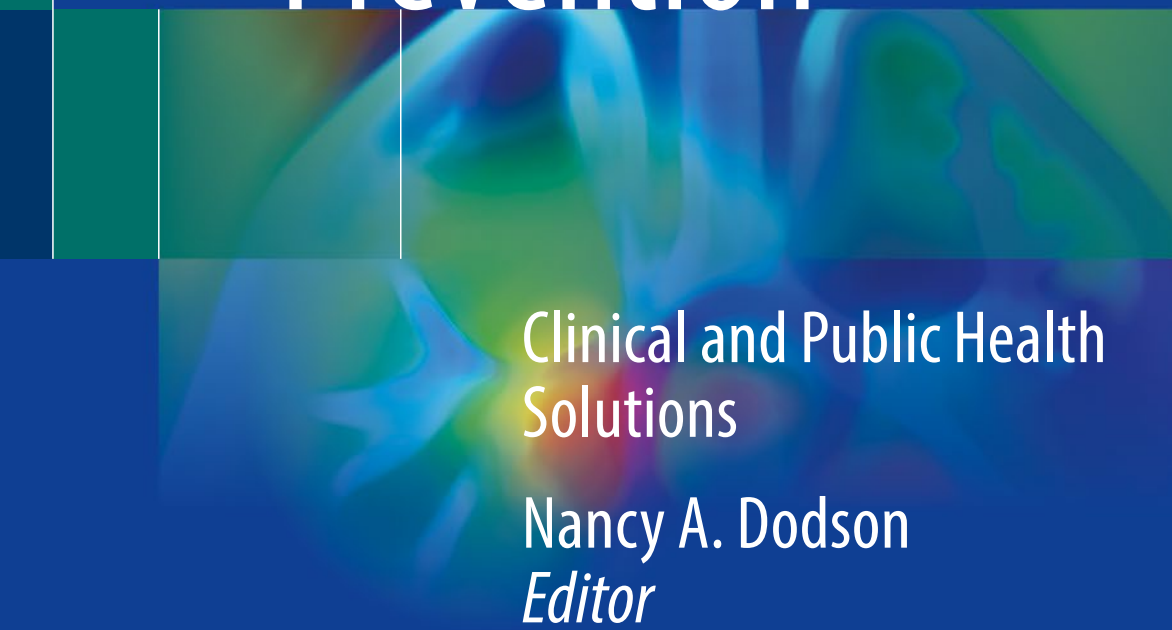
Adolescent Gun Violence Prevention



Clinical and Public Health Solutions

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Editor

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To my parents. Thank you for everything.

Preface

> "Like the scripture says, 'Everyone shall sit under their own vine and fig tree, and noone shall make them afraid' . . . they'll be safe in the nation we've made . . ." (from *Hamilton*, lyrics by Lin-Manuel Miranda)

When 20 children and 6 educators were killed inside of the Sandy Hook Elementary School in December 2012, the entire nation felt a rare moment of collective heartbreak. The week following the massacre was filled with tears and remembrances of the young children as families prepared for the funerals. Over the following weeks and months, the story faded from the headlines. However, it ignited a grassroots movement for gun violence prevention involving thousands, and eventually millions, of people. One of those people was me.

Sandy Hook broke my heart open to the fact that the United States is the only developed country where children are shot to death every day. Most of those children are adolescents who die by gun homicide and suicide; their deaths rarely make the headlines. The more I read, wrote, learned, and taught on the subject, the more I came to see gun violence as a silent but horrific health crisis for American teens. As an adolescent medicine physician, I was honored to be given the chance to edit this scientific and public health text on adolescent gun violence that you now have in your hands.

During the writing and editing of this book, the United States faced two major crises. The first was our public reckoning with racism following the murder of George Floyd. Many of us in medicine—particularly those of us who are white—asked ourselves how we could start to do the work of anti-racism within our profession. One way is to openly discuss the way that guns steal the lives of young Black men. Black teens and young adults, who make up just 2% of the country's population, account for 37% of the victims of gun homicide; indeed, gun violence is the leading cause of death for Black boys and men younger than 40 years old.[1] In the United States, guns travel a loosely regulated pipeline from the factory into

[1] Educational Fund to Stop Gun Violence and Coalition to Stop Gun Violence. (2021). A Public Health Crisis Decades in the Making: A Review of 2019 CDC Gun Mortality Data. Available: http://efsgv.org/2019CDCdata

communities. Families lose their sons, while the arms industry enjoys yearly profits to the tune of $28 billion.[2] Pediatricians, socially minded physicians, and public health professionals have always spoken up when corporate financial gains are prioritized over human life, and it is time we say: "Black Lives Matter—more than gun industry profits."

The second major crisis we faced was, of course, Covid-19. The uncertainty and anxiety of Covid-19 led to a surge in gun purchases of nearly 2 million excess guns (beyond expected sales) in the first few months of the pandemic. Early research finds that these gun sales were associated with a predictable rise in gun injury and death,[3] likely due to the compounding influence of economic despair, family stress under quarantine, and the overall national malaise. This makes the work of gun violence prevention even more urgent. But the Covid-19 pandemic, at least in my state of New York, also showed how effective we can be at tackling public health crises when we follow scientific data and take seriously our responsibility for each other's well-being. Here, in New York, where we were "first and worst" in the national Covid-19 pandemic, we saw the Covid-19 death rate plummet in a matter of weeks in Spring 2020, due to universal mask-wearing and social distancing. How many lives could we save from gun violence if we treated it as a public health challenge to be tackled and vanquished, rather than a *fait accompli* of life in America?

I hope that this book offers you a grounding in the gun violence epidemic facing America's teenagers, as well as solutions that focus both downstream on potential gun violence victims and perpetrators, as well as upstream on the gun industry. Dr. Ronca offers an overview of the "parallel tragedies" facing US adolescents: rural suicide and urban homicide. Dr. Al-Husayni and I offer hope by describing and drawing lessons from prior public health victories in the United States. Drs. Bushman and Romer review the scientific evidence for "the weapons effect," a concept that is crucial to the understanding of why guns so often lead to death. Drs. Luke and Talib discuss another core concept: preventing access to lethal methods of suicide as a means of reducing the risk of suicide. Drs. Yeates and Silver describe gun violence using an infectious disease model. Dr. Agrawal and colleagues review the evidence on gun violence exposure as an adverse childhood experience which can cause toxic stress. Drs. Myszko and Parekh write about ways in which the pediatrician can fight gun violence from their office, including their own experience changing the electronic medical record to screen for risk. Drs. Bjorkman and Rice report on suicide and homicide risk assessment for adolescents. Dr. Dunbar discusses healthy media use, given lingering questions about the relationship between violent media and guns. Drs. Menezes and Oestricher describe the legislative solutions that would make the biggest impact on adolescent gun deaths.

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[2] MacBride, E. America's Gun Business Is $28B. The Gun Violence Business Is Bigger. Forbes. November 25, 2018. https://www.forbes.com/sites/elizabethmacbride/2018/11/25/americas-gun-business-is-28b-the-gun-violence-business-is-bigger/?sh=2ef161b23ae8.

[3] Schleimer JP, McCort CD, Pear VA, Shev A, Tomsich E, Asif-Sattar R, et al. Firearm Purchasing and Firearm Violence in the First Months of the Coronavirus Pandemic in the United States. medRxiv 2020.07.02.20145508; doi: https://doi.org/10.1101/2020.07.02.20145508 (pre-print)

Lastly, Jack Kelly, a high school-aged gun violence prevention activist with March for Our Lives, writes about the movement from the perspective of youth. I think you will appreciate his irreverence and determination. When outlining this book, it was crucial for me to include a chapter on the youth perspective. After all, the guns manufactured today, with normal care and maintenance, will last for the next century. So our action or inaction on gun violence in this moment will impact future generations we will never meet.

