17 and C-68 and spousal firearm homicide rates (results for bill C-51 on this outcome were not provided). Using a similar approach, McPhedran and Mauser (107) found no associations between bill C-68 and firearm female homicides, but bill C-51 was associated with reductions in firearm female domestic homicides.

Studies on the association between the Canadian bills and suicide rates are also described. Unadjusted studies comparing pre- versus postlaw trend slopes showed that lower suicide (108) and firearm suicide (103, 109) rates were associated with bill C-51. Although the association with firearm suicides was diluted after adjusting for divorce and unemployment rates (102), additional analyses assessing trends in pre/post intervention periods and models adjusting for additional factors showed that bill C-51 reversed a prior steep increase in firearm suicides; further, although the bill was associated with lower firearm suicide rates in the population and among males and females (110), there was evidence of males switching to other methods.

Caron et al. (111), using Quebec, Canada, data (1987–2001), found that bill C-17 was not associated with changes in firearm suicide rates; an increment in the rates of suicides by hanging was observed among females. Gagné et al. (112) using Quebec data (1981–2006) in Joinpoint regressions found a breakpoint in 1996 indicating reductions in firearm suicides among males and individuals aged 15–34 years. Results from Poisson regressions showed reductions in suicide rates when the anticipated effect of bill C-17 was moved to 1995 (112). Similar results were identified by Cheung and Dewa (113) for firearm suicides after 1994. These 3 studies found that suicides due to hanging increased and that the rate of overall suicides did not change over time, which is suggestive of individuals switching to substitution methods.

Regarding unintentional firearm deaths, Leenaars and Lester (114) using national data (1969–1985) in models adjusted by unemployment and divorce rates, initially found bill C-51 was only marginally associated with lower death rates among males; later the authors found the bill was also associated with lower death rates in the entire population (102).

The 1996 National Firearms Agreement (NFA) and the South Australia Firearms Act. A summary of these laws is provided in Table 3. In regards to homicide rates, Ozanne-Smith et al. (78) examined the NFA using Victoria as a control group, given that this state had previously enacted firearm restrictions in 1988. The authors found a reduction (14%) in overall firearm death rates in states implementing NFA restrictions relative to Victoria (78). Another study by Chapman et al. (115), analyzed data from 1979 to 2003 and found evidence of an acceleration in the reduction in firearm deaths and all homicides after the passing of the law; although there was also a steeper reduction in firearm homicides, the trend ratio was not significant. In addition, no firearm mass shootings occurred in Australia after the NFA compared with 13 in the prelaw period (115). In contrast, Baker and McPhedran (116) compared observed versus predicted homicide rates after the NFA (1979–2004 data) in autoregressive integrated moving average models and found no association between the law and homicide rates, although the downward trend was observed to continue in the years after the law. Neill and Leigh (117) criticized Baker and McPhedran (116) for not using the log of death rates (which made expected rates become negative). Adjusting for new model specifications, they found a reduction in the firearm homicide rates associated with the NFA (117).

Lee and Suardi (118), using data from 1915 to 2004 and tests of unknown structural breaks, found no evidence suggesting

that the NFA was associated with reduction in homicides or suicide rates. In contrast, Chapman et al. (115) showed reductions in the rate of firearm and total suicide rates after the implementation of the NFA. Similar results were observed by Neill and Leigh (117) and by Baker and McPhedran (116) for firearm suicides. McPhedran and Baker (119), using an approach similar to that of Lee and Suardi (118), also identified a breakpoint in 1997 for firearm suicide rates but only for individuals aged 35–44 years (although no association was found in other models). Klieve et al. (120), examining data from the Queensland suicide register (1990–2004) and national data (1968–2004), found that the NFA was associated with negative trends in firearm suicide rates at the national level, but not with suicides among males in Queensland.

In regard to the 1977 South Australia Firearms Act, Snowden and Harris (121) using data from Australian states (1968–1989) observed that the law was associated with lower rates of firearm suicides.

Finally, in regard to unintentional firearm death rates, Baker and McPhedran (116) and Chapman et al. (115) showed an increment in the rate of unintentional firearm deaths associated with the NFA (115), although they conclude that rates can be greatly affected by small changes in the number of annual cases given that unintentional firearm deaths are rare events.

The Estatuto do Desarmamento in Brazil. This law tightened restrictions on the possession of firearms and ammunition, implemented requirements for the registration of owned firearms, increased firearm costs, and established stronger penalties for illegal trafficking of firearms (Table 3). Marinho de Souza et al. (122), using time-series models (1996–2004 data) found that observed deaths were lower than predicted ones in the next 6 postlaw months.

The 1997 Austrian firearm law. This law placed restrictions for some firearms (including handguns and semiautomatics) and mandated background checks, minimum age requirements for purchases, safer firearm storage regulations, and waiting periods (Table 3). Kapusta et al. (123), using data from 1985 to 2005, found that the law was associated with reductions in firearm homicide (percent change in trends in pre/postlaw periods = -4.8) and firearm suicide (percent change = -9.9) rates in models adjusted for unemployment and alcohol consumption. Moreover, Niederkrotenthaler et al. (124) found that the law was associated with a long-term reduction in the rate of firearm suicides and the proportion of firearm suicides among adolescents (aged 10–19 years).

The New Zealand Amendment to the Arms Act. The law included bans on certain firearms, licensing for dealers and firearm owners that required passing training tests, police assessments of applicant and applicant's home, and interviews with family members. Beautrais et al. (125), using Poisson models and interrupted time-series analyses (1985–2002 data), found that the amendment was associated with reductions in the rate of firearm suicides among those aged 15–24 and 25 years or older, but not with reductions in all suicides.

South Africa's Firearms Control Act. This law banned certain firearms (including automatic guns), required an additional license per each gun owned and passing training tests to obtain licenses, increased age requirements for possession/purchase of firearms, and mandated background checks

(Table 3). Matzopoulos et al. (126) evaluated the association between the Act and changes in homicide rates in 5 major cities (2001–2005 data). Results showed a decreasing trend (13.6% per year) for firearm homicides through the implementation of the program and until 1 year after the law was fully implemented. Reductions in nonfirearm homicides were also observed, although not as pronounced as the ones observed for firearm homicides.

Additional studies comparing states/cities with a classification based on degrees of firearm law strictness

In regard to homicide rates, studies from the 1960s found little evidence of laws affecting homicide rates. Geisel et al. (127) compared states and major cities (1960–1965 data) and found that stricter laws were not associated with homicide rates. Magaddino and Medoff (96) and others (128–130) examined state and federal laws (requirements for sales and purchases) using data from 1960 and 1970, and they observed that associations between laws and homicide rates vanished after controlling for sociodemographic factors. A study by Seitz (131) (1967 data) showed that states with carrying and purchasing prohibitions had lower homicide rates among whites. Recent studies found that states/cities with stricter laws had lower rates of homicides (132), firearm deaths (133–135), and firearm injuries (136). Fleegler et al. (137), using a legislative strength score, found that states with scores in the highest quartile (more restrictive) compared with those in the lowest quartile had lower rates of firearm homicides.

In regard to variations in suicide rates, Geisel et al. (127) and other authors (129, 138–141) reported that stricter laws were associated with lower rates of suicides and unintentional death rates; however, other authors described that these associations vanished when models were adjusted for confounders (128, 130). Boor and Bair (142) (1985 data) found that stricter firearm laws were associated with reductions in suicide rates. Sloan et al. (143) while comparing 2 cities also found similar results for firearm suicides. In addition, Conner and Zhong (144) classified states according to strictness (1999–2000 data) and found lower suicide rates among males and females in states with stricter laws. Fleegler et al. (137) also identified lower firearm suicides in states in the highest quartile (most strict).

CONCLUSIONS

In a comprehensive review of firearm-control legislation worldwide, we identified a range of studies examining the association between firearm-related laws and firearm deaths. Three general observations emerge from this analysis: 1) The simultaneous implementation of laws targeting multiple elements of firearms regulations reduced firearm-related deaths in certain countries; 2) some specific restrictions on purchase, access, and use of firearms are associated with reductions in firearm deaths; 3) challenges in ecological design and the execution of studies limit the confidence in study findings and the conclusions that can be derived from them.

A variety of longitudinal studies describe the association between the simultaneous implementation of laws targeting multiple elements of regulations and firearm deaths. Despite

their limitations, specifically on the identification of which laws are more likely to be effective, these studies inform on the potential synergistic effects, or the aggregated individual effects of multiple laws, when they are simultaneously implemented within a narrow time window. The Australian NFA provides a good illustration of this. Following the implementation of the NFA, a decline in firearm deaths and firearm suicides, as well as an absence of mass shootings (78, 115, 117, 120), occurred. We found similar findings in other studies examining legislation targeting multiple elements of regulations in other countries (122–126), although, except in the case of Austria, findings have not been replicated. In Canada, although there has been a continuous downward trend in firearm death rates over time and legislation including background checks has been associated with fewer female firearm homicides, evidence of the association between these laws and overall homicides is mixed. Moreover, studies from Canada, New Zealand, and Australia (at least for the first post-NFA years) show that observed reductions in firearm suicides, after the implementation of these laws, were compensated by substitution methods that resulted in no significant changes in overall suicide rates.

There is also compelling evidence of specific laws being associated with reductions in the rate of firearm deaths. Studies on background checks suggest that the quality of systems used to review applicants, in terms of the access to local and federal information on mental health conditions and criminal and domestic violence history, is a critical component of these laws. However, in some longitudinal studies, little attention is given to whether states conducted local checks and how results would vary after adjusting models for this. US studies examining more detailed aspects of background check laws describe how requiring checks on restraining orders is associated with reductions in intimate partner female firearm homicides, and how checking local mental health facility records is linked to fewer firearm suicides. Regarding child access prevention laws, most studies in the United States show that additional laws allowing for felony prosecution of offenders are associated with greater reductions in unintentional deaths among children. In addition, most studies show that relaxing firearm restrictions, as in the case of “stand your ground” laws or the repealing of existing permit laws, may increase the rate of firearm homicides. We also found international evidence suggesting that, in a particular setting with high rates of homicides, banning the carrying of firearms on sensitive days along with police enforcement can be an effective strategy to reduce homicide rates.

In contrast, evidence suggests that laws restricting the sales of certain firearms are not associated with variations in all or firearm homicides. In this regard, it is possible that because of the fact that studies examine short periods after the laws are implemented, studies may not be able to identify a significant association, as the effects of these laws are more likely to be gradual and delayed given the already high rate of firearms ownership and the availability of firearms in secondary markets. A similar situation may occur for studies with short postlaw periods examining laws targeting sentences for gun offenders, as described for studies on the 1975 Massachusetts’ law. In addition, for laws targeting sentences, variations in the restrictions and the types of sentence in states, and also

the interactions with other factors, such as law enforcement and limitations in jail space, may explain the different results across regions and studies.

One potential problem of studies on firearms laws is the way in which the author's affiliations and personal interests bias study results and influence what is to be published. This can be particularly problematic when researchers are funded by for-or-against firearms groups and when these organizations have control of what material is publishable and what is not, and also when researchers purposely select to present only the results that match their interests. In this review, we have avoided making statements on sources of funding or on affiliations of authors, although we acknowledge that this is an important problem that may distort the general information that could be obtained from this review, and that may contribute to publication bias.

In addition, the studies reviewed here may suffer from validity problems that are common in observational ecological studies. In this regard, cross-sectional studies are of least design suitability (145), and although useful for hypothesis generation, they offer little information on which laws are more likely to work in certain settings. Alternatively, longitudinal studies, especially those examining changes in outcomes before and after the legislation and those including control groups, offer stronger evidence. Longitudinal studies looking at local policy changes, although less generalizable, may provide more precise information on factors necessary for interventions to work compared with those using national aggregated data. However, we observe that incomplete or missing data or problems in quality of the data challenge the evaluation of laws at local levels. Additional concerns of validity, even in longitudinal designs, include the lack of robustness of findings to modeling specifications, such as regarding the use of more years of data or moving the expected point of the intervention effect. Also, particular challenges in study execution include specifications that control for potential confounders that can also be mediators (e.g., firearm ownership). Researchers adjusting for these variables without acknowledging the presence of mediating effects can wrongly conclude that these laws are not associated with the outcomes.

While identifying the limitations of designs and the execution of studies reviewed here, we also identified opportunities for future research. First, studies focusing on the association between the relaxation of firearms laws, such as Missouri's repeal of permits law and the "stand your ground" law, and firearm-related deaths provide an alternative angle to evaluate firearm legislation. Research in this direction may be able to identify more abrupt changes in firearm mortality compared with research on the implementation of new laws, which in theory would have more gradual and delayed effects (67). Second, limited availability and quality of injury data have driven most research to focus on firearm deaths, the most extreme outcome. Better data to assess changes in firearm injuries at both the national and state levels could improve our knowledge on the consequences of firearm laws with a broader scope. Third, we found that few studies have examined how these laws are associated with outcomes among particular ethnic/racial or lower socioeconomic groups; focusing on subgroup outcomes would help to identify which

laws may be most beneficial to those at greater risk. Fourth, research is needed to understand how the enactment or repeal of firearms laws is associated with changes in social attitudes, norms, and behaviors and how this in turn is associated with firearms deaths. Fifth, there is little research using complex systems approaches to identify or predict variations in firearm deaths when single or multiple laws are implemented and how the magnitude of associations would vary in the presence of other factors (e.g., enforcement). As these methods evolve, they may become an avenue to explore the benefits and disadvantages associated with firearms laws and other alternatives in different population contexts. There are also unanswered questions on whether new alternatives, not directly targeting firearm rights, such as increments in firearm taxation, safer manufacturing of firearms, or background checks for all private sales, can be effective in reducing firearm-related death rates.

To conclude, we have provided an overview of national and international studies on the association between firearm-related laws and firearm injuries/deaths. High-quality research overcoming limitations of existing studies in this field would lead to a better understanding of what interventions are more likely to work given local contexts. This information is key for policy development aiming at reducing the burden posed to populations worldwide by violent and unintentional firearm injuries.

ACKNOWLEDGMENTS

Author affiliations: Epidemiology Department, Mailman School of Public Health, Columbia University, New York, New York (Julian Santaella-Tenorio); Department of Emergency Medicine, University of California at Davis, Sacramento, California (Magdalena Cerdá); Department of Epidemiology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina (Andrés Villaveces); and School of Public Health, Boston University, Boston, Massachusetts (Sandro Galea).

J.S.T. was supported by the J. William Fulbright and the Colciencias doctoral scholarships.

We thank Konstantina Matsoukas and Maria C. Salcedo for their help and comments on the literature search process. We also thank Robert Hahn for helpful comments on the classification of study limitations.

Conflict of interest: none declared.

REFERENCES

1. Richmond TS, Cheney R, Schwab CW. The global burden of non-conflict related firearm mortality. *Inj Prev*. 2005;11(6): 348–352.
2. GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2015;385(9963):117–171.
3. Richardson EG, Hemenway D. Homicide, suicide, and unintentional firearm fatality: comparing the United States with other high-income countries, 2003. *J Trauma*. 2011; 70(1):238–243.