Jonas Salk, inventor of the polio vaccine, once said that the most important question we can ask ourselves is, "Are we being good ancestors?"

Well? Are we?

Warmly,

Bronx, New York, USA Nancy A. Dodson, MD, MPH

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Chapter 1
Epidemiology of Adolescent Gun Violence: The Parallel Tragedies of Rural Suicide and Urban Homicide

Kristen Ronca

Gun Violence in the United States

When it comes to firearm deaths, the United States stands alone among developed nations. From 2003 to 2012, over 300,000 people died from firearms—more Americans than died in all of World War II [1–3]. In 2012, the United States had the highest rates of firearm deaths when compared to other developed countries [4]. Americans experience ten times the rates of firearm assaults compared to people in other nations with top-ranking GDPs [5]. American lives accounted for 80% of all firearm deaths among 23 of the most developed countries in 2011 [6]. Brazil was the only country that superseded the United States in death rates by firearms when comparing all countries from 1990 to 2016 [7].

Lax gun control policies and high rates of gun production are responsible for the widespread gun violence plaguing US citizens [8]. After Australia enacted sweeping gun reforms in response to a mass shooting in 1996, that country saw a significant reduction in firearm deaths, particularly suicides, in the following decade [9]. The United States has the highest rates of gun ownership, with more guns in civilian possession than people who live in the United States. There are 120.5 guns for every 100 people in the United States, while in Japan there is fewer than 1 gun for every 100 people [8].

Gun violence has become a forefront discussion in politics and the news; the issue is anything but new. Rates of gun violence have increased disproportionately to population growth. The most dramatic increase of firearm deaths occurred through the mid-1970s, with another large surge in the early 1990s [3].

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There was a 16% increase in firearm deaths from 2014 to 2017, and by 2017, people died from firearm injuries at the highest rate in the proceeding 40 years [10].

Across the United States, rates of gun violence vary; all states are affected. The highest death rates from firearms occur in Alaska, Alabama, and Montana. These estimates do not account for state-specific population characteristics [11]. Lower suicide and homicide rates are found in the New England region; states with higher suicide and homicide events are in the southeast region of the United States [3].

The variability among states is due in large part to differences in access to guns and the strength of state gun laws. States with more restrictive gun laws have decreased rates of firearm morbidity and mortality. States with more gun laws, including stricter background checks, restriction of guns in public places, and banning of assault weapons, have lower household ownership of firearms and decreased rates of firearm mortality [12]. Stricter legislation, designated by a "legislative strength score" assigned in quartiles and compiled by the Brady Campaign to Prevent Gun Violence [13], were observed in states with lower overall mortality, and lower suicide and homicide rates individually (as seen in states such as California, New York, Massachusetts, etc.) [12]. States with lower legislative strength scores, such as Arizona, New Mexico, Louisiana, and Mississippi, had higher firearm mortality [12]. These findings were based on ecological and cross-sectional data; data was adjusted for age, race/ethnicity, sex, poverty, unemployment, college education, population density, rates of non-firearm suicides and/or non-firearm homicides, and rates of firearm ownership. A stepwise analysis was also performed on firearm ownership. A stronger background check system was the only specific legislative measure associated with lower overall firearm fatality [12]. Higher legislative strength scores were also associated with lower rates of household ownership; higher household ownership was associated with higher firearm mortality [12].

Recent studies have confirmed these findings: laws for universal background checks decrease childhood gun deaths [14–21]. People died by firearm suicide less often in states with gun laws regarding waiting periods, universal background checks, safe storage or open carrying regulations; the proportion of suicide by firearms in states with these laws also decreased [14]. For example, suicide rates in South Dakota increased by 7.6% the year after repealing their waiting period law (compared to a 3.3% increase nationally); after California implemented a law to restrict open carry, suicide rates decreased by 3.5% (compared to national increase of 2.1%); Oklahoma suicide rates decreased by 1.7% after implementing a law requiring a concealed carry permit to openly carry a gun (compared to the national increase of 0.6%) [14]. Interventions to decrease gun violence in the United States need to take into account the variability in production and regulation of guns.

Pediatric Populations

Among 23 high-income countries, 87% of children younger than 14 years killed by guns died in the United States [6]. US children are killed by firearms between 36 and 42 times the rate of children in other high-income countries [10, 22]. Firearms are the second leading cause of death for American children, behind car crashes which, unlike gun violence, have decreased significantly over time [3]. Approximately 1300 children younger than 18 years old die each year from firearm-related injuries [23]. As Gary Slutkin M.D., the founder of the CeaseFire program, stated about gun violence, "It's kind of like heart disease and cancer for the young. That's what kids are dying from—and it's what kids are seeing their friends die from." [24]

From 1993 to 2000, approximately 22,661 children 14 and younger were treated for non-fatal firearm injuries in ERs across the nation. 5542 children died from firearm injuries over the same span of time [25]. From 2010 to 2015, the incidence of children younger than 19 years old presenting to the emergency room for gunshot wounds was as high as 19 per 100,000 persons [26]. In 2008, 14,831 children were seen in the emergency department for firearm injuries in the United States. The incidence of pediatric firearm injuries in the emergency department increased to 15,576 by 2010, with an average of 7 deaths each day [27]. From 2001 to 2012, there were a total of 322,370,927 visits to pediatric ambulatory sites for gun injuries.

Urban Suicide and Rural Homicide: Parallel Tragedies

Pediatric gun deaths are largely a result of suicides among boys and young men in rural areas, and homicides among boys and young men in urban areas. Unintentional firearm injuries, while often particularly tragic because they involve very young children, make up a small percentage of all childhood gun deaths [4]. Still, American youths are ten times more likely to die from unintentional shootings compared with youths living in other countries [6]. Firearms caused 85% of homicides and 47% of suicides among 15–19-year-old adolescents in the United States [10]. Rural suicide and urban homicide are such formidable public health crises that they are nearly equivalent in scope: the rates of firearm mortality in very rural counties are the same as the rates in very urban counties across the United States [28, 29]. Rural counties have identical pediatric firearm mortality rates, with an adjusted rate ratio of 0.91, compared to urban counties (95% confidence interval 0.63–1.32) [28]. Pediatric suicides by firearms occur at 1.89 times the rate in rural counties compared to urban; pediatric firearm homicides occur at 2.35 times the rate in urban counties compared to rural [28]. In this way, urban and rural rates of death by firearms are equivalent.

The same paradigm is true for adults. In the general population, rural counties have the same rate of firearm deaths as urban counties at 14.30 and 14.34 deaths per 100,000 person-years, respectively [29].

Rural Suicide

American children and teens die from suicide at a rate twice as high as other countries [30]. CDC data shows that 60.5% of deaths by firearms are due to suicide; suicide rates have exceeded homicide rates over the past 30 years [3, 10]. For adolescents and young adults aged 15–24, suicide rates were 11.8 per 100,000 per data from the CDC and have increased by 30% from 2000 to 2016 [31]. Even beyond completed suicide, suicidal thinking is rampant among adolescents. The Youth Risk Behavior Assessment found that 17.2% of high-school students seriously contemplated suicide in the preceding year and 13.6% had made a suicide plan. 7.4% of high-schoolers attempted suicide [32]. Suicide is currently the second leading cause of death among adolescents and college-aged young adults [10].

The high rate of suicide among adolescents is due in part to the impulsivity that is a developmentally normal characteristic of that age group. People often contemplate suicide for between 5 and 10 minutes prior to the attempt [33–35], and for many, the urge to attempt suicide will pass within an hour [36]. This is particularly true for the younger aged populations, where suicide attempts are more likely to be spontaneous; by contrast, suicide attempts by older adults are more likely to be planned [6]. Impulsivity combined with access to lethal means is a major driver of suicide among American youth.