4. Murphy S, Xu J, Kochanek K. Deaths: final data for 2010. Supplemental tables. http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_04.pdf. Published May 8, 2013. Accessed June 12, 2014.
5. Miniño A, Arias E, Kochanek K, et al. Deaths: final data for 2000. *Natl Vital Stat Rep*. 2002;50(15):1–120.
5. Ohsfeldt RL, Morrissy MA. Firearms, firearms injury, and gun control: a critical survey of the literature. *Adv Health Econ Health Serv Res*. 1992;13:65–82.
6. Kleck G, Patterson EB. The impact of gun control and gun ownership levels on violence rates. *J Quant Criminol*. 1993; 9(3):249–287.
7. Teret SP, Wintemute GJ. Policies to prevent firearm injuries. *Health Aff (Millwood)*. 1993;12(4):96–108.
8. Hahn RA, Bilukha O, Crosby A, et al. Firearms laws and the reduction of violence: a systematic review. *Am J Prev Med*. 2005;28(2 suppl 1):40–71.
9. Wellford CF, Pepper JV, Petrie CV, eds. *Firearms and Violence: A Critical Review*. Washington, DC: The National Academies Press; 2005.
11. Makarios MD, Pratt TC. The effectiveness of policies and programs that attempt to reduce firearm violence: a meta-analysis. *Crime Delinq*. 2012;58(2):222–244.
12. Zaza S, Wright-De Agüero LK, Briss PA, et al. Data collection instrument and procedure for systematic reviews in the *Guide to Community Preventive Services*. Task Force on Community Preventive Services. *Am J Prev Med*. 2000;18(1 suppl):44–74.
13. Briss PA, Zaza S, Pappaioanou M, et al. Developing an evidence-based *Guide to Community Preventive Services*—methods. The Task Force on Community Preventive Services. *Am J Prev Med*. 2000;18(1 suppl):35–43.
14. Moher D, Liberati A, Tetzlaff J, et al. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann Intern Med*. 2009;151(4):264–269.
15. Lott JR, Mustard DB. Crime, deterrence, and right-to-carry concealed handguns. *J Legal Stud*. 1997;26(1):1–68.
16. Bronars SG, Lott JR Jr. Criminal deterrence, geographic spillovers, and the right to carry concealed handguns. *Am Econ Rev*. 1998;88(2):475–479.
17. Bartley WA, Cohen MA. The effect of concealed weapons laws: an extreme bound analysis. *Econ Inq*. 1998;36(2):258–265.
18. Mustard DB. The impact of gun laws on police deaths. *J Law Econ*. 2001;44(2):635–657.
19. Olson D, Maltz M. Right-to-carry concealed weapons laws and homicide in large U.S. counties: the effect on weapons types, victim characteristics, and victim-offender relationships. *J Law Econ*. 2001;44:747–770.
20. Plassmann F, Tideman TN. Does the right to carry concealed handguns deter countable crimes? Only a count analysis can say. *J Law Econ*. 2001;44(2):771–798.
21. Plassmann F, Whitley J. Confirming “more guns, less crime.” *Stanford Law Rev*. 2003;55(4):1313–1369.
22. Helland E, Tabarrok A. Using placebo laws to test “more guns, less crime.” *Adv Econ Anal Policy*. 2004;4(1):1–11.
23. Lott J. *More Guns, Less Crime: Understanding Crime and Gun Control Laws*. 2nd ed. Chicago, IL: University of Chicago Press; 2000.
24. Duggan M. More guns, more crime. *J Polit Econ*. 2001; 109(5):1086–1114.
25. Duwe G, Kovandzic T, Moody CE. The impact of right-to-carry concealed firearm laws on mass public shootings. *Homicide Stud*. 2002;6(4):271–296.
26. Ludwig J. Concealed-gun-carrying laws and violent crime: evidence from state panel data. *Int Rev Law Econ*. 1998;18(3): 239–254.
27. Moody CE. Testing for the effects of concealed weapons laws: specification errors and robustness. *J Law Econ*. 2001;44(2): 799–813.
28. Black DA, Nagin DS. Do right-to-carry laws deter violent crime? *J Legal Stud*. 1998;27(1):209–219.
29. Kovandzic T, Marvell TB. Right-to-carry concealed handguns and violent crime: crime control through gun decontrol? *Criminol Public Policy*. 2003;2(3):363–396.
30. McDowall D, Loftin C, Wiersema B. Easing concealed firearms laws: effects on homicide in three states. *J Crim Law Criminol*. 1995;86(1):193–206.
31. Rubin PH, Dezhbakhsh H. The effect of concealed handgun laws on crime: beyond the dummy variables. *Int Rev Law Econ*. 2003;23(2):199–216.
32. Martin RA Jr, Legault RL. Systematic measurement error with state-level crime data: evidence from the “more guns, less crime” debate. *J Res Crime Delinq*. 2005;42(2):187–210.
33. Ayres I, Donohue JJ. Shooting down the “more guns, less crime” hypothesis. *Stanford Law Rev*. 2003;55(4): 1193–1312.
34. Ayres I, Donohue JJ. The latest misfires in support of the “more guns, less crime” hypothesis. *Stanford Law Rev*. 2003; 55(4):1371–1398.
35. Donohue J. Guns, crime, and the impact of state right-to-carry laws. *Fordham Law Rev*. 2004;73(2):623–652.
36. Wellford CF, Pepper JV, Petrie CV, eds. Right to carry laws. In: *Firearms and Violence: A Critical Review*. Washington, DC: The National Academies Press; 2005:120–151.
37. Grambsch P. Regression to the mean, murder rates, and shall-issue laws. *Am Stat*. 2008;62(4):289–295.
38. Rosengart M, Cummings P, Nathens A, et al. An evaluation of state firearm regulations and homicide and suicide death rates. *Inj Prev*. 2005;11(2):77–83.
39. Hepburn L, Miller M, Azrael D, et al. The effect of nondiscretionary concealed weapon carrying laws on homicide. *J Trauma*. 2004;56(3):676–681.
40. Kovandzic TV, Marvell TB, Vieraitis LM. The impact of “shall-issue” concealed handgun laws on violent crime rates—evidence from panel data for large urban cities. *Homicide Stud*. 2005;9(4):292–323.
41. La Valle JM. Rebuilding at gunpoint: a city-level re-estimation of the Brady law and RTC laws in the wake of hurricane Katrina. *Crim Justice Policy Rev*. 2007;18(4):451–465.
42. La Valle J, Glover TC. Revisiting licensed handgun carrying: personal protection or interpersonal liability? *Am J Crim Just*. 2012;37(4):580–601.
43. Ginwalla R, Rhee P, Friese R, et al. Repeal of the concealed weapons law and its impact on gun-related injuries and deaths. *J Trauma Acute Care Surg*. 2014;76(3):569–574; discussion 574–575.
44. Strnad J. Should legal empiricists go Bayesian? *Am Law Econ Rev*. 2007;9(1):195–303.
45. Moody CE, Marvell TB. The debate on shall issue laws, continued. *Econ J Watch*. 2009;6(2):203–217.
46. Moody CE, Marvell TB. The debate on shall-issue laws. *Econ J Watch*. 2008;5(3):269–293.
47. Lott J. *More Guns, Less Crime: Understanding Crime and Gun Control Laws*. 3rd ed. Chicago, IL: University of Chicago Press; 2010.
48. Gius M. An examination of the effects of concealed weapons laws and assault weapons bans on state-level murder rates. *Appl Econ Lett*. 2014;21(4):265–267.
49. Ayres I, Donohue JJ. More guns, less crime fails again: the latest evidence from 1977–2006. *Econ J Watch*. 2009;6(2): 218–238.

50. Ayres I, Donohue JJ. Yet another refutation of the more guns, less crime hypothesis—with some help from Moody and Marvell. *Econ J Watch*. 2009;6(1):35–59.
51. Aneja A, Donohue J 3rd, Zhang J. The impact of right to carry laws and the NRC report: the latest lessons for the empirical evaluation of law and policy. Cambridge, MA: National Bureau of Economic Research; 2012. (NBER working paper no. 18294). <http://www.nber.org/papers/w18294>. Published August 2012. Updated November 7, 2014. Accessed December 12, 2014.
52. Villaveces A, Cummings P, Espitia VE, et al. Effect of a ban on carrying firearms on homicide rates in 2 Colombian cities. *JAMA*. 2000;283(9):1205–1209.
53. Cheng C, Hoekstra M. Does strengthening self-defense law deter crime or escalate violence? Evidence from expansions to castle doctrine. *J Hum Resour*. 2013;48(3):821–854.
54. McClellan C, Tekin E. Stand your ground laws and homicides. Cambridge, MA: National Bureau of Economic Research; 2012:1–55. (NBER working paper no. 18187). <http://nber.org/papers/w18187>. Accessed December 13, 2014.
55. Ruddell R, Mays GL. State background checks and firearms homicides. *J Crim Just*. 2005;33(2):127–136.
56. Sumner SA, Layde PM, Guse CE. Firearm death rates and association with level of firearm purchase background check. *Am J Prev Med*. 2008;35(1):1–6.
57. Ludwig J, Cook PJ. Homicide and suicide rates associated with implementation of the Brady Handgun Violence Prevention Act. *JAMA*. 2000;284(5):585–591.
58. Vigdor E, Mercy J. Disarming batterers: the impact of laws restricting access to firearms by domestic violence offenders. In: Ludwig J, Cook P, eds. *Evaluating Gun Policy: Effects on Crime and Violence*. Washington, DC: Brookings Institution; 2003:157–215.
59. Vigdor ER, Mercy JA. Do laws restricting access to firearms by domestic violence offenders prevent intimate partner homicide? *Eval Rev*. 2006;30(3):313–346.
60. Zeoli AM, Webster DW. Effects of domestic violence policies, alcohol taxes and police staffing levels on intimate partner homicide in large US cities. *Inj Prev*. 2010;16(2):90–95.
61. Rodríguez Andres A, Hempstead K. Gun control and suicide: the impact of state firearm regulations in the United States, 1995–2004. *Health Policy*. 2011;101(1):95–103.
62. Sen B, Panjamapirom A. State background checks for gun purchase and firearm deaths: an exploratory study. *Prev Med*. 2012;55(4):346–350.
63. Irvin N, Rhodes K, Cheney R, et al. Evaluating the effect of state regulation of federally licensed firearm dealers on firearm homicide. *Am J Public Health*. 2014;104(8):1384–1386.
64. Medoff MH, Magaddino JP. Suicides and firearm control laws. *Eval Rev*. 1983;7(3):357–372.
65. Marvell TB. The impact of banning juvenile gun possession. *J Law Econ*. 2001;44(2):691–713.
66. Webster DW, Vernick JS, Zeoli AM, et al. Association between youth-focused firearm laws and youth suicides. *JAMA*. 2004;292(5):594–601.
67. Webster D, Crifasi CK, Vernick JS. Effects of the repeal of Missouri's handgun purchaser licensing law on homicides [erratum in *J Urban Health*. 2014;91(3):598–601]. *J Urban Health*. 2014;91(2):293–302.
68. Reisch T, Steffen T, Habenstein A, et al. Change in suicide rates in Switzerland before and after firearm restriction resulting from the 2003 “Army XXI” reform. *Am J Psychiatry*. 2013;170(9):977–984.
69. Gjertsen F, Leenaars A, Vollrath ME. Mixed impact of firearms restrictions on fatal firearm injuries in males: a national observational study. *Int J Environ Res Public Health*. 2014;11(1):487–506.
70. Cummings P, Grossman DC, Rivara FP, et al. State gun safe storage laws and child mortality due to firearms. *JAMA*. 1997;278(13):1084–1086.
71. Webster DW, Starnes M. Reexamining the association between child access prevention gun laws and unintentional shooting deaths of children. *Pediatrics*. 2000;106(6):1466–1469.
72. Hepburn L, Azrael D, Miller M, et al. The effect of child access prevention laws on unintentional child firearm fatalities, 1979–2000. *J Trauma*. 2006;61(2):423–428.
73. Lott JR, Whitley JE. Safe storage gun laws: accidental deaths, suicides, and crime. *J Law Econ*. 2001;44(2):659–689.
74. Lee J, Moriarty KP, Tashjian DB, et al. Guns and states: pediatric firearm injury. *J Trauma Acute Care Surg*. 2013;75(1):50–53.
75. DeSimone J, Markowitz S, Xu J. Child access prevention laws and nonfatal gun injuries. *South Econ J*. 2013;80(1):5–25.
76. Koper CS, Roth JA. The impact of the 1994 federal assault weapon ban on gun violence outcomes: an assessment of multiple outcome measures and some lessons for policy evaluation. *J Quant Criminol*. 2001;17(1):33–74.
77. Webster DW, Vernick JS, Hepburn LM. Effects of Maryland's law banning “Saturday night special” handguns on homicides. *Am J Epidemiol*. 2002;155(5):406–412.
78. Ozanne-Smith J, Ashby K, Newstead S, et al. Firearm related deaths: the impact of regulatory reform. *Inj Prev*. 2004;10(5):280–286.
79. Deutsch SJ, Alt FB. The effect of Massachusetts gun-control law on gun-related crimes in city of Boston. *Eval Q*. 1977;1(4):543–568.
80. Berk RA, Hoffman DM, Maki JE, et al. Estimation procedures for pooled cross-sectional and time series data. *Eval Q*. 1979;3(2):385–411.
81. Hay RA, McCleary R. Box-tiao time series models for impact assessment: a comment on the recent work of Deutsch and Alt. *Eval Q*. 1979;3(2):277–314.
82. Pierce GL, Bowers WJ. The Bartley-Fox gun law's short-term impact on crime in Boston. *Ann Am Acad Pol Soc Sci*. 1981;455(May):120–137.
83. Deutsch S. Intervention modeling: analysis of changes in crime rates. In: Fox J, ed. *Methods in Quantitative Criminology*. New York, NY: Academic Press; 1981:171–193.
84. Loftin C, McDowall D. “One with a gun gets you two”: mandatory sentencing and firearms violence in Detroit. *Ann Am Acad Pol Soc Sci*. 1981;455(May):150–167.
85. Loftin C, McDowall D. The deterrent effects of the Florida felony firearm law. *J Crim Law Crim*. 1984;75(1):250–259.
86. McDowall D, Loftin C, Wiersema B. A comparative study of the preventive effects of mandatory sentencing laws for gun crimes. *J Crim Law Crim*. 1992;83(2):378–394.
87. Fife D, Abrams WR. Firearms' decreased role in New Jersey homicides after a mandatory sentencing law. *J Trauma*. 1989;29(11):1548–1551.
88. O'Carroll PW, Loftin C, Waller JB Jr, et al. Preventing homicide: an evaluation of the efficacy of a Detroit gun ordinance. *Am J Public Health*. 1991;81(5):576–581.
89. Marvell TB, Moody CE. The impact of enhanced prison terms for felonies committed with guns. *Criminology*. 1995;33(2):247–281.
90. La Valle JM. Guns and homicide: Is the instrument-focused approach to deterrence efficacious? *Justice Policy J*. 2008;5(2):1–30.

91. Raphael S, Ludwig J. Prison sentence enhancements: the case of Project Exile. In: Cook P, Ludwig J, eds. *Evaluating Gun Policy: Effects on Crime and Violence*. Washington, DC: Brookings Institution; 2003:251–286.
92. Rosenfeld R, Fornango R, Baumer E. Did Ceasefire, Compstat, and Exile reduce homicide? *Criminol Public Policy*. 2005;4(3):419–449.
93. Rosenfeld R. Gun buybacks: crime control or community mobilization. In: Plotkin M, ed. *Under Fire: Gun Buybacks, Exchanges and Amnesty Programs*. Washington, DC: Police Executive Research Forum; 1995:1–28.
94. Phillips SW, Kim DY, Sobol JJ. An evaluation of a multiyear gun buy-back programme: re-examining the impact on violent crimes. *Int J Police Sci Manage*. 2013;15(3):246–261.
95. Leigh A, Neill C. Do gun buybacks save lives? Evidence from panel data. *Am Law Econ Rev*. 2010;12(2):509–557.
96. Magaddino J, Medoff M. State firearm control laws and violent crimes—an empirical analysis of federal and state firearm control laws. In: Kates D, ed. *Firearms and Violence*. Cambridge, MA: Ballinger; 1984:229–241.
97. Loftin C, McDowall D, Wiersema B, et al. Effects of restrictive licensing of handguns on homicide and suicide in the District of Columbia. *N Engl J Med*. 1991;325(23):1615–1620.
98. McDowall D, Loftin C, Wiersema B. Using quasi-experiments to evaluate firearm laws: comment on Britt et al.'s reassessment of the D.C. Gun Law. *Law Soc Rev*. 1996;30(2):381–391.
99. Britt CL, Kleck G, Bordua DJ. A reassessment of the D.C. Gun Law: some cautionary notes on the use of interrupted time series designs for policy impact assessment. *Law Soc Rev*. 1996;30(2):361–380.
100. Britt CL, Kleck G, Bordua DJ. Avoidance and misunderstanding: a rejoinder to McDowall et al. *Law Soc Rev*. 1996;30(2):393–398.
101. Leenaars AA, Lester D. The impact of gun control (Bill C-51) on homicide in Canada. *J Crim Just*. 2001;29(4):287–294.
102. Leenaars AA, Lester D. Gender, gun control, suicide and homicide: a reply. *Arch Suicide Res*. 1999;5(1):77–79.
103. Carrington PJ. Gender, gun control, suicide and homicide in Canada. *Arch Suicide Res*. 1999;5(1):71–75.
104. Mauser GA, Holmes RA. An evaluation of the 1977 Canadian firearms legislation. *Eval Rev*. 1992;16(6):603–617.
105. Blais E, Gagne MP, Linteau I. The effect of laws in relation to firearm control on homicides in Canada, 1974–2004. *Can J Criminol Crim*. 2011;53(1):27–61.
106. Langmann C. Canadian firearms legislation and effects on homicide 1974 to 2008. *J Interpers Violence*. 2012;27(12):2303–2321.
107. McPhedran S, Mauser G. Lethal firearm-related violence against Canadian women: Did tightening gun laws have an impact on women's health and safety? *Violence Vict*. 2013;28(5):875–883.
108. Rich CL, Young JG, Fowler RC, et al. Guns and suicide: possible effects of some specific legislation. *Am J Psychiatry*. 1990;147(3):342–346.
109. Carrington PJ, Moyer S. Gun control and suicide in Ontario. *Am J Psychiatry*. 1994;151(4):606–608.
110. Leenaars AA, Moksony F, Lester D, et al. The impact of gun control (Bill C-51) on suicide in Canada. *Death Stud*. 2003;27(2):103–124.
111. Caron J, Julien M, Huang JH. Changes in suicide methods in Quebec between 1987 and 2000: the possible impact of bill C-17 requiring safe storage of firearms. *Suicide Life Threat Behav*. 2008;38(2):195–208.
112. Gagné M, Robitaille Y, Hamel D, et al. Firearms regulation and declining rates of male suicide in Quebec. *Inj Prev*. 2010;16(4):247–253.
113. Cheung AH, Dewa CS. Current trends in youth suicide and firearms regulations. *Can J Public Health*. 2005;96(2):131–135.
114. Leenaars AA, Lester D. Effects of gun control on the accidental death rate from firearms in Canada. *J Safety Res*. 1997;28(3):119–122.
115. Chapman S, Alpers P, Agho K, et al. Australia's 1996 gun law reforms: faster falls in firearm deaths, firearm suicides, and a decade without mass shootings. *Inj Prev*. 2006;12(6):365–372.
116. Baker J, McPhedran S. Gun laws and sudden death: Did the Australian firearms legislation of 1996 make a difference? *Br J Criminol*. 2007;47(3):455–469.
117. Neill C, Leigh A. Weak tests and strong conclusions: a re-analysis of gun deaths and the Australian firearms buyback. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1011519. Published September 5, 2007. Accessed December 12, 2014.
118. Lee WS, Suardi S. The Australian firearms buyback and its effect on gun deaths. *Contemp Econ Policy*. 2010;28(1):65–79.
119. McPhedran S, Baker J. Suicide prevention and method restriction: evaluating the impact of limiting access to lethal means among young Australians. *Arch Suicide Res*. 2012;16(2):135–146.
120. Klieve H, Barnes M, De Leo D. Controlling firearms use in Australia: Has the 1996 gun law reform produced the decrease in rates of suicide with this method? *Soc Psychiatry Psychiatr Epidemiol*. 2009;44(4):285–292.
121. Snowdon J, Harris L. Firearms suicides in Australia. *Med J Aust*. 1992;156(2):79–83.
122. Marinho de Souza Mde F, Macinko J, Alencar AP, et al. Reductions in firearm-related mortality and hospitalizations in Brazil after gun control. *Health Aff (Millwood)*. 2007;26(2):575–584.
123. Kapusta ND, Etzersdorfer E, Krall C, et al. Firearm legislation reform in the European Union: impact on firearm availability, firearm suicide and homicide rates in Austria. *Br J Psychiatry*. 2007;191:253–257.
124. Niederkrotenthaler T, Till B, Herberth A, et al. Can media effects counteract legislation reforms? The case of adolescent firearm suicides in the wake of the Austrian firearm legislation. *J Adolesc Health*. 2009;44(1):90–93.
125. Beautrais AL, Fergusson DM, Horwood LJ. Firearms legislation and reductions in firearm-related suicide deaths in New Zealand. *Aust N Z J Psychiatry*. 2006;40(3):253–259.
126. Matzopoulos RG, Thompson ML, Myers JE. Firearm and nonfirearm homicide in 5 South African cities: a retrospective population-based study. *Am J Public Health*. 2014;104(3):455–460.
127. Geisel MS, Roll R, Wettick RS Jr. The effectiveness of state and local regulation of handguns: a statistical analysis. *Duke Law J*. 1969;18(4):647–676.
128. Murray DR. Handguns, gun control laws and firearm violence. *Soc Probl*. 1975;23(1):81–93.
129. Lester D, Murrell ME. The influence of gun control laws on personal violence. *J Community Psychol*. 1986;14(3):315–318.
130. Lester D. Gun control, gun ownership, and suicide prevention. *Suicide Life Threat Behav*. 1988;18(2):176–180.
131. Seitz S. Firearms, homicides, and gun control effectiveness. *Law Soc Rev*. 1972;6(4):595–614.