Half of youth suicide attempts are made with a firearm [10]. Firearms are nearly universally fatal when used in a suicide attempt, with a mortality rate over 90% [37]. Adolescents attempt suicide at the same rate in urban and rural areas in the United States, but access to handguns, shotguns, and rifles in rural areas contributes to the high rates of completed suicide among rural young people [38, 39]. A literature review by Miller et al. in 2012 demonstrated that there was a two to ten times higher risk of firearm suicide in homes with firearms compared to homes without. The increased risk was demonstrated consistently across every case-control study evaluated [40]. States with higher rates of firearms in the home had higher rates of suicide [41], which may account for the fact that the suicide rate is twice as high in rural areas as in urban areas [10, 12, 42]. A survey of over 10,000 adolescents found that of youths who lived at home with a firearm, 40% felt they could access and shoot the firearm in their house. Teen firearm access was also significantly higher for those living in rural areas [43].

While the gun control debate often focuses on ensuring that those with mental health disorders are not able to access guns, mental illness is not the most important risk factor for suicide by firearm. CDC data from the 2004 National Violent Death Reporting System showed that 56–79% of suicide victims had no history of mental health problems or psychiatric treatment [44]. Rates of gun ownership are the same in houses of individuals with a history of mental illness as those without a mental illness [45]. Among American households, gun ownership was not associated with psychiatric disease including anxiety or other mood disorders or substance abuse. Notably, suicidal ideation and planning were also not associated with psychiatric disorders, implying the high rates of suicide seen in households with guns cannot be explained by differences in mental health [46].

Rates of mental illness are not higher in rural areas, and therefore cannot explain the higher rates of suicide in rural areas [47–50]. Having a gun in the home increases the risk of suicide even when correcting for psychiatric disorders or other risk factors for suicide [51, 52]. We now have ample evidence that access to guns, and not psychiatric illness, helps to explain the disproportionate rate of completed, lethal suicide in rural areas in the United States; implications for interventions to the gun violence epidemic must take this into account.

Urban Homicide

Adolescents in urban areas suffer injury and death from gun assaults and homicides. Overall, children and adolescents in the United States die from gun homicide at a rate 42 times higher than children in other high-income countries, with male homicide by firearm rates 22 times higher and female homicide rates 11 times higher [6]. The national homicide rate is driven by firearm homicides: the overall homicide rate is 6 per 100,000 persons, with firearm homicide making up 4.1 per 100,000 persons of the overall rate [6]. Of firearm homicides taking place, 15–24 year-olds have the highest rates of firearm homicide victimization [6]. CDC data shows a higher concentration of firearm homicides in urban areas than in the nation as a whole, with children of ages 10–19 at a higher risk. Therefore, addressing urban youth gun violence is vital to decreasing national homicide. Urban youth are at a relatively lower risk for suicide by firearms, demonstrating the dichotomy of rural vs urban gun violence issues [53]. Up to 80% of firearms used by urban adolescents are obtained illegally [54], which is another contrast from the rural gun violence epidemic which is largely characterized by family-owned guns.

One of the most striking aspects of adolescent gun violence is the enormous racial disparity seen in homicide deaths. Data from across the country demonstrate increases in rates of homicide and gun violence among urban youth [25, 26, 55–58]. Firearm death is the leading cause of death for Black men aged 15–34 and the second leading cause of death for Black women aged 15–24. Hispanic teens are also at a higher risk of dying by firearm homicide than white teens [3, 55]. Males experience higher rights of homicide than women of the same ethnicity, but Black female homicide rates are higher than homicide rates of white men [3]. Addressing youth gun homicide would do a great deal to correct racial health disparities in the United States.

What makes American adolescents so vulnerable to gun violence? Schmidt et al. systematically reviewed individual, family, peer, and community level risk factors for victimization by and perpetration of gun violence [59]. In the 28 studies reviewed, drug and alcohol use, retaliatory attitudes, prior involvement in violence, peer gun ownership, and neighborhood disadvantage were associated with increased risk for involvement in gun violence. Victimization was associated with drug use, truancy, delinquency, access to firearms in the home, single-parent household, low parental supervision, and communities with low socioeconomic status. Similarly,

perpetration of gun violence was associated with prior exposure to violence, substance use, delinquency, access to firearms, and experiencing firearm victimization. Of note, risk factors for suicide by firearms showed less consistent associations, with access to firearms in the home being the only clear risk factor [59]. When thinking about what factors could contribute to the astounding number of youth gun homicides in the United States, criminality does not appear to be higher in the United States than other countries [6]. Victimization rates using comparable international surveys show similar reports of crime and violence among some high-income countries [60, 61]. As Richardson and Hemenway explain in their international comparison of firearm fatality, the United States is likely average in its basic violence rates, but the higher firearm rates may also encourage non-firearm homicide through retaliation [6].

Economic Burden

The economic burden of the gun violence epidemic is difficult to measure. While adolescents carry the highest burden, children less than 5 years of age with gunshot wounds are over two times more likely to die [26]. In 2010, the societal costs of suicides and homicides was equal to 1.1% of the GDP in the United States that year [3]. Half of children admitted for gunshot wounds leave the hospital with a disability [62]. Beyond the extensive hospital bills and cost to the medical system, the criminal justice system related to gun violence is over 60 billion dollars annually [26]. To the families and loved ones of the 1700 children who die annually from gun violence [10], there is no way to measure the cost of a life.

Because the US adolescent gun death crisis is defined by two parallel epidemics, local public health interventions and solutions for rural and urban gun violence will vary. However, easy access to guns remains a consistent risk factor for gun death across different populations. With the burden of guns on the children and adolescents of the United States being so high, one thing is clear: there is no longer time to ignore the gun violence epidemic.

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Chapter 2
What Does a "Public Health Approach" Mean? Lessons from Earlier Successes

Noor Al-Husayni and Nancy A. Dodson

What does a "public health approach to gun violence prevention" really mean? The term "public health" has its roots in the nineteenth century. In 1848, many social justice movements around the world were gaining traction, and with them, new revelations on the ways in which health problems were caused by social and economic inequality, and poor living and working conditions. Prior to these social reforms, the common view was that poor people's ill health was caused by their weak morals and self-imposed dirty living conditions. Public health was used to denote the actions that governments and societies could take to protect the health of the people rather than actions that an individual person or physician could take [1].

In the nineteenth century, public health efforts were generally aimed at infection control, sanitation, sewage, and safer working conditions. Since the twentieth century, noninfectious epidemic health problems have also come under the lens of public health. Car crash fatalities, lead poisoning, and tobacco all provide examples in which enormous societal health gains have been made through a comprehensive public health approach. Consider car crash deaths. In 1922, 18 people died for every 100 million miles driven; now, 1 person dies for every 100 million miles driven [2]. Lead poisoning of children was an increasingly common problem from the introduction of lead paint in the 1880s and leaded gasoline in the 1920s until public health interventions started in earnest in the 1970s; the average blood lead level in preschool-aged children fell from 15 mg/dL in the late 1970s to less than 2 mg/dL by 2006 [3]. In 1983, nearly 700 billion cigarettes were smoked in the United States; in 2012, that number was more than halved. Since 1965, the number of American adults who smoke has also decreased by half [4]. By looking at the themes that run

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through the stories of car crash deaths, lead poisoning, and tobacco, we can glean important lessons that can help shape our approach to gun violence prevention. These common truths are as follows:

- Medical and scientific knowledge is necessary—but not sufficient—to drive policy change.
- Industry invariably resists public health-minded reforms.
- Grassroots activists can change social norms and attitudes toward threats to public health.
- The public health approach switches the focus from the *individual's* failure to be healthy to the *environment's* failure to promote health.