132. Sloan JH, Kellermann AL, Reay DT, et al. Handgun regulations, crime, assaults, and homicide. A tale of two cities. *N Engl J Med*. 1988;319(19):1256–1262.
133. Kwon IWG, Scott B, Safranski SR, et al. The effectiveness of gun control laws: multivariate statistical analysis. *Am J Econ Sociol*. 1997;56(1):41–50.
134. Kwon IWG, Baack DW. The effectiveness of legislation controlling gun usage: a holistic measure of gun control legislation. *Am J Econ Sociol*. 2005;64(2):533–547.
135. Lanza SP. The effect of firearm restrictions on gun-related homicides across US states. *Appl Econ Lett*. 2014;21(13):902–905.
136. Safavi A, Rhee P, Pandit V, et al. Children are safer in states with strict firearm laws: a National Inpatient Sample study. *J Trauma Acute Care Surg*. 2014;76(1):146–150.
137. Fleegler EW, Lee LK, Monuteaux MC, et al. Firearm legislation and firearm-related fatalities in the United States. *JAMA Intern Med*. 2013;173(9):732–740.
138. Lester C, Murrell ME. The influence of gun control laws on suicidal behavior. *Am J Psychiatry*. 1980;137(1):121–122.
139. Lester D, Murrell ME. The preventive effect of strict gun control laws on suicide and homicide. *Suicide Life Threat Behav*. 1982;12(3):131–140.
140. Lester D. Capital punishment, gun control, and personal violence (suicide and homicide). *Psychol Rep*. 1990;66(1):122.
141. Sommers PM. The effect of gun control laws on suicide rates. *Atl Econ J*. 1984;12(1):67–69.
142. Boor M, Bair JH. Suicide rates, handgun control laws, and sociodemographic variables. *Psychol Rep*. 1990;66(3 pt 1):923–930.
143. Sloan JH, Rivara FP, Reay DT, et al. Firearm regulations and rates of suicide. a comparison of two metropolitan areas. *N Engl J Med*. 1990;322(6):369–373.
144. Conner KR, Zhong Y. State firearm laws and rates of suicide in men and women. *Am J Prev Med*. 2003;25(4):320–324.
145. Cartwright N, Hardie J. *Evidence-Based Policy: A Practical Guide to Doing It Better*. New York, NY: Oxford University Press; 2012.
146. Cook P, Goss K. *The Gun Debate, What Everyone Needs to Know*. New York, NY: Oxford University Press; 2014.
147. Gun Control Act of 1968, 101, Pub. L. No. 90-618, 82 Stat. 1213-1236. <http://www.gpo.gov/fdsys/pkg/STATUTE-82/pdf/STATUTE-82-Pg1213-2.pdf>. Accessed August 12, 2015.
148. Jones E 3rd. The District of Columbia's 'Firearms Control Regulations Act of 1975': the toughest handgun control law in the United States—or is it? *Ann Am Acad Pol Soc Sci*. 1981;455:138–149.
149. Brady Handgun Violence Prevention Act. Pub. L. No. 103-159, 107 Stat. 1536-1546. <http://www.gpo.gov/fdsys/pkg/STATUTE-107/pdf/STATUTE-107-Pg1536.pdf>. Accessed August 11, 2015.
150. Royal Canadian Mounted Police. History of firearms control in Canada: up to and including the Firearms Act. <http://www.rcmp-grc.gc.ca/cfp-pcaf/pol-leg/hist/con-eng.htm>. Updated June 19, 2012. Accessed August 12, 2015.
151. Australian Government, Australian Institute of Criminology. Legislative reforms. http://www.aic.gov.au/publications/current_series/rpp/100-120/rpp116/06_reforms.html. Updated June 29, 2012. Accessed August 12, 2015.
152. Library of Congress. Firearms-control legislation and policy: Australia. <http://www.loc.gov/law/help/firearms-control/australia.php>. Updated July 30, 2015. Accessed August 12, 2015.
153. Attorney-General's Department, Government of South Australia. South Australia Firearms Act 1977. <http://www.legislation.sa.gov.au/LZ/C/A/FIREARMS ACT 1977.aspx>. Accessed August 12, 2015.
154. Câmara dos Deputados. Estatuto do Desarmamento. http://www2.camara.leg.br/busca/?o=recent&v=noticias&colecacao=AGENCIA_CAMARA&assunto=estatuto+do+desarmamento. Accessed January 26, 2016.
155. Kirsten A. Simpler, better, faster—review of the 2005 firearms amnesty. Institute for Security Studies. <http://www.issafrica.org/uploads/Paper134.pdf>. Published April 2007. Accessed August 12, 2015.U.
156. The Law Library of Congress. Firearms-control legislation and policy. <https://www.loc.gov/law/help/firearms-control/firearms-control.pdf>. Published February 2013. Accessed January 26, 2016.

EXHIBIT 64



JOHN LOCKE

TWO TREATISES OF GOVERNMENT
BY IOHN LOCKE

SALUS POPULI SUPREMA LEX ESTO

LONDON PRINTED MDCLXXXVIII
REPRINTED, THE SIXTH TIME, BY A. MILLAR, M.
WOODFALL, I. WHISTON AND B. WHITE, I. RI-
VINGTON, L. DAVIS AND C. REYMERS, R. BALD-
WIN, HAWES CLARKE AND COLLINS; W. IOHN-
STON, W. OWEN, I. RICHARDSON, S. CROWDER,
T. LONGMAN, B. LAW, C. RIVINGTON, E.
DILLY, R. WITHEY, C. AND R. WARE, S. BAKER,
T. PAYNE, A. SHUCKBURGH, L. HINXMAN
M D C C L X I I I I

The present Edition of this Book has not only been collated with the first three Editions, which were published during the Author's Life, but also has the Advantage of his last Corrections and Improvements, from a Copy delivered by him to Mr. Peter Coste, communicated to the Editor, and now lodged in Christ College, Cambridge.

TWO TREATISES OF GOVERNMENT.
IN THE FORMER THE FALSE PRIN-
CIPLES AND FOUNDATION OF SIR
ROBERT FILMER AND HIS FOL-
LOWERS ARE DETECTED AND
OVERTHROWN.
THE LATTER IS AN ESSAY CON-
CERNING THE TRUE ORIGINAL
EXTENT AND END OF CIVIL
GOVERNMENT.



. OF CIVIL-GOVERNMENT

BOOK II

Chap. I. §. 1. It having been shewn in the foregoing discourse,

1. That *Adam* had not, either by natural right of fatherhood, or by positive donation from God, any such authority over his children, or dominion over the world, as is pretended :

2. That if he had, his heirs, yet, had no right to it :

3. That if his heirs had, there being no law of nature nor positive law of God that determines which is the right heir in all cases that may arise, the right of succession, and consequently of bearing rule, could not have been certainly determined :

4. That if even that had been determined, yet the knowledge of which is the eldest line
O of

194 OF CIVIL-GOVERNMENT.

of *Adam's* posterity, being so long since utterly lost, that in the races of mankind and families of the world, there remains not to one above another, the least pretence to be the eldest house, and to have the right of inheritance:

All these premises having, as I think, been clearly made out, it is impossible that the rulers now on earth should make any benefit, or derive any the least shadow of authority from that, which is held to be the fountain of all power, *Adam's private dominion and paternal jurisdiction*; so that he that will not give just occasion to think that all government in the world is the product only of force and violence, and that men live together by no other rules but that of beasts, where the strongest carries it, and so lay a foundation for perpetual disorder and mischief, tumult, sedition and rebellion, (things that the followers of that hypothesis so loudly cry out against) must of necessity find out another rise of government, another original of political power, and another way of designing and knowing the persons that have it, than what *Sir Robert Filmer* hath taught us.

§. 2. To this purpose, I think it may not be amiss, to set down what I take to be political power; that the power of a *magistrate* over a subject may be distinguished from that of a *father* over his children, a *master* over his servant, a *husband* over his wife, and

OF CIVIL-GOVERNMENT. 195

a *lord* over his slave. All which distinct powers happening sometimes together in the same man, if he be considered under these different relations, it may help us to distinguish these powers one from another, and shew the difference betwixt a ruler of a common-wealth, a father of a family, and a captain of a galley.

§. 3. *Political power*, then, I take to be a *right* of making laws with penalties of death, and consequently all less penalties, for the regulating and preserving of property, and of employing the force of the community, in the execution of such laws, and in the defence of the common-wealth from foreign injury; and all this only for the public good.

C H A P. II.

Of the State of Nature.

§. 4. **T**O understand political power right, and derive it from its original, we must consider, what state all men are naturally in, and that is, a *state of perfect freedom* to order their actions, and dispose of their possessions and persons, as they think fit, within the bounds of the law of nature, without asking leave, or depending upon the will of any other man.

A *state* also *of equality*, wherein all the power and jurisdiction is reciprocal, no one

196 OF CIVIL-GOVERNMENT.

having more than another; there being nothing more evident, than that creatures of the same species and rank, promiscuously born to all the same advantages of nature, and the use of the same faculties, should also be equal one amongst another without subordination or subjection, unless the lord and master of them all should, by any manifest declaration of his will, set one above another, and confer on him, by an evident and clear appointment, an undoubted right to dominion and sovereignty.

§. 5. This equality of men by nature, the judicious *Hooker* looks upon as so evident in itself, and beyond all question, that he makes it the foundation of that obligation to mutual love amongst men, on which he builds the duties they owe one another, and from whence he derives the great maxims of justice and charity. His words are,

The like natural inducement hath brought men to know that it is no less their duty, to love others than themselves; for seeing those things which are equal, must needs all have one measure; if I cannot but wish to receive good, even as much at every man's hands, as any man can wish unto his own soul, how should I look to have any part of my desire herein satisfied, unless myself be careful to satisfy the like desire, which is undoubtedly in other men, being of one and the same nature? To have any thing offered them repugnant to this desire, must needs in all respects

OF CIVIL-GOVERNMENT. 197

respects grieve them as much as me; so that if I do harm, I must look to suffer, there being no reason that others should shew greater measure of love to me, than they have by me shewed unto them: my desire therefore to be loved of my equals in nature, as much as possible may be, imposeth upon me a natural duty of bearing to them-ward fully the like affection; from which relation of equality between ourselves and them that are as ourselves, what several rules and canons natural reason hath drawn, for direction of life, no man is ignorant. Eccl. Pol. Lib. 1.

§. 6. But though this be a *state of liberty*, yet it is not a *state of licence*: though man in that state have an uncontrollable liberty to dispose of his person or possessions, yet he has not liberty to destroy himself, or so much as any creature in his possession, but where some nobler use than its bare preservation calls for it. The *state of nature* has a law of nature to govern it, which obliges every one: and reason, which is that law, teaches all mankind, who will but consult it, that being all *equal and independent*, no one ought to harm another in his life, health, liberty, or possessions: for men being all the workmanship of one omnipotent, and infinitely wise maker; all the servants of one sovereign master, sent into the world by his order, and about his business; they are his property, whose workmanship they are, made to last

O 3

during

198 OF CIVIL-GOVERNMENT.

during his, not one another's pleasure: and being furnished with like faculties, sharing all in one community of nature, there cannot be supposed any such *subordination* among us, that may authorize us to destroy one another, as if we were made for one another's uses, as the inferior ranks of creatures are for our's. Every one, as he *is bound to preserve himself*, and not to quit his station wilfully, so by the like reason, when his own preservation comes not in competition, ought he, as much as he can, *to preserve the rest of mankind*, and may not, unless it be to do justice on an offender, take away, or impair the life, or what tends to the preservation of the life, the liberty, health, limb, or goods of another.

§. 7. And that all men may be restrained from invading others rights, and from doing hurt to one another, and the law of nature be observed, which willeth the peace and *preservation of all mankind*, the *execution of the law of nature is*, in that state, put into every man's hands, whereby every one has a right to punish the transgressors of that law to such a degree, as may hinder its violation: for the *law of nature* would, as all other laws that concern men in this world, be in vain, if there were no body that in the state of nature had a *power to execute that law*, and thereby preserve the innocent and restrain offenders. And if any one in the state of nature may punish another for any evil he has done,

OF CIVIL-GOVERNMENT. 199

done, every one may do so: for in that *state of perfect equality*, where naturally there is no superiority or jurisdiction of one over another, what any may do in prosecution of that law, every one must needs have a right to do.

§. 8. And thus, in the state of nature, *one man comes by a power over another*; but yet no absolute or arbitrary power, to use a criminal, when he has got him in his hands, according to the passionate heats, or boundless extravagancy of his own will; but only to retribute to him, so far as calm reason and conscience dictate, what is proportionate to his transgression, which is so much as may serve for *reparation* and *restraint*: for these two are the only reasons, why one man may lawfully do harm to another, which is that we call *punishment*. In transgressing the law of nature, the offender declares himself to live by another rule than that of reason and common equity, which is that measure God has set to the actions of men, for their mutual security; and so he becomes dangerous to mankind, the tie, which is to secure them from injury and violence, being slighted and broken by him. Which being a trespass against the whole species, and the peace and safety of it, provided for by the law of nature, every man upon this score, by the right he hath to preserve mankind in general, may restrain, or where it is neces-

200 OF CIVIL-GOVERNMENT.

fary, destroy things noxious to them, and so may bring such evil on any one, who hath transgressed that law, as may make him repent the doing of it, and thereby deter him, and by his example others, from doing the like mischief. And in this case, and upon this ground, *every man hath a right to punish the offender, and be executioner of the law of nature.*

§. 9. I doubt not but this will seem a very strange doctrine to some men: but before they condemn it, I desire them to resolve me, by what right any prince or state can put to death, or *punish an alien*, for any crime he commits in their country. It is certain their laws, by virtue of any sanction they receive from the promulgated will of the legislative, reach not a stranger: they speak not to him, nor, if they did, is he bound to hearken to them. The legislative authority, by which they are in force over the subjects of that common-wealth, hath no power over him. Those who have the supreme power of making laws in *England, France or Holland*, are to an *Indian*, but like the rest of the world, men without authority: and therefore, if by the law of nature every man hath not a power to punish offences against it, as he soberly judges the case to require, I see not how the magistrates of any community can *punish an alien* of another country; since, in reference to him, they can have

no

OF CIVIL-GOVERNMENT. 201

no more power than what every man naturally may have over another.

§. 10. Besides the crime which consists in violating the law, and varying from the right rule of reason, whereby a man so far becomes degenerate, and declares himself to quit the principles of human nature, and to be a noxious creature, there is commonly *injury* done to some person or other, and some other man receives damage by his transgression: in which case he who hath received any damage, has, besides the right of punishment common to him with other men, a particular right to seek *reparation* from him that has done it: and any other person, who finds it just, may also join with him that is injured, and assist him in recovering from the offender so much as may make satisfaction for the harm he has suffered.

§. 11. From these *two distinct rights*, the one of *punishing* the crime *for restraint*, and preventing the like offence, which right of punishing is in every body; the other of taking *reparation*, which belongs only to the injured party, comes it to pass that the magistrate, who by being magistrate hath the common right of punishing put into his hands, can often, where the public good demands not the execution of the law, *remit* the punishment of criminal offences by his own authority, but yet cannot *remit* the satisfaction due to any private man for the damage

202 OF CIVIL-GOVERNMENT.

damage he has received. That, he who has suffered the damage has a right to demand in his own name, and he alone can remit: the damnified person has this power of appropriating to himself the goods or service of the offender, *by right of self-preservation*, as every man has a power to punish the crime, to prevent its being committed again, *by the right he has of preserving all mankind*, and doing all reasonable things he can in order to that end: and thus it is, that every man, in the state of nature, has a power to kill a murderer, both *to deter* others from doing the like injury, which no reparation can compensate, by the example of the punishment that attends it from every body, and also to secure men from the attempts of a criminal, who having renounced reason, the common rule and measure God hath given to mankind, hath, by the unjust violence and slaughter he hath committed upon one, declared war against all mankind, and therefore may be destroyed as a *lion* or a *tyger*, one of those wild savage beasts, with whom men can have no society nor security: and upon this is grounded that great law of nature, *Whofo sheddeth man's blood, by man shall his blood be shed*. And Cain was so fully convinced, that every one had a right to destroy such a criminal, that after the murder of his brother, he cries out, *Every one that findeth me,*

OF CIVIL-GOVERNMENT. 203

me, shall slay me; so plain was it writ in the hearts of all mankind.

§. 12. By the same reason may a man in the state of nature *punish the lesser breaches* of that law. It will perhaps be demanded, with death? I answer, each transgression may be *punished* to that *degree*, and with so much *severity*, as will suffice to make it an ill bargain to the offender, give him cause to repent, and terrify others from doing the like. Every offence, that can be committed in the state of nature, may in the state of nature be also punished equally, and as far forth as it may, in a common-wealth: for though it would be besides my present purpose, to enter here into the particulars of the law of nature, or its *measures of punishment*; yet, it is certain there is such a law, and that too, as intelligible and plain to a rational creature, and a studier of that law, as the positive laws of common-wealths; nay, possibly plainer; as much as reason is easier to be understood, than the fancies and intricate contrivances of men, following contrary and hidden interests put into words; for so truly are a great part of the *municipal laws* of countries, which are only so far right, as they are founded on the law of nature, by which they are to be regulated and interpreted.

§. 13. To this strange doctrine, *viz.* That *in the state of nature every one has the executive power* of the law of nature, I doubt not but it will

204 OF CIVIL-GOVERNMENT.

will be objected, that it is unreasonable for men to be judges in their own cases, that self-love will make men partial to themselves and their friends: and on the other side, that ill nature, passion and revenge will carry them too far in punishing others; and hence nothing but confusion and disorder will follow, and that therefore God hath certainly appointed government to restrain the partiality and violence of men. I easily grant, that *civil government* is the proper remedy for the inconveniencies of the state of nature, which must certainly be great, where men may be judges in their own case, since it is easy to be imagined, that he who was so unjust as to do his brother an injury, will scarce be so just as to condemn himself for it: but I shall desire those who make this objection, to remember, that *absolute monarchs* are but men; and if government is to be the remedy of those evils, which necessarily follow from men's being judges in their own cases, and the state of nature is therefore not to be endured, I desire to know what kind of government that is, and how much better it is than the state of nature, where one man, commanding a multitude, has the liberty to be judge in his own case, and may do to all his subjects whatever he pleases, without the least liberty to any one to question or controul those who execute his pleasure? and in whatsoever he doth, whether led by reason, mistake or passion, must be submitted to? much better
it

OF CIVIL-GOVERNMENT. 205

it is in the state of nature, wherein men are not bound to submit to the unjust will of another : and if he that judges, judges amiss in his own, or any other case, he is answerable for it to the rest of mankind.

§. 14. It is often asked as a mighty objection, *where are, or ever were there any men in such a state of nature?* To which it may suffice as an answer at present, that since all princes and rulers of *independent* governments all through the world, are in a state of nature, it is plain the world never was, nor ever will be, without numbers of men in that state. I have named all governors of *independent communities*, whether they are, or are not, in league with others : for it is not every compact that puts an end to the state of nature between men, but only this one of agreeing together mutually to enter into one community, and make one body politic ; other promises, and compacts, men may make one with another, and yet still be in the state of nature. The promises and bargains for truck, &c. between the two men in the desert island, mentioned by *Garcilasso de la Vega*, in his history of *Peru* ; or between a *Swiss* and an *Indian*, in the woods of *America*, are binding to them, though they are perfectly in a state of nature, in reference to one another : for truth and keeping of faith belongs to men, as men, and not as members of society.

§. 15.

206 OF CIVIL-GOVERNMENT.

§. 15. To those that say, there were never any men in the state of nature, I will not only oppose the authority of the judicious *Hooker*, *Eccl. Pol. lib. i. sect. 10.* where he says, *The laws which have been hitherto mentioned, i. e. the laws of nature, do bind men absolutely, even as they are men, although they have never any settled fellowship, never any solemn agreement amongst themselves what to do, or not to do: but forasmuch as we are not by ourselves sufficient to furnish ourselves with competent store of things, needful for such a life as our nature doth desire, a life fit for the dignity of man; therefore to supply those defects and imperfections which are in us, as living single and solely by ourselves, we are naturally induced to seek communion and fellowship with others: this was the cause of men's uniting themselves at first in politic societies.* But I moreover affirm, that all men are naturally in that state, and remain so, till by their own consents they make themselves members of some politic society; and I doubt not in the sequel of this discourse, to make it very clear.

C H A P. III.

Of the State of War.

§. 16. **T**HE state of war is a state of enmity and destruction: and therefore declaring by word or action, not

EXHIBIT 65

E 211
.A217
Copy 1



Old South Leaflets.

No. 173.

The Rights of the Colonists

BY SAMUEL ADAMS.

REPORT OF THE COMMITTEE OF CORRESPONDENCE TO THE BOSTON
TOWN MEETING, NOV. 20, 1772.

I. *Natural Rights of the Colonists as Men.*

Among the natural rights of the Colonists are these: *First*, a right to life; *Secondly*, to liberty; *Thirdly*, to property; together with the right to support and defend them in the best manner they can. These are evident branches of, rather than deductions from, the duty of self-preservation, commonly called the first law of nature.

All men have a right to remain in a state of nature as long as they please; and in case of intolerable oppression, civil or religious, to leave the society they belong to, and enter into another.

When men enter into society, it is by voluntary consent; and they have a right to demand and insist upon the performance of such conditions and previous limitations as form an equitable *original compact*.

Every natural right not expressly given up, or, from the nature of a social compact, necessarily ceded, remains.

All positive and civil laws should conform, as far as possible, to the law of natural reason and equity.

As neither reason requires nor religion permits the contrary, every man living in or out of a state of civil society has a right peaceably and quietly to worship God according to the dictates of his conscience.

“Just and true liberty, equal and impartial liberty,” in matters spiritual and temporal, is a thing that all men are clearly entitled to by the eternal and immutable laws of God and nat-

E 211

A 217

2

ure, as well as by the law of nations and all well-grounded municipal laws, which must have their foundation in the former.

In regard to religion, mutual toleration in the different professions thereof is what all good and candid minds in all ages have ever practised, and, both by precept and example, inculcated on mankind. And it is now generally agreed among Christians that this spirit of toleration, in the fullest extent consistent with the being of civil society, is the chief characteristic mark of the Church.* Insomuch that Mr. Locke has asserted and proved, beyond the possibility of contradiction on any solid ground, that such toleration ought to be extended to all whose doctrines are not subversive of society. The only sects which he thinks ought to be, and which by all wise laws are excluded from such toleration, are those who teach doctrines subversive of the civil government under which they live. The Roman Catholics or Papists are excluded by reason of such doctrines as these, that princes excommunicated may be deposed, and those that they call heretics may be destroyed without mercy; besides their recognizing the Pope in so absolute a manner, in subversion of government, by introducing, as far as possible into the states under whose protection they enjoy life, liberty, and property; that solecism in politics, *imperium in imperio*, leading directly to the worst anarchy and confusion, civil discord, war, and bloodshed.†

The natural liberty of man, by entering into society, is abridged or restrained, so far only as is necessary for the great end of society, the best good of the whole.

In the state of nature every man is, under God, judge and sole judge of his own rights and of the injuries done him. By entering into society he agrees to an arbiter or indifferent judge between him and his neighbors; but he no more renounces his original right than by taking a cause out of the ordinary course of law, and leaving the decision to referees or indifferent arbitrators. In the last case, he must pay the referees for time and trouble. He should also be willing to pay his just quota for the support of government, the law, and the constitution; the end of which is to furnish indifferent and impartial judges in all cases that may happen, whether civil, ecclesiastical, marine, or military.

* See Locke's Letters on Toleration.

† Political disabilities were not removed from the Catholics in England until 1829.—
Editor.

The *natural* liberty of man is to be free from any superior power on earth, and not to be under the will or legislative authority of man, but only to have the law of nature for his rule.*

In the state of nature men may, as the patriarchs did, employ hired servants for the defence of their lives, liberties, and property; and they should pay them reasonable wages. Government was instituted for the purposes of common defence, and those who hold the reins of government have an equitable, natural right to an honorable support from the same principle that "the laborer is worthy of his hire." But then the same community which they serve ought to be the assessors of their pay. Governors have no right to seek and take what they please; by this, instead of being content with the station assigned them, that of honorable servants of the society, they would soon become absolute masters, despots, and tyrants. Hence, as a private man has a right to say what wages he will give in his private affairs, so has a community to determine what *they* will give and grant of their substance for the administration of public affairs. And, in both cases, more are ready to offer their service at the proposed and stipulated price than are able and willing to perform their duty.

In short, it is the greatest absurdity to suppose it in the power of one, or any number of men, at the entering into society, to renounce their essential natural rights, or the means of preserving those rights; when the grand end of civil government, from the very nature of its institution, is for the support, protection, and defence of those very rights; the principal of which, as is before observed, are Life, Liberty, and Property. If men, through fear, fraud, or mistake, should in terms renounce or give up any essential natural right, the eternal law of reason and the grand end of society would absolutely vacate such renunciation. The right to freedom being the gift of God Almighty, it is not in the power of man to alienate this gift and voluntarily become a slave.

II. *The Rights of the Colonists as Christians.*

These may be best understood by reading and carefully studying the institutes of the great Law Giver and Head of the Christian Church, which are to be found clearly written and promulgated in the New Testament.

* Locke on Government.

By the act of the British Parliament, commonly called the Toleration Act; every subject in England, except Papists, &c., was restored to, and re-established in, his natural right to worship God according to the dictates of his own conscience. And, by the charter of this Province, it is granted, ordained, and established (that is, declared as an original right) that there shall be liberty of conscience allowed in the worship of God to all Christians, except Papists, inhabiting, or which shall inhabit or be resident within, such Province or Territory.* Magna Charta itself is in substance but a constrained declaration or proclamation and promulgation in the name of the King, Lords; and Commons, of the sense the latter had of their original, inherent, indefeasible natural rights,† as also those of free citizens equally perdurable with the other. That great author, that great jurist, and even that court writer, Mr. Justice Blackstone, holds that this recognition was justly obtained of King John, sword in hand. And peradventure it must be one day, sword in hand, again rescued and preserved from total destruction and oblivion.

III. *The Rights of the Colonists as Subjects.*

A commonwealth or state is a body politic, or civil society of men, united together to promote their mutual safety and prosperity by means of their union.‡

The absolute rights of Englishmen and all freemen, in or out of civil society, are principally personal security, personal liberty, and private property:

All persons born in the British American Colonies are, by the laws of God and nature and by the common law of England, exclusive of all charters from the Crown, well entitled, and by acts of the British Parliament are declared to be entitled, to all the natural, essential, inherent, and inseparable rights, liberties, and privileges of subjects born in Great Britain or within the realm. Among those rights are the following, which no man, or body of men, consistently with their own rights as men and citizens, or members of society, can for themselves give up or take away from others.

* See 1 Wm. and Mary, St. 2, c. 18, and Massachusetts Charter.

† Lord Coke's Inst. Blackstone's Commentaries, VI. p. 122. The Bill of Rights and the Act of Settlement.

‡ See Locke and Vattel.

First, “The first fundamental, positive law of all commonwealths or states is the establishing the legislative power. As the first fundamental *natural* law, also, which is to govern even the legislative power itself, is the preservation of the society.” *

Secondly, The Legislative has no right to absolute, arbitrary power over the lives and fortunes of the people; nor can mortals assume a prerogative not only too high for men, but for angels, and therefore reserved for the exercise of the Deity alone.

“The Legislative cannot justly assume to itself a power to rule by extempore arbitrary decrees; but it is bound to see that justice is dispensed, and that the rights of the subjects be decided by promulgated, standing, and known laws, and authorized *independent judges*”; that is, independent, as far as possible, of Prince and people. “There should be one rule of justice for rich and poor, for the favorite at court, and the countryman at the plough.” †

Thirdly, The supreme power cannot justly take from any man any part of his property, without his consent in person or by his representative.

These are some of the first principles of natural law and justice, and the great barriers of all free states and of the British Constitution in particular. It is utterly irreconcilable to these principles and to many other fundamental maxims of the common law, common sense, and reason that a British House of Commons should have a right at pleasure to give and grant the property of the Colonists. (That the Colonists are well entitled to all the essential rights, liberties, and privileges of men and freemen born in Britain is manifest not only from the Colony charters in general, but acts of the British Parliament.) The statute of the 13th of Geo. 2, c. 7, naturalizes even foreigners after seven years’ residence. The words of the Massachusetts charter are these: “And further, our will and pleasure is, and we do hereby for us, our heirs, and successors, grant, establish, and ordain, that all and every of the subjects of us, our heirs, and successors, which shall go to, and inhabit within our said Province or Territory, and every of their children, which shall happen to be born there or on the seas in going thither or returning from thence, shall have and enjoy all liberties and immunities of free and natural subjects within any of the domin-

* Locke on Government. *Salus populi suprema lex esto.*

† Locke.

ions of us, our heirs, and successors, to all intents, constructions, and purposes whatsoever, as if they and every one of them were born within this our realm of England.”

Now what liberty can there be where property is taken away without consent? Can it be said with any color of truth and justice, that this continent of three thousand miles in length, and of a breadth as yet unexplored, in which, however, it is supposed there are five millions of people, has the least voice, vote, or influence in the British Parliament? Have they all together any more weight or power to return a single member to that House of Commons who have not inadvertently, but deliberately, assumed a power to dispose of their lives, liberties, and properties, than to choose an Emperor of China? Had the Colonists a right to return members to the British Parliament, it would only be hurtful; as, from their local situation and circumstances, it is impossible they should ever be truly and properly represented there. The inhabitants of this country, in all probability, in a few years, will be more numerous than those of Great Britain and Ireland together; yet it is absurdly expected by the promoters of the present measures that these, with their posterity to all generations, should be easy, while their property shall be disposed of by a House of Commons at three thousand miles' distance from them, and who cannot be supposed to have the least care or concern for their real interest; who have not only no natural care for their interest, but must be *in effect* bribed against it, as every burden they lay on the Colonists is so much saved or gained to themselves. Hitherto, many of the Colonists have been free from quit rents; but if the breath of a British House of Commons can originate an act for taking away all our money, our lands will go next, or be subject to rack rents from haughty and relentless landlords, who will ride at ease, while we are trodden in the dirt. The Colonists have been branded with the odious names of traitors and rebels only for complaining of their grievances. How long such treatment will or ought to be borne, is submitted.

FRANKLIN'S PREFACE TO THE ENGLISH EDITION OF THE REPORT OF THE COMMITTEE OF CORRESPONDENCE, PUBLISHED BY HIM IMMEDIATELY AFTER HE RECEIVED IT IN LONDON.

All accounts of the discontent so general in our colonies have of late years been industriously smothered and concealed here; it seeming to suit the views of the American minister [Lord Hillsborough], to have it understood that by his great abilities all faction was subdued, all opposition suppressed, and the whole country quieted. That the true state of affairs there may be known, and the true causes of that discontent well understood, the following piece (not the production of a private writer, but the unanimous act of a large American city), lately printed in New England, is republished here. This nation, and the other nations of Europe, may thereby learn, with more certainty, the grounds of a dissension that possibly may, sooner or later, have consequences interesting to them all.

The colonies had from their first settlement been governed with more ease than perhaps can be equalled by any instance in history of dominions so distant. Their affection and respect for this country, while they were treated with kindness, produced an almost implicit obedience to the instructions of the Prince, and even to acts of the British Parliament; though the right of binding them by a legislature in which they were unrepresented was never clearly understood. That respect and affection produced a partiality in favor of everything that was English; whence their preference of English modes and manufactures; their submission to restraints on the importation of foreign goods, which they had but little desire to use; and the monopoly we so long enjoyed of their commerce, to the great enriching of our merchants and artificers.

The mistaken policy of the Stamp Act first disturbed this happy situation; but the flame thereby raised was soon extinguished by its repeal, and the old harmony restored, with all its concomitant advantage to our commerce. The subsequent act of another administration, which, not content with an established exclusion of foreign manufactures, began to make our own merchandise dearer to the consumers there, by heavy duties, revived it again; and combinations were entered into throughout the continent to stop trading with Britain till those duties should be repealed. All were accordingly repealed but

one, *the duty on tea*. This was reserved (professedly so) as a standing claim and exercise of the right assumed by Parliament of laying such duties.

The colonies, on this repeal, retracted their agreement, so far as related to all other goods, except that on which the duty was retained. This was trumpeted here by the minister for the colonies as a triumph; there it was considered only as a decent and equitable measure, showing a willingness to meet the mother country in every advance towards a reconciliation, and a disposition to a good understanding so prevalent that possibly they might soon have relaxed in the article of tea also. But the system of commissioners of customs, officers without end, with fleets and armies for collecting and enforcing those duties, being continued, and these acting with much indiscretion and rashness (giving great and unnecessary trouble and obstruction to business, commencing unjust and vexatious suits, and harassing commerce in all its branches, while that the minister kept the people in a constant state of irritation by instructions which appeared to have no other end than the gratifying his private resentments), occasioned a persevering adherence to their resolutions in that particular; and the event should be a lesson to ministers not to risk through pique the obstructing any one branch of trade; since the course and connection of general business may be thereby disturbed to a degree impossible to be foreseen or imagined. For it appears that the colonies finding their humble petitions to have this duty repealed were rejected and treated with contempt, and that the produce of the duty was applied to the rewarding with undeserved salaries and pensions every one of their enemies, the duty itself became more odious, and their resolution to share it more vigorous and obstinate.

The Dutch, the Danes, and French took this opportunity thus offered them by our imprudence, and began to smuggle their teas into the plantation. At first this was something difficult; but at length, as all business is improved by practice, it became easy. A coast fifteen hundred miles in length could not in all parts be guarded, even by the whole navy of England; especially when their restraining authority was by all the inhabitants deemed unconstitutional, the smuggling of course considered as patriotism. The needy wretches, too, who, with small salaries, were trusted to watch the ports day and night, in all weathers, found it easier and more profitable not only to

wink, but to sleep in their beds; the merchant's pay being more generous than the King's. Other India goods, also, which, by themselves, would not have made a smuggling voyage sufficiently profitable, accompanied tea to advantage; and it is feared the cheap French silks, formerly rejected, as not to the tastes of the colonies, may have found their way with the wares of India, and now established themselves in the popular use and opinion.

It is supposed that at least a million of Americans drink tea twice a day, which, at the first cost here, can scarce be reckoned at less than half a guinea a head per annum. This market, that in the five years which have run on since the act passed, would have paid two million five hundred thousand guineas for tea alone, into the coffers of the Company, we have wantonly lost to foreigners.

Meanwhile it is said the duties have so diminished that the whole remittance of the last year amounted to no more than the pitiful sum of eighty-five pounds, for the expense of some hundred thousands, in armed ships and soldiers, to support the officers. Hence the tea, and other India goods, which might have been sold in America, remain rotting in the Company's warehouses; while those of foreign ports are known to be cleared by the American demand. Hence, in some degree, the Company's inability to pay their bills; the sinking of their stock, by which millions of property have been annihilated; the lowering of their dividend, whereby so many must be distressed; the loss to government of the stipulated four hundred thousand pounds a year, which must make a proportionable reduction in our savings towards the discharge of our enormous debt; and hence, in part, the severe blow suffered by credit in general, to the ruin of many families; the stagnation of business in Spital-fields and Manchester, through want of vent for their goods; with other future evils, which, as they cannot, from the numerous and secret connections in general commerce, easily be foreseen, can hardly be avoided.

Mr. Adams's motion, creating the Committee of Correspondence, had specified three distinct duties to be performed,—to draw up a statement of the rights of the Colonists as men, as Christians, and as subjects; a declaration of the infringement and violation of those rights; and a letter to be sent to the several towns in the Province and to the world as the sense of the town. The drafting of the first

was assigned to Samuel Adams, the second to Joseph Warren, and the last to Benjamin Church.

When the reports of the several committees were prepared, they were presented on the 20th of November to a town meeting at Faneuil Hall by James Otis, who now, as chairman, made his final appearance in public,—the wreck of one of the most brilliant men of genius that America has produced, but yet sustained by the care and sympathy of some friends and the tender reverence of the people, whose cause he had ever ardently and sincerely supported.