Childhood Lead Poisoning

People have known, since the earliest uses of lead, that it has neurocognitive effects. In the second century BC, the Greek physician Dioscorides noted that "lead makes the mind give way." [5] Benjamin Franklin, in 1786, wrote a letter to a friend in which he detailed the many ill health effects he attributed to lead poisoning in various dwellings he had visited; he lamented "how long a useful Truth may be known, and exist, before it is generally receiv'd and practis'd on." [6]

The earliest scientific article connecting lead paint and childhood lead poisoning was that of Dr. Lockhart Gibson in Australia in 1904. He posited that lead paint posed risk to children in two ways: newly painted, sticky surfaces; and powdery, well-worn surfaces, which would produce particles that would travel to children's mouths by way of their hands [7].

The number of articles detailing childhood lead poisoning continued to increase throughout the next 20–30 years, including descriptions in medical textbooks and public recognition by a well-regarded physician Dr. Blackfan (for whom Diamond Blackfan Anemia is named) by 1917. As more physicians became familiar with the signs of lead toxicity—which can be vague and mirror other common childhood ailments—the more they found it, and the perceived prevalence of childhood lead poisoning rose, solely through increased recognition. The American Medical Association held a symposium in 1934 on lead poisoning in children.

By 1930, the lead industry took internal measures that revealed its knowledge of the dangers of lead to children, such as sending questionnaires to companies that produced children's toys and furniture inquiring whether or not they used lead-based paint. But publicly, they dismissed the mounting evidence linking lead exposure to neurocognitive damage in children. A lead industry executive gave a speech to industry health experts in which he discredited studies and reports of lead poisoning in children, and casted doubt on the validity of x-rays to diagnose lead poisoning.

The lead industry not only ignored warnings about lead poisoning in children; they actively promoted their product using children as an advertising hook. The National Lead Company, represented by the Little Dutch Boy logo, created a children's book entitled *The Dutch Boy's Lead Party* in which the little boy greets a light bulb, cups and saucers, shoe soles, baseballs, pencil erasers, and a bullet, and

Fig. 2.1 The Little Dutch Boy Lead Party. This promotional children's book was issued by the Little Dutch Boy Paint Company in 1923. In this story, the Little Dutch Boy invites a series of lead-containing products into his home, and then they have a painting party using white leaded paint. At the time of publication, the phenomenon of childhood lead poisoning was well-described and several countries had already banned its use for indoor spaces

after each item has bragged about its lead content, he invites them into his house for a party, and shows off his white lead paint (Fig. 2.1). By the late 1920s, when the evidence on lead poisoning in children was even more robust, the Dutch Boy was featured in another children's book, urging children to get their playrooms brightened up with white lead paint:

> This famous Dutch Boy Lead of mine.
> Can make this playroom fairly shine.
> Let's start our painting right away.
> You'll find the work is only play. (from *The Dutch Boy Conquers Old Man Gloom*).

Children were featured prominently in National Lead Company advertising, and the very figure of the Little Dutch Boy himself implied that the paint was so safe that even a child could use it.

In 1938—by which time more than a dozen other countries had significantly restricted or banned the use of leaded paint for interior walls—the Lead Industries of America started a White Lead Promotion Campaign to increase the uptake of white lead paint in the face of mounting health-based attacks. The industry promoted the use of such paint in homes, public schools, and hotels. As late as the

1950s, the lead industry resisted government efforts to warn the consumer about the dangers of lead to children.

Lead executives also resorted to a common defensive stance taken by industry: they placed blame on the victim—particularly when the victim was poor. Backed by articles authored by physicians, the industry placed blame on poor parental supervision and poorly kempt houses with peeling paint. In the 1950s, a lead executive stated that "childhood lead poisoning is essentially a problem of slum dwellings and relatively ignorant parents." Furthermore, "[u]ntil we can find means to a) get rid of our slums and b) educate the relatively ineducable parent, the problem will continue to plague us." Another executive suggested that emotionally neglected children may fill their "emotional hunger" by placing objects in their mouths [8]. There were disincentives for politicians to fight for tougher regulations for lead, as they risked inciting the ire of powerful interests such as the real estate and lead industries.

The civil rights and environmental justice movements of the 1960s shined a light on lead poisoning as a public health problem rather than a problem of the character of impoverished mothers and their children. Another catalyst for change was the increasing evidence that even low levels of lead were neurotoxic. In 1979, a study found an association between lead levels in deciduous teeth (baby teeth) and low IQ as well as poor classroom behavior. Shortly afterward, lead was removed from gasoline and the cohort of children was restudied; even with lower average blood lead levels, the association between blood lead level and lower IQ persisted [9]. Based on these data, the CDC lowered the acceptable blood lead level for children in a stepwise fashion. As the acceptable level of lead lowered, more people found their children to be affected by lead, including children of middle-class, enfranchised parents who were vocal about their entitlement to a safe environment. This effect was heightened as middle-class families moved into older city buildings and faced the problem of lead paint for the first time [3].

A definitive federal ban on lead in paint did not take effect until 1977, and lead was only phased out of gasoline starting in 1975 (over the following decade). The US National Health and Nutrition Examination Survey (NHANES) found that 700,000 children had elevated blood lead levels from 1976 to 1980, demonstrating the epidemic proportions of childhood lead poisoning. In the ensuing years, the medical community has increased its understanding of the neurotoxicity of even very low blood concentrations of lead. And yet, even as this chapter describes childhood lead poisoning as a public health success story, there are pockets of the country where children continue to be harmed by lead—most notably in Flint, Michigan, where 140,000 people were exposed to lead-contaminated water due to a failure of public oversight [10].

Tobacco

Between 1957 and 1962, four major research groups in the United States and the United Kingdom studied the possible link between smoking and cancer, and all determined that cigarettes were indeed a likely culprit, using language as clear as:

"[s]moking is an important cause of lung cancer." In 1965, the US Surgeon General published a report, based on a review of more than 7000 studies, linking smoking to lung cancer, laryngeal cancer, and bronchitis, with subsequent similar Surgeon General's reports published in 1967, 1968, 1968, 1971, 1972, 1973, and onward [11]. In 1986, the Surgeon General shined a light on the dangers of secondhand smoke, providing irrefutable evidence that "involuntary smoking," as it was called, was linked to cardiac and respiratory disease [12].

Despite this avalanche of evidence and expert opinion, the number of cigarettes smoked in the United States continued to increase throughout the 1970s, and smokers enjoyed nearly unfettered freedom to smoke in public places until the 1990s and 2000s when indoor smoking bans became widespread in US cities and towns; smoking was not definitively banned on all airplanes until 2000 [13].

Anti-tobacco grassroots activism helped to rein in the smoking epidemic several years after the Surgeon General's report had established the link between smoking and disease. In 1971, a mother named Clara Gouin felt fed up that her daughter's health suffered every time she was exposed to tobacco smoke in public places. She and her friends felt obligated to put out ashtrays in their home to accommodate smoking guests. They decided they were done welcoming cigarette smoke in their house; with a batch of buttons and signs, GASP (Group Against Smokers' Pollution) was born. The group convinced a pulmonary disease organization to disseminate their newsletter around the country, and local chapters of GASP started to appear in various states.

GASP's greatest contribution was their invention of the concept of the nonsmoker as a person with rights. Using language of rights and liberation from various Civil Rights movements, GASP asserted that nonsmokers had the right to live free from tobacco smoke in their home and in public places. GASP members removed ashtrays from their homes and put up signs that said "Thank you for not smoking." One chapter convinced their city's mayor to declare a "Be Kind to Non-smokers" week. GASP published a "Nonsmokers' Liberation Guide" as "a manual of revolutionary tactics and strategies to secure the breathing rights of nonsmokers everywhere." [14]

GASP activists' focus on the rights of the nonsmoker were amplified by the US Surgeon General Jesse Steinfeld, who in 1971 also employed the language of nonsmokers' rights in a speech to health organizations, in which he called for the banning of smoking in all confined public places such as restaurants, airplanes, and buses. When Steinfeld was asked to resign by President Richard Nixon in 1972, he felt that it was due to the influence of tobacco executives on the president, showing once again the push-and-pull between public health progress and industry resistance.

While it wouldn't be until the twenty-first century that GASP activists' dreams of public places free of tobacco smoke would be realized, their early activism introduced American society to the concept of the nonsmoker as a person with rights, and helped to change social norms about the acceptability of smoking in public. In 1984, Steinfeld expressed this sentiment: "Smoking is an activity which should only be done by consenting adults in private. We should make nonsmoking the social norm—smoking should be made unacceptable in society." [15]

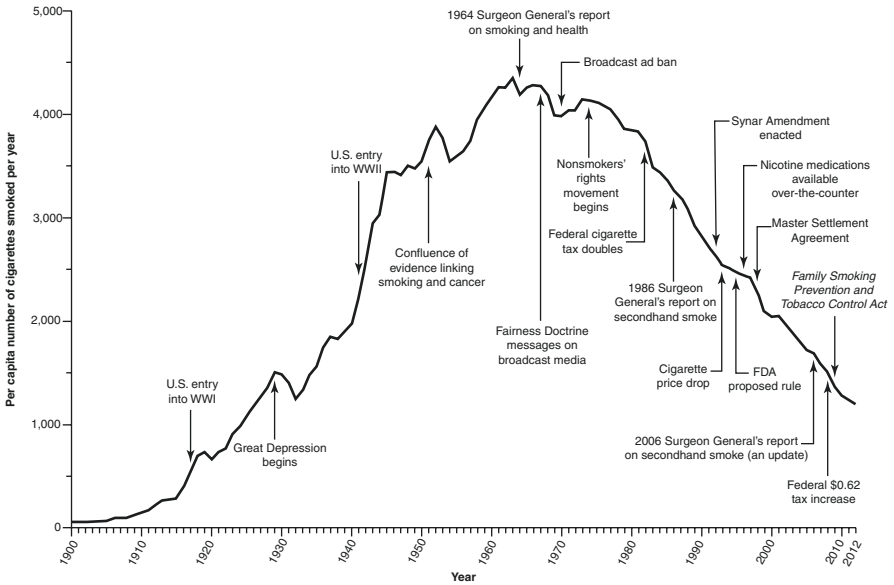
Perhaps more than any other public health issue in the United States, the story of tobacco control demonstrates the power of litigation to achieve public health-minded reforms [16]. Until 1996, the tobacco industry had never paid damages to any person who became sick from smoking. Using the model of victim-blaming that so often characterizes industry's attempts to thwart public health regulations, they convinced juries that smokers were making the choice to smoke despite known health risks.

In the 1990s, there were several types of lawsuits being brought against the tobacco industry: individual suits by people sickened by cigarettes; class action lawsuits (including by nonsmoking flight attendants exposed to tobacco smoke on the job); and suits brought by states attempting to recover Medicaid funds spent on smoking-related illnesses.

In 1996, the volume of lawsuits reached a critical mass, and several tobacco companies prepared to agree to a large settlement which would include paying financial damages but also making significant public health concessions, in exchange for immunity from further litigation. When immunity was removed, industry retracted its support for this "global settlement," as it came to be called. However, in 1998, they did settle the state Medicaid lawsuits, agreeing to pay $10 billion annually, and to ban outdoor advertising. Large damages were paid to individual smokers (or their survivors).

One significant class action lawsuit brought by Florida smokers and their survivors resulted in a verdict in which cigarettes were deemed unreasonably dangerous, causing 20 distinct diseases. The tobacco industry was found guilty of negligence, fraudulent concealment, conspiracy to commit fraud, and intentional infliction of emotional distress. While the guilty verdict was overturned by the Florida Supreme Court, future plaintiffs were allowed to use the jury's findings to file their own individual suits, such as Cynthia Robinson who sued for the death of her husband from smoking-related illness and was awarded $24 billion in damages [17].

The public health significance of such verdicts lay not in the amount of money awarded to the plaintiff, but in the concessions and reforms that each suit brought to bear on the tobacco industry. Litigation, or the threat of future litigation, has caused the tobacco industry to take many steps: an end to billboard advertising; the end to child-friendly, cartoonish advertising gimmicks; limits on tobacco promotional items and free cigarette samples; and reining in youth marketing. Verdicts have included funding for health-related research and for anti-tobacco public health campaigns. Another key contribution of litigation to public health progress was the change in societal attitudes toward the tobacco industry, since trials often led to the disclosure of damning internal industry documents. In the case of Ms. Robinson, jurors were moved by footage of a 1994 congressional hearing in which tobacco executives swore under oath, untruthfully, that cigarettes were not addictive and did not cause cancer, as well as internal documents going back as far as 60 years proving that the tobacco industry did indeed know of the health risks and addictiveness of smoking. In general, jurors who were given access to internal documents showing such nefarious practices of the tobacco industry tended to find tobacco companies guilty [18].



Sources: Adapted from Warner 1985 with permission from Massachusetts Medical Society, ©1985; U.S. Department of Health and Human Services 1989; Creek et at. 1994; U.S. Department of Agriculture 2000; U.S. Census Bureau 2013; U.S. Department of the Treasury 2013.

Adults ≥ 18 years of age as reported annually by the Census Bureau.

Fig. 2.2 Adult (18 years and older) per capita cigarette consumption and major smoking and health events, United States, 1900–2012. (*Sources*: Reprinted from U.S. Department of Health and Human Services. *The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014. Printed with corrections, January 2014. The original figure was adapted with permission from the Massachusetts Medical Society, the U.S. Department of Health and Human Services; the U.S. Department of Agriculture; the U.S. Census Bureau; and the U.S. Department of the Treasury)

Smoke-free legislation and taxes on cigarettes have had appreciable effects on the health of the public, including improvements in perinatal and child health, as well as myocardial infarction rates [19, 20, 21]. Figure 2.2 shows the association of several health laws and regulations with cigarette consumption in the United States, including the Fairness Doctrine which required broadcasting networks to provide contrasting viewpoints on controversial issues important to the public (such as tobacco) and the Synar Amendment which was a federal law prohibiting the sale of tobacco to minors.

Car Crashes

Car crashes provide an example in which scientific evidence is necessary but not sufficient to move policy forward. Successful public health reform movements have been driven by grassroots citizen activists who rely on a combination of personal testimony and scientific evidence to drive policy change.

Perhaps no example is as vivid in the modern American memory as that of Mothers Against Drunk Drivers (MADD) which was founded in 1980 by a mother named Candy Lightner whose 13-year-old daughter had been struck and killed by a drunk driver with multiple offenses. There had been knowledge about the effects of alcohol on driving since 1904, and various federal programs in the 1960s and 1970s had taken aim at the problem of drunk driving, including a largely unsuccessful public education campaign urging people not to drink and drive by emphasizing the numbers of lives lost to drunk driving each year.

Five days after her daughter's death, Candy Lightner decided to form Mothers Against Drunk Drivers. She quickly connected with another mother named Cindi Lamb whose infant daughter had been paralyzed by a crash with a drunk driver. The two appeared at press conferences together and met with legislators; they were joined by protestors who held high-profile marches around the White House. MADD Chapters sprung up around the country; within 10 years, there were over 300 chapters. Lightner, Lamb, and the MADD organization put a child's face to the anonymous statistics on drunk driving. Press coverage of drunk driving significantly increased from 1980 onward.