“Samuel Adams,” says Hutchinson, writing to a friend, “had prepared a long report, but he let Otis appear in it”; and again, in another letter: “the Grand Incendiary of the Province prepared a long report for a committee appointed by the town, in which, after many principles inferring independence were laid down, many resolves followed, all of them tending to sedition and mutiny, and some of them expressly denying Parliamentary authority.”

The report created a powerful sensation, both in America and in England, where it was for some time attributed to Franklin, by whom it was republished. It is divided into the three subjects specified in the original motion. The first, in three subdivisions, considering the rights of the Colonists as men, as Christians, and as subjects, was from the pen of Samuel Adams; his original draft, together with the preparatory rough notes or headings, being in perfect preservation. It is important, not only as a platform upon which were afterwards built many of the celebrated state papers of the Revolution, but as the first fruits of the Committee of Correspondence.

The error of John Adams, when, fifty years afterwards, he attributed this pamphlet to James Otis, gave rise to some interesting letters from both Jefferson and Adams a few years before their death. John Adams, while questioning the credit due to Jefferson, as the author of the Declaration of Independence, had called that document a “recapitulation” of the Declaration of Rights by the Congress of 1774; and, again, writing to Mr. Pickering, he says: “As you justly observe, there is not an idea in it [the Declaration of Independence] but what had been hackneyed in Congress two years before. The substance of it is contained in the Declaration of Rights, and the Violations of those Rights, in the journals of Congress in 1774. Indeed, the essence of it is contained in a pamphlet voted and printed by the town of Boston before the first Congress met, composed by James Otis, as I suppose, in one of his lucid intervals, and pruned and polished by Samuel Adams.” John Adams’s Works, II. 514.

The fact that Otis was allowed to present the report as his final public act may have given John Adams this impression; for, at this time (1772), he himself took no part in public affairs, but devoted his time to professional pursuits. Otis, however, had nothing to do with preparing the paper, and, to the grief of his friends and his country, had long been incapable of any public service. Jefferson, adopting

I I

the "supposition" of John Adams as to the authorship of the "Rights of the Colonists," wrote to Mr. Madison a year later that the "Otis pamphlet he never saw," and upon this his biographer, continuing the subject in defence of Jefferson's originality, refers repeatedly to the pamphlet in question as the production of Otis. (Randall's Jefferson, I. 189.) There certainly is a similarity between the "Rights of the Colonists" in 1772 and the "Declaration of Rights" in 1774, and between them both and the Declaration of Independence; but, as all are founded on the time-honored principles of Locke, Hooker, Sydney, and Harrington, some of whom are duly quoted by Samuel Adams in his treatise, the disputes as to the originality are needless.

But John Adams's memory failed him in relation to the Declaration of Rights made by the first Congress, as well as in attributing the pamphlet now under consideration to James Otis. He implies that there were two Declarations, the one of Rights, and the other of Violations, which is manifestly incorrect. It would seem, too, that any attempt to lessen the credit of Jefferson, by showing that the essence of the Declaration of Independence was contained in Samuel Adams's pamphlet of 1772 and the Declaration of Rights in 1774, must reflect upon whoever claims the authorship of the latter (since the sentiments are identical), unless it be conceded that Samuel Adams, as is more than probable, was largely engaged in composing the Declaration of Rights, and introduced into that paper the same principles he had advanced in 1772.

Here [in the paper of 1772] is embodied the whole philosophy of human rights, condensed from the doctrines of all time, and applied to the immediate circumstances of America. Upon this paper was based all that was written or spoken on human liberty in the Congress which declared independence; and the immortal instrument itself is, in many features, but a repetition of the principles here enunciated, and of Joseph Warren's list of grievances, which followed the Rights of the Colonists in the report.—*Wells, Life of Samuel Adams.*

The report was the boldest exposition of the American grievances which had hitherto been made public, and was drawn up with as much ability as freedom. Hutchinson says of this report of the committee, that, "although at its first appearance it was considered as their own work, yet they had little more to do than to make the necessary alterations in the arrangement of materials prepared for them by their great director in England, whose counsels they obeyed, and in whose wisdom and dexterity they had an implicit faith. Such principles in government were avowed as would be sufficient to justify the colonies in revolting, and forming an independent state; and such instances were given of the infringement of their rights by the exercise of Parliamentary authority as, upon like reasons, would justify an exception to the authority in all cases whatever; never-

theless, there was color for alleging that it was not 'expressly' denied in 'every' case. The whole frame of it, however, was calculated to strike the colonists with a sense of their just claim to independence, and to stimulate them to assert it."

The person alluded to by Governor Hutchinson, as "the great director in England," was Dr. Franklin, and it is insinuated that he was in effect the author of the report, but this is in no sense true; nor did he wholly approve the measures adopted at that meeting. He thought the affair was carried a little farther than the occasion required at the time, and was afraid that ill consequences would result. It was only the time and manner of bringing the subject forward, however, upon which he had any doubts. To the sentiments expressed in the report of the committee, and adopted by the inhabitants of the town, he fully assented. This is proved by his sending a copy of the proceedings to the press, as soon as he received it in London, with a prefatory notice written by himself. The pamphlet was entitled "The Votes and Proceedings of the Freeholders and other Inhabitants of the Town of Boston, in Town Meeting assembled, according to Law. Published by Order of the Town."—*Starks*.

Frothingham in his "Rise of the Republic" gives perhaps the best general survey of the tendencies and movements toward independence and union in the colonies from the New England Confederation of 1643 onward. He recognizes as the earliest organized action against taxation of the colonies by the British government the instructions adopted by the town of Boston to its representatives, May 24, 1764. These instructions were written by Samuel Adams; and they are printed as the first paper in the first volume of the new edition of Samuel Adams's Writings, collected and edited by H. A. Cushing. Published in the Boston newspapers at the time, they were included the next year in James Otis's pamphlet on "The Rights of the British Colonists asserted and proved." The significance of Adams's paper in 1772 on "The Rights of the Colonists," reprinted in the present leaflet, is sufficiently set forth by Wells in the passage given above from his Life of Samuel Adams, where the paper is printed entire, as it also is in Cushing's edition, vol. ii. Compare this famous statement (1772) of the philosophy of government not only with the Declaration of Rights (1774) and the Declaration of Independence (1776), but with John Wise's statement of the Law of Nature in Government (Old South Leaflet No. 165), which, first published in 1717, was reprinted in Boston the same year, 1772, that Samuel Adams prepared his paper on "The Rights of the Colonists." See the Lives of Adams by Wells and Hosmer; also the chapter on "The Revolution Impending," by Mellen Chamberlain, in Winsor's Narrative and Critical History of America," vi., and especially the editorial notes appended containing a very full bibliography of the historical period. The republication of the report of Adams's committee, in London, by Franklin, whose preface to the London edition is included in the present leaflet, is doubly interesting in view of Franklin's long and conspicuous efforts in behalf of the union of the colonies. See Franklin's Plan of Union, 1754, in Old South Leaflet No. 9; and see his various papers in the interest of the American cause prepared in London at the time of the Stamp Act and in the years immediately following. Samuel Adams is properly called "the Father of the American Revolution." Hutchinson refers to Franklin with considerable justice, in connection with his co-operation with Adams and his associates in 1772, as "their great director in England." His watchfulness, faithfulness, and inspiration never failed.

PUBLISHED BY

THE DIRECTORS OF THE OLD SOUTH WORK,
Old South Meeting-house, Boston, Mass.

428

LIBRARY OF CONGRESS



0 011 698 484 2

EXHIBIT 66

The Right Not to Be Shot: Public Safety, Private Guns, and the Constellation of Constitutional Liberties

JONATHAN LOWY* AND KELLY SAMPSON**

TABLE OF CONTENTS

INTRODUCTION: DUELING VISIONS OF AMERICA’S FIRST FREEDOM	188
I. THE RIGHT FOR WHICH “THERE IS NO REMEDY OF RESURRECTION”	191
II. PROTECTING LIVES: THE FIRST LEGITIMATE OBJECT OF GOOD GOVERNMENT	196
A. <i>America’s First Freedom</i>	196
B. <i>Constitutional Recognition of the Right to Live</i>	198
C. <i>Public Safety is Paramount</i>	198
i. Public Safety Limits Fifth Amendment Rights	198
ii. Public Safety Limits First Amendment Rights	199
iii. Public Safety Limits Property Rights	200
iv. Public Safety Limits Habeas Corpus Rights	200
D. <i>Back to the Future: Protecting Life and Public Safety in Pre-Heller America</i>	201
III. PROTECTING AMERICA’S FIRST FREEDOM IN THE POST- <i>HELLER</i> WORLD	204
CONCLUSION: RECLAIMING AMERICA’S FIRST FREEDOM	205

* Director, Legal Action Project, Brady Center to Prevent Gun Violence.

** Staff Attorney, Legal Action Project, Brady Center to Prevent Gun Violence.

Thanks to Elizabeth Holtzman, who years ago responded to the *Heller* decision by asking: “What about the right to life?” Thanks also to Sara Murphy, Brad Paraszczak, and Matthew Merlo for extraordinary research; Joseph Blocher, Dennis Henigan, Paul Wolfson, Alla Lefkowitz, and Rob Wilcox for advice; and Kelsey Rogers and Saurav Sarkar for invaluable all-around assistance. © 2016, Jonathan Lowy and Kelly Sampson.

INTRODUCTION: DUELING VISIONS OF AMERICA'S FIRST FREEDOM

"They talk about gun rights. What about Chris's right to live?"¹

—Richard Martinez, after his son Chris was killed in the
2014 Santa Barbara spree shootings

"[Y]our dead kids don't trump my Constitutional rights."²

—Joe "the Plumber" Wurzelbacher, responding to Richard Martinez

On the evening of February 26, 2012, a seventeen-year old boy bought a soft drink and candy at a convenience store in Sanford, Florida, and began walking back to the house where he was staying with his father.³ He was spotted by a twenty-eight-year old man, who was sitting in a truck. The man called the police, telling them he was suspicious of the teen. The police told him someone was on the way. Though the police discouraged the man from pursuing the boy, the man left his vehicle and followed him into the rainy night. The man was carrying a loaded semi-automatic pistol, for which the State of Florida had issued him a permit to carry. The man claimed to be carrying the gun to protect his community as a Neighborhood Watch volunteer. What happened next is disputed, but what is certain is that the man shot and killed the teen. A jury later found that the man, George Zimmerman, had committed no crime in shooting and killing the teen, Trayvon Martin. Zimmerman retained his Florida gun permit, entitling him to carry a loaded gun on streets, in parks—virtually anywhere.⁴

Many gun rights proponents assert that it was not just Florida law that allowed Zimmerman to carry and fire his gun, but the United States Constitution—specifically the Second Amendment's right to keep and bear arms (the "RKBA," for short).⁵ The Second Amendment, they claim, entitles anyone who can legally possess a gun to carry and use it in "confrontation," in the home or in

1. Todd Leopold, *Father of Rampage Victim: 'When will this insanity stop?'* CNN (May 27, 2014, 8:01 PM), <http://www.cnn.com/2014/05/24/us/santa-barbara-shooting-victims/>.

2. Joe Wurzelbacher, *An Open Letter: To the Parents of the Victims Murdered by Elliot Rodger*, BARBWIRE (May 27, 2014, 6:05 AM), <http://barbwire.com/2014/05/27/open-letter-parents-victims-murdered-elliott-rodger/>; see also Alan Rappoport, *Ben Carson on Oregon: "I Would Not Just Stand There And Let Them Shoot Me,"* N.Y. TIMES: FIRST DRAFT (Oct. 6, 2015, 1:34 PM), <http://www.nytimes.com/politics/first-draft/2015/10/06/ben-carson-says-he-would-have-been-more-aggressive-against-oregon-gunman/> (quoting Republican presidential candidate Ben Carson saying that "I never saw a body with bullet holes that was more devastating than taking the right to arm ourselves away").

3. For details on the shooting of Trayvon Martin, see Adam Weinstein et al., *The Trayvon Martin Killing, Explained*, MOTHER JONES (Mar. 18, 2012, 12:42 PM), <http://www.motherjones.com/politics/2012/03/what-happened-trayvon-martin-explained>.

4. See Katie McDonough, *George Zimmerman Arrested for Domestic Violence Again—Will He Finally Lose His Guns?*, SALON (Jan. 12, 2015, 4:39 PM), http://www.salon.com/2015/01/12/george_zimmerman_arrested_for_domestic_violence_again/ ("[B]ecause [Zimmerman] was ultimately acquitted in the fatal shooting of Martin, . . . he's free to own and carry as many guns as he'd like.").

5. U.S. CONST. amend. II.

public spaces.⁶ Gun rights lawsuits seek to strike down laws that deny gun carry permits to people who do not have good cause or a particular need to carry guns in public; such restrictions, advocates say, are as unconstitutional as laws prohibiting “almost all persons from speaking out loud in public.”⁷ Other constitutional challenges seek to invalidate laws that require gun owners to have firearms training; mandate safety standards for guns; bar sales of military-style weapons to civilians; or prohibit domestic abusers from possessing guns.⁸ The right to keep and bear arms is not only broad, the NRA says; it is “America’s First Freedom.”⁹

This expansive conception of the Second Amendment is not supported by Supreme Court precedent. *District of Columbia v. Heller*¹⁰ and *McDonald v. City of Chicago*¹¹ recognized only “the right of law-abiding, responsible citizens to use arms in defense of hearth and home,”¹² and emphasized that while total handgun bans are “off the table,”¹³ most and perhaps all other gun laws remain constitutional—including bans on carrying concealed weapons in public.¹⁴ This article contends that a sweeping right to guns also is at odds with our most fundamental rights.

“America’s First Freedom” is *not* the right to firearms; it is the freedom that the Founders, in fact, announced first: the right to life, liberty, and the pursuit of

6. See, e.g., *Woollard v. Gallagher*, 712 F.3d 865, 872 (4th Cir. 2013) (reversing district court decision recognizing “the right of individuals to possess and carry firearms in case of confrontation . . . is a right that extends beyond the home.”). Five states have enacted “Constitutional Carry” laws that allow public carrying without a permit. Vermont has never required permits. See Law Center to Prevent Gun Violence, *Concealed Weapons Permitting Policy Summary* (Sept. 10, 2015), <http://smartgunlaws.org/concealed-weapons-permitting-policy-summary/>.

7. Brief of Amicus Curiae Center for Constitutional Jurisprudence at 12, *McKay v. Hutchens*, No. 12-57049 (9th Cir. Dec. 6, 2012), 2012 WL 6538347.

8. See, e.g., *Heller v. District of Columbia*, 801 F.3d 264 (D.C. Cir. 2015) (striking down parts of District of Columbia gun law requiring re-registration of firearms, passage of a test of knowledge about local gun laws, and one-pistol-per-month registration limitations); *Friedman v. City of Highland Park*, 784 F.3d 406 (7th Cir.), *cert. denied*, 136 S. Ct. 447 (2015) (rejecting challenge to city ordinance generally prohibiting the possession, sale, or manufacture of semi-automatic weapons and large capacity magazines); *United States v. Skoien*, 614 F.3d 638 (7th Cir. 2010) (upholding statute prohibiting domestic-violence misdemeanants from possessing a firearm); *Draper v. Healey*, 98 F. Supp. 3d 77 (D. Mass. 2015), *aff’d*, 2016 U.S. App. LEXIS 11003 (1st Cir. June 17, 2016) (dismissing action challenging the constitutionality of regulation requiring certain safety features to be on handguns sold by dealers).

9. The National Rifle Association, for example, published a magazine entitled *America’s 1st Freedom*. See NAT’L RIFLE ASS’N OF AM., AMERICA’S 1ST FREEDOM, <http://www.americas1stfreedom.org/>.

10. 554 U.S. 570 (2008).

11. 561 U.S. 742 (2010).

12. *Heller*, 554 U.S. at 635.

13. *Id.* at 636.

14. See *id.* at 626–27 & n.26; *McDonald*, 561 U.S. at 785 (plurality opinion) (“[S]tate and local experimentation with reasonable firearms regulations will continue under the Second Amendment.”) (quoting Brief of the States of Texas et al. as Amici Curiae in Support of Petitioners at 23, *McDonald v. City of Chicago*, 561 U.S. 742 (No. 08-1521), 2009 WL 4378909).

happiness.¹⁵ The right to life—or to live¹⁶—is protected by the Constitution and is the bedrock principle on which our government and civil society are founded. While courts have not labeled safety interests as deriving from a “right to live,”¹⁷ courts have recognized that public safety (which derives from, and is intended to protect, that right) is paramount, and no rights may expose people to the risk of imminent harm. Whatever gun rights George Zimmerman had that night in Florida, Trayvon Martin had a countervailing right to live—a right not to be shot.

The right to live is of particular importance in today’s post-*Heller* world, as the Supreme Court has recognized a right (albeit limited) to lethal firearms. Legal challenges seeking to broadly expand that right force courts to grapple with a heretofore largely novel question: Does the Constitution require the public to be exposed to a risk of lethal violence? This article begins to answer that question.

This article argues that the right to live, as enunciated in America’s founding documents, subsumes a right not to be shot,¹⁸ and it serves as a constitutional counterweight that limits Second Amendment rights. We first describe the imminent, lethal risks created by firearms possession and use. We then explore how the Declaration of Independence and Constitution recognize a right to live. We next demonstrate that courts limit the scope of all constitutional rights to prevent people from being exposed to the risk of imminent harm—and that, historically, the RKBA was not allowed to infringe on public safety and order. Finally, we explain that because guns create a risk of imminent harm, the RKBA is necessarily constrained by the Constitution in order to protect public safety. To paraphrase Justice Jackson, the Constitution is not a homicide pact.¹⁹

In sum, there is constitutional relevance to the question posed by Richard Martinez, and by the ever-growing list of gun violence victims. Americans do enjoy a right to enjoy a club in Orlando, Florida; to watch a movie in Aurora, Colorado; to go to church in Charleston, South Carolina, or temple in Oak Creek, Wisconsin; to meet one’s elected representative at a strip mall in Tucson,

15. THE DECLARATION OF INDEPENDENCE para. 2 (U.S. 1776).

16. This article uses “right to live,” as it is a more accurate descriptor and avoids confusion with the abortion issue.

17. Cf. *Bond v. United States*, 134 S. Ct. 2077, 2088 (2014) (“The notion that some things ‘go without saying’ applies to legislation just as it does to everyday life.”).