MADD was instrumental in passing policies that contributed to decreases in alcohol-related crashes: the minimal legal drinking age; a strict national blood alcohol content limit; license revocation laws; and stronger penalties for repeat offenders [22]. To its credit, MADD also evolved from a primarily punitive focus on drunk drivers (understandably borne out of the anger of grieving parents) to a more environmental approach in which they took aim at policies that enabled drunk driving. In 1985, to reflect this shift in focus from the criminality of the drunk driver to the social and legal milieu that fostered alcohol-related car crashes, they changed their name from Mothers Against Drunk Drivers to Mothers Against Drunk Driving. MADD also made a decision to only support policies that were supported by scientific evidence, which shifted their focus away from stronger jail penalties and toward solutions such as license revocation and a minimum legal drinking age.

Perhaps the most significant contribution that MADD made to decrease alcohol-related car crashes was its effect on the social acceptability of drunk driving. Because of their focus not only on severely drunk driving but also impaired driving, they made it socially acceptable (and even admirable) for a designated driver to decline alcohol with the words, "I am driving."

In the first half of the twentieth century, car crashes were deemed "accidents" (meaning they were tragically unavoidable, and not caused by a predictable pattern) and were largely deemed the fault of bad drivers. In 1965, consumer advocate and social reformer Ralph Nader published *Unsafe at Any Speed* in which he shone a light on the auto industry's resistance to adopting safety standards because of their reluctance to lose money. The book began: "For over half a century the automobile has brought death, injury and the most inestimable sorrow and deprivation to millions of people." [23] Nader's book encompassed two key principles of a public health approach: it shifted blame from the driver to the product (the car), and it cast the automobile industry, which had evaded public scrutiny in years prior, in an unfavorable light. Within a year of the book's publication, the federal government

established the National Highway Traffic Safety Administration. The National Highway Traffic Safety Administration publicized the results of crash tests done with dummies, and the results embarrassed manufacturers. In the ensuing decades, auto makers not only adopted federally mandated safety standards, but went beyond what was required, as safety became a selling point for cars. Safety standards and improved crashworthiness have been credited with substantially reducing the rate of car crash deaths since the 1960s [24, 25].

The Public Health Approach to Gun Violence

Until the twentieth century, gun violence was not seen as a public health problem. Rather, it was compartmentalized into homicides which were a criminal problem; suicides which were a mental health problem; and unintentional shootings which were a personal safety problem. Now, gun violence researchers and activists have shifted the paradigm and are calling for a public health approach, which focuses on the environment that encourages gun violence, rather than on the flawed individuals who carry it out.

Any comprehensive and meaningful public health approach to gun violence prevention will require a long, hard look at industry's role in perpetuating the epidemic. Kim Odom of Boston, Massachusetts, is a pastor and the mother of Steven who was killed by gun violence at age 13. Rather than focus on the criminality of the person who shot her son, Pastor Odom asks, "Where did the gun come from?" In her advocacy work, she points the spotlight upstream, away from the shooter and victim and toward the manufacturing and distribution process that floods the streets with cheaply available guns. Nancy Robinson of Ladies Involved in Putting a Stop to Inner City Killing (Operation LIPSTICK) demonstrates this need to change our focus with a simple thought experiment that can be easily replicated when teaching about gun violence. This thought experiment is illustrated in Fig. 2.3.

Smith et al. have proposed applying the "Host-Agent-Vector-Environment" model to gun violence. This model, which is a refreshing alternative to the criminal justice view of gun violence that prevailed for much of US history, names the gun industry as the "vector" which delivers the "agent" (the gun) to the "host" (the person who shoots). In this model, the "environment" is comprised of social cultural norms and laws regarding guns. Smith et al. studied federal data and found that domestic firearm production steadily increased from 2005 until 2013—a year in which over ten million guns were produced for domestic sale. There was a trend toward guns that were more lethal (higher caliber) and more concealable. On a hopeful note, the authors found that the majority of the gun market is concentrated among a few very large companies, and so a public health-minded decision by one or two companies (such as the adoption of smart-gun technology) would profoundly affect the supply of guns in circulation [26].

Public health success stories of the past have shown the valuable role that litigation plays in moving public health reforms forward. However, the Protection of

Fig. 2.3 "The Peanut Factory and the Gun Manufacturer." Nancy Robinson of Operation LIPSTICK uses this thought experiment to illustrate the need for a focus on the source of gun violence, rather than its perpetrators and victims. For each group, she asks the audience where the media focuses its attention. When the tragedy involves gun violence, people focus on the shooter and the victim, away from the upstream source of the gun. When the tragedy involves contaminated food, people focus on the upstream source and the need to increase regulation. To impact gun violence, we need to shift our gaze "upstream" to where the guns come from. Illustration by Ronnie Lynch

Legal Commerce in Arms Act (PLCAA), passed in 2005, prevents victims from suing firearms manufacturers or dealers for damages resulting from crimes committed with their products. This law has immunized the firearms industry from reform in a way that is unmatched by protections afforded to any other industry. Public health scientists have pointed to the PLCAA as a major barrier to progress on gun violence in the United States [27].

For a public health movement for gun violence prevention to be effective, it will require a collaboration of scientists, physicians, and voices from the community—notably survivors, who will put a human face on the grim statistics of gun violence in the United States. Efforts must be placed on regulating the industry, the product, the distribution, and the sale of firearms. Technological stop-gaps must be implemented to make firearms less dangerous. Social and cultural norms regarding guns in public places must also change. A later chapter in this book details legislative and regulatory interventions that would have the greatest impact.

International Gun Violence Victories

Gun violence is an international public health issue recognized by the World Health Organization as one of the leading causes of worldwide mortality, estimated to be responsible for about 250,000 deaths worldwide per year [28, 29]. According to a study published by the Global Burden of Disease Collaborators in 2016, half of those deaths originated from just six countries: Brazil, Mexico, Colombia, Venezuela, Guatemala, and the United States [28]. There are a variety of factors that influence gun violence mortality rates including socioeconomic status and gang- and drug-related violence, but what is striking about this statistic is that the United States is included despite our status as one of the world's wealthiest and most developed nations. When compared to other developed nations, the United States has the highest rate of gun homicides, as well as the highest rate of gun ownership by a large margin (Fig. 2.4). There is mounting evidence that access to firearms is associated with higher rates of firearm deaths [30, 31]. The Geneva Declaration on Armed Violence and Development, first signed in 2006, and now supported by over 100 nations including the United Kingdom and Australia, highlighted the responsibility of civil societies in non-conflict settings to do their part in decreasing firearm fatalities [32]. This is in response to the fact that most deaths caused by armed violence occur in countries without armed conflict, highlighting the need for public health solutions domestically.

Nations across the globe, regardless of the level of economic development, have recognized gun violence as an important public health issue and have put forth policy changes to curb gun-related fatalities [33]. It can be difficult to compare different countries' progress in tackling firearm-related injuries and deaths due to differences in population sizes, economic status, and varied methods of data collection and reporting. It is also important to take into account differences in political situations, social norms, and cultural attitudes. Despite these challenges, there is growing evidence that legislation in domestic gun policy saves lives.