18. In addition to Elizabeth Holtzman and Richard Martinez, others have referred to a right not to be shot. See Paul Kurtz, *Mayor Nutter Joins Coalition of Anti-Gun Groups*, CBS PHILLY (Apr. 16, 2014, 5:10 PM) <http://philadelphia.cbslocal.com/2014/04/16/mayor-nutter-joins-coalition-of-anti-gun-groups/> (quoting Philadelphia Mayor Michael Nutter saying “I respect the second amendment, but I believe I have a first amendment right not to be shot.”); Andy Borowitz, *Right Not to Get Shot Faces Uphill Fight in Senate*, NEW YORKER (Apr. 9, 2013), www.newyorker.com/humor/borowitz-report/right-not-to-get-shot-faces-uphill-fight-in-senate (lampooning Senate Republicans for opposing a hypothetical “controversial bill supporting the right not to get shot”).

19. See *Terminiello v. City of Chicago*, 337 U.S. 1, 37 (1949) (Jackson, J., dissenting) (“There is danger that, if the Court does not temper its doctrinaire logic with a little practical wisdom, it will convert the constitutional Bill of Rights into a suicide pact.”).

Arizona; to go to work in Washington, D.C., Minneapolis, Minnesota, or Kennesaw, Georgia; to ride a bus in Chicago; to teach or attend a college in Roseburg, Oregon, or Blacksburg, Virginia, or a high school in Littleton, Colorado, or an elementary school in Newtown, Connecticut—without getting shot and killed.²⁰ When considering the breadth of the RKBA, courts must minimize infringement on individuals' right to live and to public safety.

I. THE RIGHT FOR WHICH “THERE IS NO REMEDY OF RESURRECTION”

Second Amendment analysis must begin with the recognition that the risks created by firearms are unique among constitutional rights inasmuch as firearms pose a risk of imminent lethality. There is some risk that speech may incite violence, or that a released suspect may commit a crime; but firearms can be used to kill people in seconds,²¹ and they often are.

In considering the risks created by the RKBA, it must be acknowledged that a right to firearms implicitly embraces, if not a right to shoot, at least an increased risk that others will be shot. Guns are generally possessed in order to shoot them when the owner deems it necessary to do so. And a gun that is legally (or constitutionally) possessed one second can become a cause of needless death or injury the next. Guns possessed in the home for self-defense can lead to the shooting of visitors or family members mistaken for burglars²²; unintentional

20. See Larry Buchanan et al., *How They Got Their Guns*, N.Y. TIMES (June 12, 2016), <http://www.nytimes.com/interactive/2015/10/03/us/how-mass-shooters-got-their-guns.html> (describing via interactive graphic how perpetrators of mass shootings acquired their firearms); Mark Follman et al., *A Guide to Mass Shootings in America*, MOTHER JONES (July 7, 2016, 10:00 PM), <http://www.motherjones.com/politics/2012/07/mass-shootings-map> (discussing recent mass shootings); Mandi Milligan, *FedEx Gunman Joked He Would Shoot Up Workplace*, CBS46 (Apr. 29, 2014, 6:13 AM), <http://www.cbs46.com/story/25375072/shooting-reported-at-fedex-warehouse> (discussing workplace shooting at FedEx in Kennesaw, Georgia); Joseph Lindberg, *Minneapolis Workplace Shooting: Gunman Was Fired, Then The Rampage Began*, PIONEER PRESS (St. Paul, Minn.) (Sept. 30, 2012, 11:01 PM), http://www.twincities.com/ci_21673312/minneapolis-police-office-shooter-who-killed-five-was (discussing 2012 workplace shooting at Minneapolis sign company); Kristen Schorsch, *Blair Holt Case: Killer of Student Blair Holt Gets 100 Years in Prison*, CHI. TRIB. (July 21, 2009), http://articles.chicagotribune.com/2009-07-21/news/0907200506_1_prison-killer-bus (discussing incident where a teen was killed by gunman on bus while attempting to shield his friend from gunfire).

21. A semiautomatic handgun can shoot twenty rounds in 3.3 seconds. See Brian Palmer, *How Many Times Can You Shoot a Handgun in Seven Minutes?*, SLATE (Nov. 9, 2009, 6:25 PM), www.slate.com/articles/news_and_politics/explainer/2009/11/how_many_times_can_you_shoot_a_handgun_in_seven_minutes.html. An assault rifle, with a high-capacity ammunition magazine, can be shot up to sixty-five times per minute, depending on the shooter's skill and experience. See INST. FOR RES. ON SMALL ARMS IN INT'L SEC., *Assault Rifle Fact Sheet #1*, www.guncite.com/assausup.txt.

22. See, e.g., Anoushah Rasta, *HCSO: Husband Accidentally Shoots Wife After Believing Intruder Was Inside Home*, CLICK2HOUSTON.COM (Apr. 24, 2015, 7:43 PM), <http://www.click2houston.com/news/hcso-husband-accidentally-shoots-wife-after-thinking-intruder-was-inside-home/32545450>; Dan Sullivan, *Woman Shoots 7-Year-Old Grandson She Mistook For an Intruder*, TAMPA BAY TIMES (Aug. 19, 2014, 6:59 AM), <http://www.tampabay.com/news/publicsafety/accidents/tampa-grandmother-mistakes-grandson-7-for-intruder-shoots-him-deputies-say/2193576>; *Retired Chicago Cop Fatally Shoots Son After Mistaking Him For Burglar*, CBS NEWS (Oct. 10, 2012, 3:26 PM), <http://www.cbsnews.com/news/retired-chicago-cop-fatally-shoots-son-after-mistaking-him-for-burglar/>; *Cops: Woman Kills Husband*,

shootings, often of children,²³ and suicides.²⁴ Guns are dropped,²⁵ stolen,²⁶ and misfired.²⁷ Guns turn quotidian skirmishes and feuds deadly.²⁸ A gun in the home is twenty-two times more likely to be used in a domestic homicide, suicide, or accidental shooting than in self-defense.²⁹ The risks to women, especially abused women, are even more dire.³⁰ Even trained officers miss their

Mistaking Him For Intruder, NBC NEWS (Sept. 11, 2012, 4:06 AM), http://usnews.nbcnews.com/_news/2012/09/11/13800398-cops-woman-kills-husband-mistaking-him-for-intruder.

23. See U.S. GOV'T ACCT. OFF., ACCIDENTAL SHOOTINGS: MANY INJURIES AND DEATHS CAUSED BY FIREARMS COULD BE PREVENTED (1991); Matthew Miller et al., *Firearm Availability and Unintentional Firearm Deaths*, 33 ACCIDENT ANALYSIS & PREVENTION 477, 477 (2001) ("A statistically significant and robust association exists between gun availability and unintentional firearm deaths."). There are hundreds of documented child shootings per year, and many incidents are uncounted. See Gina Damron & Ann Zaniewski, *4-Year-Old Shot, Killed By 4-Year-Old Cousin in Detroit*, DETROIT FREE PRESS (Jan. 17, 2014, 1:25 PM), <http://www.usatoday.com/story/news/nation/2014/01/17/boy-fatally-shot-by-girl-cousin/4566727/>; Mark Follman, *At Least 194 Children Have Been Shot To Death Since Newtown*, MOTHER JONES (Dec. 10, 2013, 7:00 AM), <http://www.motherjones.com/politics/2013/12/children-killed-guns-newtown-anniversary/>; Michael Luo & Mike McIntire, *Children and Guns: The Hidden Toll*, N.Y. TIMES (Sept. 28, 2013), <http://www.nytimes.com/2013/09/29/us/children-and-guns-the-hidden-toll.html>.

24. See Matthew Miller et al., *Household Firearm Ownership and Rates of Suicide Across the 50 United States*, 62 J. TRAUMA 1029, 1029–35 (2007) (noting that states with higher gun ownership are associated with higher suicide and gun suicide); BRADY CTR. TO PREVENT GUN VIOLENCE, *THE TRUTH ABOUT SUICIDE & GUNS* 3–5 (2015), <http://www.bradycampaign.org/sites/default/files/Truth-About-Suicide-Guns.pdf>.

25. See Claudette Riley, *Police: Student Was Passing Gun That Dropped, Fired*, SPRINGFIELD NEWS-LEDGER (Sept. 6, 2014, 6:45 AM), <http://www.news-leader.com/story/news/local/ozarks/2014/09/05/central-high-firearm-discharged-backpack/15132835/>; *Wife Drops Gun at McDonald's, Shoots Husband*, ASSOCIATED PRESS (Feb. 8, 2013, 3:31 PM), <http://archive.azcentral.com/news/free/20130208oregon-wife-drops-gun-mcdonalds-shoots-husband.html>.

26. See Kelly Matter, *Resident Charged After Killing Home Invasion Suspect with Stolen Gun, Officials Say*, WMBF NEWS (Aug 25, 2015, 7:05 PM), <http://www.wmbfnews.com/story/29872377/resident-charged-after-killing-home-invasion-suspect-with-stolen-gun-officials-say>; *Jacksonville, Florida: Man Faces Charges After Fatally Shooting Girlfriend with Stolen Gun, Police Say*, MISSOPEN (Oct. 7, 2015), <http://www.missopen.com/news/jacksonville-florida-man-faces-charges-after-fatally-shooting-girlfriend-with-stolen-gun-police-say/>.

27. See Laura Zuckerman, *Idaho Professor Accidentally Shoots Himself in the Foot in Chemistry Class*, REUTERS (Sept. 3, 2014, 3:48 PM) <http://www.reuters.com/article/2014/09/03/us-usa-guncontrol-idaho-idUSKBN0GY2E620140903>.

28. Ryan Parker et al., *Bell Gardens Mayor Daniel Crespo Fatally Shot at Home; Wife Released*, L.A. TIMES (Sept. 30, 2014, 10:55 PM), <http://www.latimes.com/local/lanow/la-me-ln-bell-gardens-mayor-shot-20140930-story.html>; Lisa Roose-Church, *'Stand Your Ground' Defense Raised in Road Rage Case*, DETROIT FREE PRESS, (Oct. 7, 2014, 6:06 PM), <http://www.freep.com/story/news/local/michigan/2014/10/07/road-rage-shooting/16844745/>; Lisa Buie, *Curtis Reeves, Suspect in Movie Theater Shooting, Released on Bail*, TAMPA BAY TIMES (July 11, 2014, 3:16 PM), <http://www.tampabay.com/news/courts/criminal/appeals-court-sends-bail-issue-for-accused-movie-theater-shooter-back-to/2188116>.

29. See Arthur Kellermann et al., *Injuries and Deaths Due to Firearms in the Home*, 45 J. TRAUMA: INJ., INFECTION, & CRITICAL CARE 263, 263 (1998).

30. The presence of a gun in the home of an abused woman makes it six times more likely that she will be killed. See Jacquelyn C. Campbell et al., *Assessing Risk Factors for Intimate Partner Homicide*, 250 NAT'L INST. JUST. J. 14, 16 (2003). In 2011, 61% of the women killed with a gun by someone they knew were murdered by a husband or intimate acquaintance. See VIOLENCE POL'Y CTR., *WHEN MEN MURDER WOMEN: AN ANALYSIS OF 2011 HOMICIDE DATA—FEMALES MURDERED BY MALES IN SINGLE VICTIM/SINGLE OFFENDER INCIDENTS 3* (Sept. 2013), available at <http://www.vpc.org/studies/wmmw2013.pdf>.

target far more than they hit it, and misjudgments are compounded in confrontations.³¹ Civilians with less training create greater risks.³² Guns are often possessed and carried by people who may have anger management problems, struggle with impulse control, or abuse alcohol, among other issues that lead to shootings.³³ People with concealed carry licenses have killed hundreds,³⁴ and at least some of those deaths would not have happened if a gun were not present.³⁵ People are shot and killed in the course of everyday life in virtually every place and activity imaginable—in schools, workplaces, shopping centers, theaters, places of worship³⁶; while being strolled in a baby carriage, or riding in a car³⁷—often at the hands of legal gun owners.³⁸ Every year in America about 100,000 people are shot, about 30,000 of them fatally, including homicides, suicides, and unintentional shootings.³⁹

31. A study found that police hit their target 18% of the time in gunfights, 30% when no return of fire. See BERNARD D. ROSTKER ET AL., RAND CENTER ON QUALITY POLICING, EVALUATION OF THE NEW YORK CITY POLICE DEPARTMENT FIREARM TRAINING AND FIREARM-DISCHARGE REVIEW PROCESS 14 (2008), available at http://www.nyc.gov/html/nypd/downloads/pdf/public_information/RAND_Firearm_Evaluation.pdf.

32. See, e.g., *Deadly Hunting Accident Reported in Delaware County, Oklahoma State Bureau of Investigation Reports*, NEWSOK (Sept. 28, 2015), <http://newsok.com/deadly-hunting-accident-reported-in-delaware-county-oklahoma-state-bureau-of-investigation-reports/article/5449878>; Cassandra Taloma, *Target Shooting Ricochet Blamed For Man's Death in Tule Springs*, LAS VEGAS REV.-J. (Mar. 9, 2015, 5:08 PM), <http://www.reviewjournal.com/news/las-vegas/target-shooting-ricochet-blamed-man-s-death-tule-springs>; Elizabeth Daley, *Pennsylvania Baby Shot in Head in Apparent Hunting Accident*, REUTERS (Sept. 29, 2014), <http://www.reuters.com/article/2014/09/29/us-usa-pennsylvania-infant-idUSKCN0HO21Z20140929>.

33. See, e.g., Shamar Walters, *Pregnant Teen Critically Hurt by Road-Rage Shooting in Reedley, California*, NBC NEWS (Aug. 4, 2015, 9:31 AM), <http://www.nbcnews.com/news/us-news/pregnant-teen-critically-hurt-road-rage-shooting-reedley-california-n403651>; *Road Rage Leads To Shooting, Suicide*, ABC NEWS (June 19, 2001), <http://abcnews.go.com/US/story?id=93070>; see also Jeffrey W. Swanson et al., *Guns, Impulsive Angry Behavior, and Mental Disorders: Results from the National Comorbidity Survey Replication*, 33 BEHAV. SCI. & L. 199 (2015) (finding that 8.9% of Americans who have a history of angry, impulsive behavior also have access to guns); Garen J. Wintemute, *Alcohol Misuse, Firearm Violence Perpetration, and Public Policy in the United States*, PREVENTIVE MED. (2015), http://www.calwellness.org/assets/docs/news/wintemute_alcohol_misuse.pdf (observing that alcohol misuse coupled with firearms ownership or access is associated with various firearms risks).

34. Between May 2007 and September 27, 2015, 750 people were killed by concealed carry license holders, excluding self-defense incidents. See VIOLENCE POL'Y CTR., *Total People Killed By Concealed Carry Killers*, <http://www.concealedcarrykillers.org/total-people-killed-by-concealed-carry-killers/>.

35. For example, it is questionable whether George Zimmerman would have left his car, against the advice of police, to follow someone he viewed as a threat, if he did not have a gun—in which case he would not have interacted with Trayvon Martin.

36. See *supra* note 20.

37. See Iris Carreras, *Antonio Santiago Murder Update: De'Marquise Elkins, Ga. Teen Convicted of Killing Baby in Stroller; Sentenced to Life in Prison*, CBS NEWS (Sept. 13, 2013, 10:54 AM), <http://www.cbsnews.com/news/antonio-santiago-murder-update-demarquise-elkins-ga-teen-convicted-of-killing-baby-in-stroller-sentenced-to-life-in-prison/>; *Police: 9 Year Old Shot in Car*, LEX18.COM (Mar. 8, 2015, 8:04 PM) <http://www.lex18.com/story/28289485/police-9-year-old-child-shot-in-car>.

38. See *supra* note 20 (discussing mass shootings, some by legal gun owners, including at an Aurora, Colorado movie theater; Lafayette, Louisiana movie theater; Virginia television station; Sandy Hook elementary school; Wisconsin Sikh temple; and constituent meeting outside a supermarket in Tucson).

39. See BRADY CAMPAIGN TO PREVENT GUN VIOLENCE, KEY GUN VIOLENCE STATISTICS, <http://www.bradycampaign.org/key-gun-violence-statistics>.

No other right exposes the public to such grave risks of lethal, imminent harm. While some claim that laws allowing more gun carrying reduce crime,⁴⁰ that assertion has been debunked.⁴¹ Research suggests that tighter gun regulations are associated with reduced firearm death rates and criminal access to guns,⁴² while more gun ownership and availability is associated with more homicides, suicides, unintentional shootings, and harm to society.⁴³ Regardless

40. See, e.g., JOHN R. LOTT, JR., *MORE GUNS LESS CRIME* 160 (1998).

41. John J. Donohue, *The Impact of Concealed-Carry Laws*, in *EVALUATING GUN POLICY: EFFECTS ON CRIME AND VIOLENCE* 287, 324 (Jens Ludwig & Philip J. Cook eds., 2003) (stating that evidence “should put to rest any notion that shall-issue laws can be expected to lower crime . . . most states experienced increases in crime from the passage of shall-issue laws”); Ian Ayres & John J. Donohue III, *Shooting Down the “More Guns, Less Crime” Hypothesis*, 55 *STAN. L. REV.* 1193, 1296 (2003) (“No longer can any plausible case be made on statistical grounds that shall-issue laws are likely to reduce crime for all or even most states.”); Jens Ludwig, *Concealed-Gun-Carrying Laws and Violent Crime: Evidence from State Panel Data*, 18 *INT’L REV. L. & ECON.* 239, 239 (1998) (noting that laws broadly allowing concealed carrying of weapons “have resulted, if anything, in an increase in adult homicide rates.”) (emphasis in original). See generally Mark Duggan, *More Guns, More Crime*, 109 *J. POL’Y. ECON.* 1086 (2001).