As mentioned throughout this book, the United States has a unique set of challenges when it comes to implementing a public health approach toward eliminating

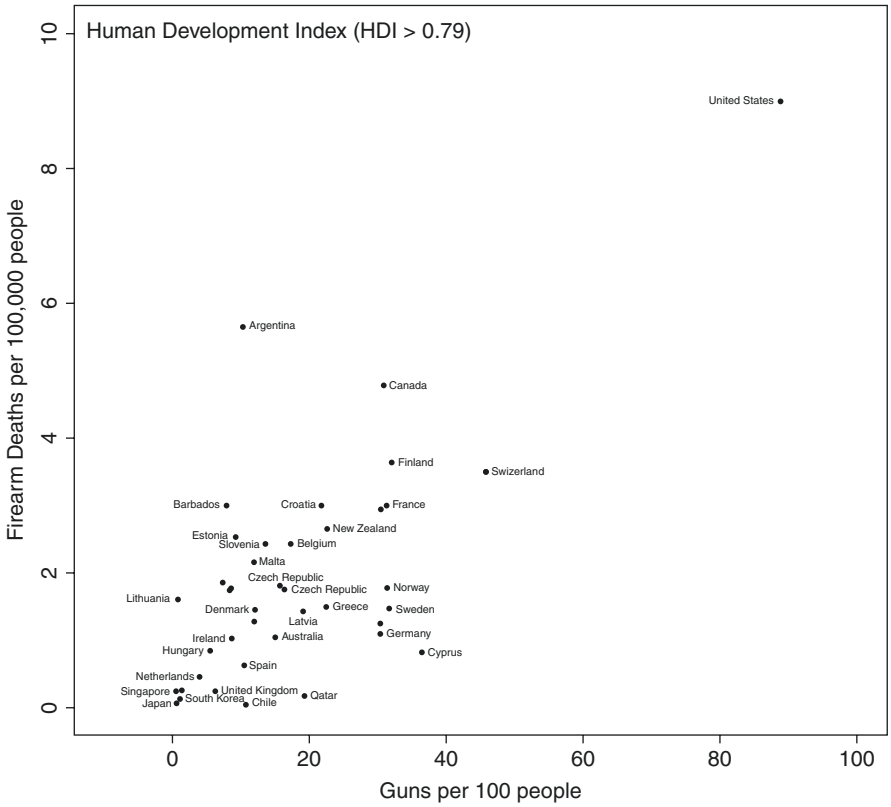


Fig. 2.4 Gun Violence as a Function of Gun Ownership rates for countries with a Very High Human Development Index Score. This graph shows that when compared to countries with similar levels of development, the United States surpasses them in firearm fatalities as well as in gun ownership, suggesting that less access to guns is associated with fewer gun deaths. The Human Development Index (HDI) is a summary score used by the United Nations Development Programme to assess the development of a country by three key dimensions: life expectancy, level of education, and gross national income per capita. Source: Tewksbury Lab 2012. https://web.archive.org/web/20170105171532/http://tewksburylab.org/blog/2012/12/gun-violence-and-gun-ownership-further-refinement-and-response-to-reader-comments/#comments

gun violence which include cultural attitudes toward firearms, existing legislation limiting research and litigation of firearms, and powerful industry resistance. Six of the deadliest mass shootings in the United States, defined as shooting with fatality of at least four people, have occurred in the last 10 years [34]. The shootings at Sandy Hook Elementary School in 2012, Pulse night club in 2016, and the Marjory Stoneman Douglas High School shootings in 2018 each garnered media attention and public support for effective gun violence prevention. Despite the collective grief and outrage generated in the aftermath of those tragic events and others, mass shootings have not been associated with passage of gun control laws in the United States

[35]. In this section, we draw on the experience of another developed nation: Australia, and the political and social conditions that made it possible to enact sweeping and effective firearm legislation.

Australia's journey to enacting national firearm safety measures is centered around the 1996 Port Arthur massacre in Tasmania, where a gunman used semi-automatic rifles to kill 35 people and injure 18 others at a tourist site. At that time, this was the largest mass murder committed by a single gunman that the world had witnessed.

Australia's governmental organization consists of a federation of six states, each with their own constitution and legislature, as well as several territories. At the time of the Port Arthur massacre, each state had its own differing set of gun laws. The federal government had no overarching control on the regulation and internal sale of firearms but could ban the importation of firearms. The weapons that the gunman used in the 1996 Port Arthur massacre happened to be legal in the state where the killings occurred, but banned in most other states. In the 18 years leading up to this massacre, there had been 12 mass shootings, which were followed by outrage and desire for gun law reform, resulting in local state level changes but never amounting to national, standardized change. States that contained more rural towns and were more politically conservative were more resistant to passing firearm legislation. National efforts were often defeated by their gun lobby, which though smaller than the National Rifle Association (NRA) in the United States, was nonetheless vocal and influential [36].

In the decade preceding the Port Arthur massacre, and especially surrounding the mass shootings that occurred in Australia in 1988, there had been a movement for national gun control spearheaded by the National Coalition for Gun Control (NCGC), a broad coalition made up of professional and community groups with the common goal of reducing firearm-related violence in Australia. The organizations that made up the coalition ran the gamut from youth, seniors, mothers, and LGTBQ groups to medical, legal, trade, and public health organizations. They campaigned to garner regional support as well to fund research aimed at creating policy. The most comprehensive review was done by The National Committee on Violence (NCV) which had presented 25 legislative recommendations aimed at reducing the availability and access to firearms.

The research and advocacy groundwork that had already been laid, coupled with strong public opinion in favor of meaningful gun control measures in the wake of the 1996 attack contributed to the ability to enact gun legislation, but many credit the then newly elected conservative prime minister John Howard with taking decisive and swift action to make it possible. He was able to call a meeting within 2 weeks of the massacre in which all jurisdictions agreed to pass the National Firearms Agreement (NFA) in each of their respective states and territories. There was industry resistance in the form of the gun lobby and from certain states and territories especially on the issue of banning semi-automatic rifles. There were efforts by the gun lobby and some states to avoid a full ban, by proposing modified semi-automatic guns. In response, Howard threatened to hold a national referendum to enact the proposed gun legislation into federal law, as at the time, he had the public and political support to accomplish that. Within a year, the legislation was passed in each state and territory [37].

The National Firearms Agreement of 1996 included strict requirements for licensing and sales of firearms, as well as a ban on automatic and semi-automatic rifles and a buyback of those firearms. There were systematic inter-state and territory changes that were instituted such as a nationwide computerized registration system that was standardized for all states. Those seeking a license had to apply for a permit for each gun to be owned, wait a mandatory period of 28 days for each gun permit, pass a safety training, and provide a "genuine reason" for each firearm to be owned. There were strict guidelines for refusal or revocation of gun licenses and seizures of firearms, which included: an applicant or gun owner found to be guilty of violence or with a restraining order against them in the past 5 years; poor character; and lack of genuine reason for ownership. Firearms sales were to go through a licensed dealer with prohibition of informal or mail order sales. The seller was responsible for verifying that the purchaser is licensed for each firearm to be purchased, and was also required to submit information of the sale into the nationwide registry. There was also a limit on the amount of ammunition sold, and the seller had to verify that it was being bought for a licensed gun [38].

The most notable part of the law was the total ban on automatic and semi-automatic firearms and a compulsory federal buyback and the destruction of such weapons. The buyback, also described as a gun amnesty, took place over a period of a year and was paid for by a one-time increase of the Australian national health service tax levy. It was initially estimated that about 650,000 prohibited firearms were bought back in the first year after the attack, and later estimates accounting for additional data put that number to almost one million prohibited firearms confiscated and destroyed [39]. This amounted to a 20% reduction of the total firearms present in Australia at the time. Six years later, in 2002, another shooting of two university students led to two additional pieces of gun control legislation related specifically to handguns, as well as the 2003 National Handgun Buyback [40]. This gun amnesty resulted in the confiscation and destruction of about 700,000 additional prohibited weapons [39].

There is evidence that the buyback has resulted in a safer Australia. One study, conducting a state-by-state analysis of the number of guns withdrawn, found that the post-Port Arthur massacre gun buyback in 1997 led to a statistically significant 74% decrease in the firearm suicide rate [41]. Compared to the 12 mass shootings in the 18 years preceding the Port Arthur shooting, there has been one mass shooting since [42]. Without the changes to national gun legislation and gun culture that followed the Port Arthur massacre, it is estimated that Australia would have suffered more than a dozen mass shootings in the two decades following 1996 [43]. In addition, since the firearm legislation passed in 1996, there has been an accelerated decline in firearm deaths, especially suicides, though this trend was also accompanied with an overall decrease in non-firearm suicide and homicide deaths [44].