42. See *UPDATED EVIDENCE AND POLICY DEVELOPMENTS ON REDUCING GUN VIOLENCE IN AMERICA* (Daniel Webster, & Jon Vernick, eds., 2014), available at http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-gun-policy-and-research/resources/digital_update_Webster_Vernick.pdf (noting that repeal of Missouri permit-to-purchase law was associated with an increase in gun homicides, which was not seen in neighboring state); *REDUCING GUN VIOLENCE IN AMERICA: INFORMING POLICY WITH EVIDENCE AND ANALYSIS* 111–19 (Daniel Webster, & Jon Vernick, eds., 2013) (finding that more restrictive gun laws are associated with fewer guns diverted to criminals); Daniel Webster et al., *Effects of Missouri’s Repeal of Its Handgun Purchaser Licensing Law on Homicides*, 91 *J. URBAN HEALTH* 293 (2014) (finding that repeal of handgun licensing law was associated with increased homicide rate); Eric W. Fleegler et al., *Firearm Legislation and Firearm-Related Fatalities in the United States*, 173 *JAMA INTERNAL MED.* 732 (2013) (observing that the higher number of firearm laws in a given state is associated with a lower rate of firearm fatalities); Kenneth R. Conner & Yueying Zhong, *State Firearm Laws and Rates of Suicide in Men and Women*, 25 *AM. J. PREVENTIVE MED.* 320, 322–23 (2003) (finding that more restrictive firearms laws are associated with lower rates of suicide); John J. Donohue III et al., *The Impact of Right to Carry Laws and the NRC Report: The Latest Lessons for the Empirical Evaluation of Law and Policy* (Nat’l Bureau of Econ. Res., Working Paper 18294, 2012), available at <http://media.law.stanford.edu/publications/archive/pdf/ssrn-id1632599.pdf> (noting that evidence suggests that right to carry laws are associated with statistically significant increases in murder, rape, aggravated assault, robbery, auto theft, burglary, and larceny, with no statistically significant estimate of decreased crime); *Permit to Purchase Licensing For Handguns Fact Sheet*, *JOHNS HOPKINS BLOOMBERG SCH. OF PUB. HEALTH* (Mar. 2015), http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-gun-policy-and-research/publications/FactSheet_PermittoPurchaseLicensing.pdf.

43. See, e.g., Philip Cook & Jens Ludwig, *The Social Costs of Gun Ownership*, 90 *J. PUB. ECON.* 379, 387 (2006) (noting that increase in gun prevalence may cause greater lethality and harm to the community); Matthew Miller et al., *State-Level Homicide Victimization Rates in the US in Relation to Survey Measures of Household Firearm Ownership, 2001–2003*, *SOC. SCI. & MED.* (2006) (finding that states with higher rates of firearm ownership had significantly higher homicide victimization rates”); Lisa M. Hepburn & David Hemenway, *Firearm Availability and Homicide: A Review of the Literature*, 9 *AGGRESSION & VIOLENT BEHAV.* 417 (2004) (finding that households with firearms are at higher risk for homicide, and there is no net beneficial effect of firearm ownership); Matthew Miller et al., *Rates of Household Firearm Ownership and Homicide Across US Regions and States, 1988–1997*, 92 *AM J. PUB. HEALTH* 1988 (2002) (finding that in areas where household firearm ownership rates were higher, a disproportionately large number of people died from homicide); David Hemenway et al., *Gun Use in the United States: Results of National Survey*, 6 *INJ. PREVENTION* 263 (2000) (finding that most

of the benefits of gun possession, guns indisputably create risks, causing people to be killed and injured who would not have been if a gun was not present.⁴⁴

Some courts have recognized the uniquely lethal consequences of the RKBA. Judge William H. Walls upheld New Jersey's law restricting the public carrying of firearms, noting:

[T]his Court shall be careful—most careful—to ascertain the reach of the Second Amendment right that the plaintiffs advance. That privilege is unique among all other constitutional rights to the individual because it permits the user of a firearm to cause serious personal injury—including the ultimate injury, death—to other individuals, rightly or wrongly. In the protection of oneself and one's family in the home, it is a right use. In the deliberate or inadvertent use under other circumstances, it may well be a wrong use. A person wrongly killed cannot be compensated by resurrection.⁴⁵

Judge J. Harvie Wilkinson III similarly noted the potentially lethal consequences of extending the Second Amendment right to a broad right to carry guns in public, stating:

To the degree that we push the right beyond what the Supreme Court in *Heller* declared to be its origin, we circumscribe the scope of popular governance, move the action into court, and encourage litigation in contexts we cannot foresee. This is serious business. We do not wish to be even minutely responsible for some unspeakably tragic act of mayhem because in the peace of our judicial chambers we miscalculated as to Second Amendment rights. It is not far-fetched to think the *Heller* Court wished to leave open the possibility that such a danger would rise exponentially as one moved the right from the home to the public square.⁴⁶

Judge David Ebel, writing for the Tenth Circuit, similarly wrote:

The right to carry weapons in public for self-defense poses inherent risks to others. Firearms may create or exacerbate accidents or deadly encounters, as the longstanding bans on private firearms in airports and courthouses illustrate. The risk inherent in firearms and other weapons distinguishes the Second Amendment right from other fundamental rights that have been held to be evaluated under a strict scrutiny test, such as the right to marry and the

self-reported self-defense gun uses likely illegal); David Hemenway & Deborah Azrael, *The Relative Frequency of Offensive and Defensive Gun Uses: Results from a National Survey*, 15 VIOLENCE & VICTIMS 257, 271 (2000) (finding that firearms are used more to intimidate than for self-defense).

44. The claim that the right not to be shot is protected by more guns also ignores the fact that the person being shot has, probably, a right to shoot back, at a person who also has a right not to be shot.

45. *Piszczatoski v. Filko*, 840 F. Supp. 2d 813, 816 (D.N.J. 2012), *aff'd sub nom. Drake v. Filko*, 724 F.3d 426 (3d Cir. 2013), *cert. denied sub nom. Drake v. Jerejian*, 134 S. Ct. 2134 (2014).

46. *United States v. Masciandaro*, 638 F.3d 458, 475–76 (4th Cir. 2011).

right to be free from viewpoint discrimination, which can be exercised without creating a direct risk to others.⁴⁷

These thoughtful jurists are properly cautious about extending the relatively narrow right recognized in *Heller*, not only because of the public safety risks created by expanding the Court's holding, but because the *Heller* opinion counsels restraint. Indeed, the *Heller* majority referred to 19th-century cases which rejected expansive gun rights as antithetical to a civil society, in noting that “commentators and courts routinely explained that the right was not a right to keep and carry any weapon whatsoever in any manner whatsoever and for whatever purpose.”⁴⁸

Nonetheless, in this early era in the post-*Heller* world some courts are struggling to grasp for principles that properly account for the right's unique dangers. Some courts have applied precedent developed for far less risk-creating rights, like the right to free speech.⁴⁹ Doing so fails to account for the inherent risks posed by guns. For example, content-based restrictions on speech are far more troubling than the risks of unfettered discourse, but the lethal risks posed by firearms make preventative, prophylactic measures essential to protect public safety. Since “[a] person wrongly killed cannot be compensated by resurrection,”⁵⁰ Second Amendment cases demand consideration of the bedrock right to live, and of individuals' personal safety. This is not a novel concept. It is a return to first principles.

II. PROTECTING LIVES: THE FIRST LEGITIMATE OBJECT OF GOOD GOVERNMENT

A. America's First Freedom

The right to live is America's first right, and it predates the nation's founding. John Locke listed the right to life as the foremost natural right.⁵¹ William Blackstone explained that life “cannot legally be disposed of or destroyed by any individual”⁵² The Founding Fathers incorporated these natural law concepts into the Declaration of Independence. Chiefly drafted by Thomas Jefferson, the Declaration was the United States' first official act. It established the nation, and defined the purpose of government—to protect man's inalienable rights:

47. *Bonidy v. U.S. Postal Serv.*, 790 F.3d 1121, 1126 (10th Cir. 2015).

48. *District of Columbia v. Heller*, 554 U.S. 570, 626 (2008).

49. *E.g.*, *Tyler v. Hillsdale Cnty. Sheriff's Dep't*, 775 F.3d 308, 327 (6th Cir. 2014) (holding that strict scrutiny should apply in Second Amendment challenge to federal statute prohibiting the possession of firearms by persons committed to a mental institution), *reh'g en banc granted, opinion vacated*, 2015 U.S. App. LEXIS 6638 (6th Cir. Apr. 21, 2015).

50. *Piszczatoski*, 840 F. Supp. 2d at 816.

51. JOHN LOCKE, *THE SECOND TREATISE ON CIVIL GOVERNMENT* 9–10 (1986) (1690).

52. WILLIAM BLACKSTONE, *1 COMMENTARIES* *129.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights that among these are Life, Liberty and the pursuit of Happiness. That to secure these rights, Governments are instituted among Men⁵³

There it is—America’s first freedom. America was founded with the declaration that the core purpose of government is to protect life, liberty and, as the Declaration goes on to say, “Safety and Happiness.”⁵⁴ Jefferson later reiterated, “the care of human life & happiness, & not their destruction, is the first and only legitimate object of good government.”⁵⁵

While the Declaration does not have the force of law, as “Father of the Constitution” James Madison put it, the purpose of the Constitutional Convention was to establish a government that would “provide for the safety, liberty and happiness of the Community.”⁵⁶ And the Supreme Court has recognized:

It is always safe to read the letter of the Constitution in the spirit of the Declaration of Independence. No duty rests more imperatively upon the courts than the enforcement of those constitutional provisions intended to secure that equality of rights which is the foundation of free government.⁵⁷

The right to live is accepted internationally as well,⁵⁸ and international authorities have explicitly noted that stronger regulation of firearms is needed for the United States to “fulfil its obligation to protect the right to life and to reduce gun violence”⁵⁹

53. THE DECLARATION OF INDEPENDENCE para. 2 (U.S. 1776).

54. *Id.*

55. THOMAS JEFFERSON, TO THE REPUBLICANS OF WASHINGTON COUNTY, MARYLAND (1809), available at <http://founders.archives.gov/documents/Jefferson/03-01-02-0088>.

56. 1 THE RECORDS OF THE FEDERAL CONVENTION OF 1787, at 53 (M. Farrand ed., 1911). In a letter to Jefferson, Madison wrote that the Declaration was one of the “best guides” to the “distinctive principles” of the U.S. government. See FOUNDERS EARLY ACCESS, *James Madison to Thomas Jefferson 8 Feb. 1825*, available at <http://rotunda.upress.virginia.edu/founders/default.xqy?keys=FOEA-print-02-02-0384>.

57. *Gulf, Colo. & Santa Fe Ry. Co. v. Ellis*, 165 U.S. 150, 160 (1897).

58. See, e.g., G.A. Res. 217 (III) A, Universal Declaration of Human Rights, art. III (Dec. 10, 1948); Geneva Convention Relative to the Treatment of Prisoners of War, art. 3(1)(a), Aug. 12, 1949, 6 U.S.T. 3316; International Covenant on Civil and Political Rights, art. 6, Dec. 16, 1966, 999 U.N.T.S. 171.

59. U.N. Committee on the Elimination of Racial Discrimination, *Concluding Observations on the Combined Seventh to Ninth Periodic Reports of the United States of America*, at 7 (Aug. 29, 2014) [hereinafter CERD Report]; see *id.* 7–8 (“The Committee urges the State party to take effective legislative and policy measures to fulfill its obligation to protect the right to life and to reduce gun violence, including by adopting legislation expanding background checks for all private firearm transfers and prohibiting the practice of carrying concealed handguns in public venues; increasing transparency concerning gun use in crime and illegal gun sales, including by repealing the Tiahrt Amendments; and reviewing the Stand Your Ground Laws to remove far-reaching immunity and ensure strict adherence to the principles of necessity and proportionality when deadly force is used for self-defence”).

B. Constitutional Recognition of the Right to Live

Beyond the Declaration of Independence, the right to live is recognized in the Due Process Clauses of the Constitution's Fifth and Fourteenth Amendments, which prohibit the government from depriving "any person of life, liberty, or property without due process of law."⁶⁰ In fact, courts have recognized that police shooting of suspects may infringe on their "right not to be shot."⁶¹ The constitutional liberty interest also arguably protects the freedom to live without the risk of gunfire in streets, parks, places of worship and other venues frequented in ordinary life. And while some argue the Due Process Clause is expressly a "negative" right that restricts government action,⁶² as Dean Erwin Chemerinsky has stated, "the argument that the Constitution provides only negative liberties is based on a questionable distinction between government action and government inaction."⁶³ Regardless of the extent to which the right is "positive," the Due Process Clauses embrace a constitutional right to live.

C. Public Safety is Paramount

Courts consistently recognize that every right is constrained by the bedrock interest in public safety. Although these cases do not expressly rely on the right to live, these public safety interests necessarily derive from the right to live and, hence, the need to protect lives.

i. Public Safety Limits Fifth Amendment Rights

The Supreme Court has recognized that the public safety risks posed by even a single unsecured gun can outweigh Fifth Amendment rights. In *New York v. Quarles*,⁶⁴ a woman claimed she was raped by an armed man, who then fled into a store.⁶⁵ When the suspect was apprehended, the officer asked him about

60. U.S. CONST. amend. V; U.S. CONST. amend. XIV.

61. *See, e.g.*, *Weinmann v. McClone*, 787 F.3d 444, 448 (7th Cir. 2015) (stating that a person "has a constitutional right not to be shot on sight if he did not put anyone else in imminent danger or attempt to resist arrest for a serious crime"); *Yates v. Cleveland*, 941 F.2d 444, 447 (6th Cir. 1991) ("Yates 'had a right not to be shot unless he was perceived to pose a threat to the pursuing officers or to others[.]'" (alterations in original) (quoting *Robinson v. Bibb*, 840 F.2d 349, 351 (6th Cir. 1988)); *see also* *Tennessee v. Garner*, 471 U.S. 1, 9 (1984) ("The suspect's fundamental interest in his own life need not be elaborated upon.").

62. *See, e.g.*, *DeShaney v. Winnebago Cnty. Dep't of Soc. Servs.*, 489 U.S. 189, 196 (1989).

63. Erwin Chemerinsky, *Making the Case for a Constitutional Right to Minimum Entitlements*, 44 *MERCER L. REV.* 525, 535 (1993); *see also* Cass R. Sunstein, *Social and Economic Rights? Lessons from South Africa 2* (Pub. Law and Legal Theory, Working Paper No. 12, 2001) (explaining that government action is needed to create conditions to enjoy rights); Eugene Volokh, *Positive Rights, the Constitution, and Conservatives and Moderate Libertarians*, *VOLOKH CONSPIRACY* (May 7, 2013, 4:21 PM), <http://volokh.com/2013/05/07/positive-rights-the-constitution-and-conservatives-and-moderate-libertarians/> ("While it's true that the U.S. Constitution lacks some of the 'positive rights' that people sometimes discuss under that label . . . it does secure other positive rights; and indeed, some positive rights are a longstanding feature of American legal traditions.").

64. 467 U.S. 649 (1984).

65. *Id.* at 651–53.

the gun's whereabouts without giving *Miranda* warnings.⁶⁶ Despite the constitutional violation, the Supreme Court refused to exclude the suspect's response—"the gun is over there"—because the danger created by the gun "presents a situation where concern for public safety must be paramount to adherence to the literal language of the prophylactic rules enunciated in *Miranda*."⁶⁷ Even though "there was nothing to suggest that any of the officers were any longer concerned for their own physical safety,"⁶⁸ the firearm, which the suspect had concealed in a supermarket, "obviously posed more than one danger to the public safety: an accomplice might make use of it, a customer or employee might later come upon it."⁶⁹ The Court held that the police's need to find and secure the gun "in a situation posing a threat to the public safety outweighs the need for the prophylactic rule protecting the Fifth Amendment's privilege against self-incrimination."⁷⁰ The public safety concerns raised by a gun outweighed the Fifth Amendment right of suspects.

ii. Public Safety Limits First Amendment Rights

The Supreme Court has long recognized that public safety concerns limit the scope of First Amendment rights. The First Amendment does not allow one to falsely yell "fire!" in a crowded theater, because the public has a greater right not to be exposed to the risk of being trampled by a mob heading for the exits.⁷¹ Under the Fighting Words Doctrine, words "which by their very utterance inflict injury or tend to incite an immediate breach of the peace" are not within the scope of speech protected by the Constitution.⁷² Hence, the Supreme Court held that an individual had no right to call his city marshal a "damned racketeer" and "Fascist."⁷³ The Constitution does not protect speech or press likely to "incit[e] or produc[e] imminent lawless action,"⁷⁴ because of the risks to public safety. The Assembly right is qualified by the word "peaceably," underlining the predominance of public safety.⁷⁵ Expressive conduct with the intent to intimidate also is not protected.⁷⁶

The free exercise of religion is constrained when life or safety is at risk. The Supreme Court has stated that "it was never intended or supposed that the [First] amendment could be invoked as a protection against legislation for the punish-

66. *Id.* at 652.

67. *Id.* at 653.

68. *Id.* at 655.

69. *Id.* at 657.

70. *Id.*

71. See *Schenck v. United States*, 249 U.S. 47, 52 (1919).

72. *Chaplinsky v. New Hampshire*, 315 U.S. 568, 572 (1942); see *id.* (Fighting words "are of such slight social value . . . that any benefit that may be derived from them is clearly outweighed by the social interest in order and morality.").

73. *Id.*

74. *Brandenburg v. Ohio*, 395 U.S. 444, 447 (1969) (per curiam).

75. See *Cox v. Louisiana*, 379 U.S. 536, 558 (1965).

76. See *Virginia v. Black*, 538 U.S. 343 (2003).

ment of acts inimical to the peace, good order and morals of society.”⁷⁷ Courts have upheld bans on religious acts involving snake handling, recognizing that the Constitution does not preclude “a law prohibiting the practice of a religious rite which endangers the lives, health or safety of the participants, or other persons.”⁷⁸ As the Supreme Court of North Carolina noted, “Which is superior, the public safety or the defendants’ religious practice? The authorities are at one in holding that the safety of the public comes first.”⁷⁹

iii. Public Safety Limits Property Rights

The “sacred” constitutional right to private property⁸⁰ is constrained to protect public safety. The rule of necessity allows entry onto the land of another if “it is or reasonably appears to be necessary to prevent serious harm.”⁸¹ The overriding principle is *salus populi suprema lex*—“the safety of the people is the supreme law.”⁸² When human life is concerned, “the law requires the highest degree of care In all cases of doubt the safest course should be pursued remembering that it is infinitely better to do too much than run the risk of doing too little.”⁸³ The nuisance doctrine also constrains property rights when public safety may be harmed.⁸⁴

iv. Public Safety Limits Habeas Corpus Rights

The Constitution’s Habeas Corpus provision is expressly limited by public safety concerns, allowing for the great Writ to be suspended “when in Cases of Rebellion or Invasion the public Safety may require it.”⁸⁵ For example, when the Ku Klux Klan was terrorizing blacks in the South,⁸⁶ President Grant called on Congress for legislation to suspend the Writ.⁸⁷ While there is certainly no

77. *Davis v. Beason*, 133 U.S. 333, 342 (1890).

78. *Lawson v. Commonwealth*, 164 S.W.2d 972, 974 (Ky. 1942); *see also State ex rel. Swann v. Pack*, 527 S.W.2d 99, 112 (Tenn. 1975) (holding that, under the Free Exercises Clauses of the United States and Tennessee Constitutions, “a religious practice may be limited, curtailed or restrained to the point of outright prohibition, where it involves a clear and present danger to the interests of society”).

79. *State v. Massey*, 51 S.E.2d 179, 180 (N.C. 1949).

80. *See* U.S. CONST. amend. V; *Wilkinson v. Leland*, 27 U.S. (2 Pet.) 627, 657 (1829).

81. RESTATEMENT (SECOND) OF TORTS § 197 (1965); *see also, e.g., Vincent v. Lake Erie Transp. Co.*, 124 N.W. 456 (Minn. 1910); *Ploof v. Putnam*, 71 A. 188 (Vt. 1908); *Seavey v. Preble*, 64 Me. 120 (1874).

82. *Seavey*, 64 Me. at 121.

83. *Id.* at 121–22.

84. *See Camfield v. United States*, 167 U.S. 518, 522–23 (1897).

85. U.S. CONST. art. I, § 9.

86. *Jim Crow and the Ku Klux Klan*, LIB. OF VA., <http://www.lva.virginia.gov/exhibits/mitchell/jimcrow.htm>.

87. Ulysses S. Grant, President of the United States, Proclamation 204—Suspending the Writ of Habeas Corpus in the County of Union, South Carolina (Nov. 10, 1871); *The Enforcement Acts (1870–71)*, THE RISE AND FALL OF JIM CROW, http://www.pbs.org/wnet/jimcrow/stories_events_enforce.html (“Many states were afraid to take strong action against the Klan either because the political leaders sympathized with the Klan, were members, or because they were too weak to act.”); *American*

suggestion that the Writ should be suspended today, the key point is that the threat of violence by private actors can have significant constitutional relevance.

D. Back to the Future: Protecting Life and Public Safety in pre-Heller America

The notion that the public's right to live and to safety cannot be overridden by the RKBA is longstanding—as is the recognition that overly broad gun rights are inconsistent with the Framers' vision of a civil society.

Gun-toting tall tales aside, constraining the RKBA to protect the public is as American as bald eagles. “[C]olonial and early state governments routinely exercised their police powers to restrict the time, place, and manner in which Americans used their guns.”⁸⁸ In the years after the founding, for example, states began to pass laws prohibiting concealed carrying of weapons.⁸⁹ After the Civil War, many states wrote new constitutions,⁹⁰ several of which granted citizens some right to bear arms and the majority of which explicitly empowered the state legislature to regulate the RKBA.⁹¹ Even state legislatures that did not have explicit authority to regulate firearms had implicit authority to do so.⁹² In sharp contrast to claims by today's gun lobby that citizens are entitled to possess military-style assault weaponry,⁹³ several states outlawed the private carrying of military grade weapons during the Reconstruction era.⁹⁴

President: A Reference Resource, MILLER CTR. OF PUB. AFFS., http://millercenter.org/president/events/04_20.

88. Robert H. Churchill, *Gun Regulation, the Police Power, and the Right to Keep Arms in Early America: The Legal Context of the Second Amendment*, 25 LAW & HIST. REV. 139, 162 (2007).

89. See An Act to Prevent Persons in this Commonwealth from Wearing Concealed Arms, Except in Certain Cases (La. 1813), reprinted in CLAYTON E. CRAMER, CONCEALED WEAPON LAWS OF THE EARLY REPUBLIC 143–44 (1999); Saul Cornell, *The Early American Origins of the Modern Gun Control Debate: The Right to Bear Arms, Firearms Regulation, and the Lessons of History*, 17 STAN. L. & POL'Y REV. 571, 591 (2006); see also, e.g., Ark. Act of Apr. 1, 1881; 1881 Colo. Rev. Stat. p. 229 § 149; Fla. Act of Feb. 12, 1885, ch. 3620, § 1; Ill. Act of Apr. 16, 1881; 1880 Ky. Gen. Stat. ch. 29, § 1; 1893 Neb. Cons. Stat. § 5604; 1879 N.C. Sess. Laws ch. 127; N.D. Pen. Code § 457 (1895); Act of Mar. 18, 1859, Ohio Laws 56; Laws of Oregon 1885, An Act to Prevent Persons from Carrying Concealed Weapons, §§ 1–4, p. 33; 1880 S.C. Acts 448, § 1; S.D. Terr. Pen. Code § 457 (1877); Tex. Act of Apr. 12, 1871; 1869–1870 Va. Acts 510; Wash. Code § 929 (1881); W. Va. Code ch. 148, § 7 (1870).

90. See SAUL CORNELL, A WELL-REGULATED MILITIA: THE FOUNDING FATHERS AND THE ORIGINS OF GUN CONTROL IN AMERICA 160–64 (2006).

91. For example, Texas's 1876 Constitution gave the legislature, “power, by law, to regulate the wearing of arms, with a view to prevent crime.” TEX. CONST. of 1876, art. I, § 26. Idaho's Constitution noted that “the Legislature shall regulate the exercise of this right by law.” IDAHO CONST. of 1889, art. I, § 11. Utah's Constitution noted that “nothing herein shall prevent the legislature from defining the lawful use of arms.” UTAH CONST. of 1896, art. I, § 6.

92. See, e.g., Ark. Act of Apr. 1, 1881.

93. See, e.g., *Friedman v. City of Highland Park*, 784 F.3d 406 (7th Cir.), cert. denied, 136 S. Ct. 447 (2015).

94. Tennessee law forbade carrying, “publically or privately, any . . . belt or pocket pistol, revolver, or any kind of pistol, except the army or navy pistol, usually used in warfare, which shall be carried openly in the hand.” 1879 Tenn. Pub. Acts. ch. 186. Wyoming, Arkansas and Texas enacted similar bans. 1876 Wyo. Comp. Laws ch. 52, § 1; Ark. Act of Apr. 1, 1881; Tex. Act of Apr. 12, 1871.

One striking example of how the balance has shifted from safety rights to gun rights comes from Georgia. In an 1874 case, *Hill v. State*,⁹⁵ the Supreme Court of Georgia upheld the constitutionality of a Georgia law that forbade people from carrying pistols and certain other weapons into courts, places of worship, or election grounds.⁹⁶ The court recognized that

The constitution is to be construed as a whole. One part of it is not to be understood in such a sense as will militate against another. It is as well the duty of the general assembly to pass laws for the protection of the person and property of the citizen as it is to abstain from any infringement of the right to bear arms. The preservation of the public peace, and the protection of the people against violence, are constitutional duties of the legislature, and the guarantee of the right to keep and bear arms is to be understood and construed in connection and in harmony with these constitutional duties.

... One guarantee is not to swallow up all others, but each is to be construed reasonably in reference to its plain intent, and in reference to other duties cast upon the legislature, and other rights guaranteed to the people.⁹⁷

Recognizing that the right to free exercise of religion could be infringed if guns were brought to church, the court noted that other rights are “*just as solemnly guaranteed, and just as necessary for the existence of a free state as the right to bear arms*, and either of them is seriously interfered with if it is the right and the custom of ‘people’ to attend such meetings armed as though for battle.”⁹⁸ Relying on the state Constitution’s RKBA, the court concluded that “the right to keep and bear arms is not infringed if the exercise of it be by law prohibited at places and times when a proper respect for the majesty of the law, a sense of decency and propriety, or the danger of a breach of the peace, forbid it.”⁹⁹ The *Hill* court explained that expansive gun rights are wholly inconsistent with the Framers’ vision of a civilized society:

To suppose that the framers of the constitution ever dreamed, that in their anxiety to secure to the state a well regulated militia, they were sacrificing the dignity of their courts of justice, the sanctity of their houses of worship, and the peacefulness and good order of their other necessary public assemblies, is absurd. To do so, is to assume that they took it for granted that their whole scheme of law and order, and government and protection, would be a failure, and that the people, instead depending upon the laws and the public authorities for protection, were each man to take care of himself, and to be always ready to resist to the death, then and there, all opposers On the contrary, we take it for granted that they meant what they have said, and that in

95. 53 Ga. 472 (1874).

96. *Id.* at 473.

97. *Id.* at 476–77.

98. *Id.* at 478 (emphasis added).

99. *Id.* at 479. The court held that the Second Amendment was not incorporated.

guaranteeing the right to keep and bear arms, they never dreamed they were authorizing practices, common enough, it is true, among savages, and not unusual even in the olden time, when every man was at war with his neighbor, but utterly useless and disgraceful in a well ordered and civilized community.¹⁰⁰

The *Hill* court’s reasoning provides a direct contrast to recent Georgia legislation that allows for widespread public carrying of guns, including in city halls and airports.¹⁰¹

A similar decision by the Texas Supreme Court in 1872, *English v. State*,¹⁰² was relied on by the *Heller* majority for the proposition that the RKBA has limitations, including “the historical tradition of prohibiting the carrying of ‘dangerous and unusual weapons.’”¹⁰³ The Texas court upheld a statute regulating and in some cases prohibiting the carrying of deadly weapons, finding it “little short of ridiculous, that any one should claim the right to carry upon his person any of the mischievous devices inhibited by the statute, into a peaceable public assembly, as, for instance, into a church, a lecture room, a ball room, or any other place where ladies and gentlemen are congregated together.”¹⁰⁴ Like *Hill*, the court found that civilized society should be resistant to practices that encourage individuals to take the law into their own hands:

It will doubtless work a great improvement in the moral and social condition of men, when every man shall come fully to understand that, in the great social compact under and by which States and communities are bound and held together, each individual has compromised the right to avenge his own wrongs, and must look to the State for redress. We must not go back to that state of barbarism in which each claims the right to administer the law in his own case; that law being simply the domination of the strong and the violent over the weak and submissive.¹⁰⁵

Emphasizing the State’s responsibility to prevent crime, here by restricting gun carrying, the court quoted John Stuart Mill:

It is one of the undisputed functions of government, to take precautions against crime before it has been committed, as well as to detect and punish it afterwards. The right inherent in society, to ward off crimes against itself by antecedent precautions, suggests the obvious limitations to the maxim, “that

100. *Id.* at 478–79.

101. *See* Safe Carry Protection Act, 2014 Ga. Laws. 599 (codified in scattered titles of GA. CODE ANN.) (authorizing Georgians with carry permits to bring their guns into (with exceptions) bars, schools, unsecured government buildings, churches, and areas of airport terminals outside the screening zone).

102. 35 Tex. 473 (1872).

103. *District of Columbia v. Heller*, 554 U.S. 570, 627 (2008).

104. *English*, 35 Tex. at 478–79.

105. *Id.* at 477.

purely self-regarding misconduct cannot properly be meddled with in the way of prevention or punishment.”¹⁰⁶

Other antebellum laws likewise allowed broad regulation of firearms to protect public safety.¹⁰⁷ And courts construing the scope of the RKBA in state constitutions almost universally recognized the government’s broad authority to protect public safety, applying, as Adam Winkler has explained, a doctrinal framework that allowed for “reasonable regulation.”¹⁰⁸

III. PROTECTING AMERICA’S FIRST FREEDOM IN THE POST-*HELLER* WORLD

The recognition of a right to live raises numerous issues beyond the scope of this article, including whether the right can form the basis to strike down laws that unreasonably expose the public to heightened risks of lethal violence.¹⁰⁹ The premise of this article is more limited; we argue that the right to live—the right not to be shot—necessarily constrains the scope of the Second Amendment.

Given the Supreme Court’s recognition that the “paramount” public safety concern created by a single firearm outweighed a suspect’s Fifth Amendment rights against self-incrimination, consider the risks created with expansive gun rights. In addition to the previously-discussed risks posed by gun possession,¹¹⁰ guns are mislaid and misused, by even the most trained professionals,¹¹¹ including in stores,¹¹² just as in *Quarles*. Such risks are significant Constitutional counterweights to expansive RKBA arguments.

The public safety limitations on the First Amendment also have important implications in the post-*Heller* world. How can the same man who is not entitled to express “fighting words”—because of the risk that they would instigate a (probably non-lethal) fight—be entitled to approach his nemesis,

106. *Id.* at 478 (quoting JOHN STUART MILL, ON LIBERTY (1859)).

107. See Brief of Thirty-Four Professional Historians and Legal Historians as Amici Curiae at App., *McDonald v. Chicago*, 561 U.S. 742 (2010) (No. 08-1521), 2010 WL 59025, at *1A.

108. See Adam Winkler, *Scrutinizing the Second Amendment*, 105 MICH. L. REV. 683 (2007); Adam Winkler, *The Reasonable Right to Bear Arms*, 17 STAN. L. & POL’Y REV. 593, 597–603 (2006).

109. Although not addressed in this article, another issue for future discussion is the implications of possible discriminatory impact on the right to live. See Complaint, Coal. for Safe Chi. Cmty. v. Vill. of Riverdale (Ill. Cir. Ct. Cook Cnty. July 7, 2015) (No. 2015-CH-10390), <http://www.scribd.com/doc/270818355/Coalition-for-Safe-Chicago-Communities-Complaint> (alleging that cities’ failure to regulate gun dealers violates Illinois’ civil rights law due to discriminatory impact); CERD Report, *supra* note 59, at 11 (calling on U.S. to take action to reduce racial discrimination, including by reducing gun violence and eliminating Stand Your Ground laws, since they disproportionately impact minorities).

110. See *supra* notes 21–44 and accompanying text.

111. See *Armed School Security Guard Clark Arnold Leaves Gun Unattended in Student Bathroom*, HUFFINGTON POST (Jan. 18, 2013, 2:21 PM), http://www.huffingtonpost.com/2013/01/18/armed-school-security-gua_n_2505747.html; Ryan J. Reilly, *DEA Agent Who Shot Self Presses Forward In Suit Against Gov’t (Video)*, TALKINGPOINTS MEMO (Feb. 2, 2011, 3:10 PM), <http://talkingpointsmemo.com/muckraker/dea-agent-who-shot-self-presses-forward-in-suit-against-gov-t-video>.

112. In South Carolina a loaded gun was left in the toy aisle of a department store. See Lisa Gresci, *Police Identify Man Wanted for Leaving Loaded Gun in Target Toy Aisle*, WMBF NEWS (June 5, 2014), <http://www.wmbfnews.com/story/25698439/real-gun-found-in-toy-aisle>.

with the same (albeit silent) hostility, armed with a loaded gun? Even if he is not constitutionally-entitled to shoot his foe, as a practical matter it makes little difference if he is entitled to carry his gun when he approaches; the risk presented is far more imminent and lethal than the fight that might have been provoked by Mr. Chaplinsky's name-calling. Consider that it took the man who shot Rep. Gabby Giffords and others thirty seconds to fire thirty-three lethal rounds, killing six and wounding thirteen.¹¹³

Similarly, how can a minister, who has no right to wield a poisonous snake, be entitled to pack a loaded handgun in church,¹¹⁴ exposing his parishioners to a far more dangerous risk that, unlike the snake, has no religious import?¹¹⁵ The more imminent, lethal risks created by firearms yield a constrained reading of the Second Amendment.

Other current laws also flip the proper constitutional balance, prioritizing gun rights over public safety and the right to live. For example, laws that entitle people to carry guns on private property deprive property owners of their right to exclude guns,¹¹⁶ and they ignore “the supreme law” that prioritizes public safety. Courts should look to correct these constitutional imbalances.¹¹⁷

CONCLUSION: RECLAIMING AMERICA'S FIRST FREEDOM

The fundamental right to live necessarily constrains the right to keep and bear arms. When considering arguments to expand Second Amendment rights, courts should consider the overriding constitutional interest in protecting lives and public safety, and should ensure that any expansion of the RKBA does not expose the public to an increased risk of being shot. This approach is entirely consistent with *Heller* and *McDonald*, which explicitly allow for virtually all serious gun policy solutions, other than total handgun bans.¹¹⁸ The *Heller* Court's reliance on self-defense justifications itself implicitly assumes a right to live. After all, the right recognized in *Heller* did not spring from any freestanding right to engage in “confrontation”; people are entitled to use arms “in defense of hearth and home” in order to protect life (and perhaps property).¹¹⁹

113. Mark Follman & Gavin Aronsen, “A Killing Machine”: *Half of All Mass Shooters Used High-Capacity Magazines*, MOTHER JONES (Jan. 30, 2013, 7:01 AM), <http://www.motherjones.com/politics/2013/01/high-capacity-magazines-mass-shootings>.

114. For example, Kentucky bars the use of reptiles in religious services or gatherings but allows concealed weapons in places of worship. Compare KY. REV. STAT. ANN. § 437.060, with KY. REV. STAT. ANN. § 237.110.

115. The Georgia law raises other Constitutional issues; by allowing guns in city councils, some people are likely to be chilled from exercising First Amendment rights—in a forum where political speech should be freest.

116. See, e.g., *Ramsey Winch, Inc. v. Henry*, 555 F.3d 1199 (10th Cir. 2009).

117. While not a focus of this article, courts also should be sensitive to the potential of broad firearms rights to chill or infringe upon other liberty interests, such as speech and free exercise of religion.

118. See *McDonald v. City of Chicago*, 561 U.S. 742, 785 (2010) (plurality opinion); *District of Columbia v. Heller*, 554 U.S. 570, 635 (2008).

119. *Heller*, 554 U.S. at 593–94 (discussing Blackstone).

Even as *Heller* found a limited right of people to defend themselves with guns, the Court did not disturb the broad authority to protect public safety from the risks posed by firearms. *Heller* and *McDonald* are fully supportive of a constitutional right to live.

Additional constitutional scholarship is needed to develop a legal framework that fully addresses the Second Amendment's lethal consequences, and to flesh out the implications of a right to live. This article intends to offer a start, a few insights, and a plea to keep the public's safety interests paramount. Rights are, in essence, stars in a constitutional firmament, constrained by counterweights that form the basis of our civil society, most importantly the right to live. As courts chart maps to navigate through the post-*Heller* world, they should be guided, foremost in their thoughts, by America's true First Freedom.