Though there is strong evidence that gun control legislation is associated with decreased firearm violence, there continues to be a cultural and industry resistance in the United States. In an op-ed published in the *New York Times* after the 2012 shooting at Sandy Hook Elementary school in Newtown, Connecticut, entitled "I

went after Guns. Obama can, too" John Howard, the former Australian prime minister responsible for the 1996 gun reforms, detailed the cultural and political roadblocks he had to navigate to pass them [45]. He emphasized the decisive stance he had to take within his own conservative party, which was traditionally more pro-gun; culturally, the extent of the loss of life in the 1996 Port Arthur massacre was a turning point for the Australian people. As mentioned earlier in this chapter, most public health victories are catapulted by the collective voices of the concerned who advocate for legislative as well as cultural change.

Overton Window

Joseph Overton, a leader in a public policy think tank, posited that for any given issue, there are a range of ideas that the public can accept. An idea only has a chance of becoming policy if it is within the limits of public approval—a range that came to be known as "the Overton window." [46]

Even when a public health measure is not politically feasible in the moment, there is value in discussing it because it opens up the Overton window to include that idea, and over time, it may become more acceptable to the public. Even moving a policy proposal from the fringes into the Overton window can be considered a public health victory of sorts, especially if one takes the long view that meaningful change happens slowly.

The indoor smoking ban is one such example—when New York City's mayor Bloomberg first proposed a ban on smoking in bars, restaurants, and most workplaces, the idea seemed radical, and was opposed by bar and restaurant owners who feared a downturn in business. But the measure was pushed through, and 10 years after its initiation, there was widespread support for it [47]. Indoor smoking bans have spread to other cities and locales, and the idea is no longer considered radical or fringe.

Earlier public health victories demonstrate the inherent value in putting "big ideas" on the table for discussion. Public health thinkers in gun violence should be similarly brave in proposing ideas that are bold, sweeping, or out-of-the-box, in order to affect the tragedy of this national epidemic. Even getting an idea into the Overton window for discussion should be considered progress and may positively affect the health and safety of future generations.

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Chapter 3
The Weapons Effect

Brad J. Bushman and Daniel Romer

> Guns not only permit violence, they can stimulate it as well. The finger pulls the trigger, but the trigger may also be pulling the finger.
> — Leonard Berkowitz ([1] p. 22).

In discussions of gun violence, one factor that is rarely considered is the fact that merely seeing a gun can increase aggression. This effect, called "the weapons effect," is conspicuously absent from debates about gun violence. Yet, the weapons effect is not a newly discovered phenomenon. It was first reported in a 1967 classic experiment conducted by Leonard Berkowitz and Anthony LePage [2]. (Coincidentally, Leonard Berkowitz is Brad Bushman's academic grandfather.) Participants in this experiment were male college students tested in pairs. However, one member of the pair was actually an accomplice of the experimenter that was pretending to be a participant. The two students evaluated each other's performance on a task (e.g., listing ideas a used car salesperson might use to sell more cars). The "evaluations" consisted of giving between 1 and 10 electrical shocks to the other person, with 1 shock indicating a "very good evaluation" and 10 shocks indicating a "very bad evaluation." Participants were randomly assigned to a provocation condition in which they were given 7 shocks by their ostensible partner, or to a no-provocation condition in which they were given only 1 shock by their ostensible partner. Next, the participant "evaluated" the accomplice's performance using electrical shocks, which was the aggression measure. The participant was seated at a table that had a 12-gauge shotgun and a 0.38-caliber revolver on it, or badminton racquets and shuttlecocks on it. The items on the table were described as part of another study that another experimenter had supposedly forgotten to put away.

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There was also a control condition with no items on the table. The experimenter told participants to ignore the items on the table, but they apparently could not. Participants who had been provoked and then saw the guns were more aggressive than the other participants (i.e., gave more shocks to the accomplice). Berkowitz and LePage called this finding the weapons effect. They argued that weapons are aggressive cues that can automatically and unconsciously elicit aggression.

Since 1967, the weapons effect has been replicated many times, including outside the lab. In a recent driving simulation experiment [3], for example, participants were seated in a car that had either a handgun or a tennis racket on the passenger seat. As in the Berkowitz and LePage experiment [2], participants were told that the object on the seat was part of a different experiment that the other experimenter forgot to clean up, and that they should ignore it. As in the Berkowitz and LePage experiment, they apparently could not ignore it. Participants were significantly more aggressive drivers when there was a gun on the passenger seat than when there was a tennis racket on the passenger seat. For example, they were more likely to speed, tailgate, pass drivers on the shoulder, crossing double yellow lines into oncoming traffic, swear at other drivers or use obscene gestures, or collide into other vehicles. These findings also mirror the results from survey studies. For example, one survey of a nationally representative sample of 2770 American drivers found that those with a gun in their vehicle, compared to those with no gun in their vehicle, were significantly more likely in the past year to make obscene gestures at other drivers (23% vs. 16%), tailgate (14% vs. 8%), or both (6.3% vs. 2.8%), even after controlling for several factors related to aggressive driving [4].

A 2018 meta-analysis integrated the results from all available weapons effect studies, which included 151 effect-size estimates from 78 independent studies involving 7668 participants [5]. A meta-analysis is a quantitative literature review that combines the statistical results from all studies conducted on a topic. The studies integrated in this weapons effect meta-analysis used a variety of operational definitions for key variables. This meta-analysis found a significant weapons effect when the results from all studies were integrated. The weapons effect was significant for provoked and unprovoked participants, for males and females, for participants of all ages, for college students and nonstudents, and even for toy weapons. The weapons effect was also positively correlated with the year the study was conducted, indicating that the weapons effect is getting larger over time. In the meta-analysis, all average effect sizes were in the predicted direction, with weapons having a positive impact on aggression-related outcome variables. However, the weapons effect was sometimes nonsignificant. For example, the weapons effect was significant for published studies but was nonsignificant for unpublished studies, indicating possible publication bias. More formal publication bias methods also detected publication bias for some distributions of effects, although outliers had little influence on effect sizes. The weapons effect was significant in laboratory studies but was nonsignificant in field studies. The authors pointed out the need for more field studies of the weapons effect.

Since the 2018 meta-analysis was published, an important large (N = 678) field experiment was published in 2019 [6]. For over 40 years, police officers have used electroshock weapons, such as the TASER — the most well-known brand. These

electroshock guns fire two small barbed darts with wires into the victim's skin. Electric shock is delivered through the wires, which leaves the victim temporarily incapacitated because they lose control of their muscles. The shocks are also painful. In this study, police officers were randomly assigned to carry TASERs that were visible ($n = 339$) or to not carry TASERs ($n = 339$). The researchers tested the hypothesis that the mere sight of a TASER would increase aggression against police officers (due to a weapons effect), even though TASERs are meant to be deterrents of aggression against police officers (because people should be more reluctant to assault an officer who is carrying a non-concealed TASER). Results found that the number of physical assaults against police officers was more than twice as high in the TASER group (0.4425 per 1000 incidents) than in the no-TASER group (0.2094 per 1000 incidents). Thus, the mere presence of a TASER gun increased aggression against police officers.

Possible Sources of the Weapons Effect

The weapons effect suggests that weapons are a powerful cue for the priming of aggressive thoughts. Violence has been a popular subject for both movies and television, in part because it attracts larger audiences [7]. Recent years have also seen a proliferation of guns in top-selling Hollywood movies, especially those open to audiences of all ages [8, 9]. The surge in the presence of gun violence suggests that Hollywood recognizes the power of guns to enhance violent narratives. This is consistent with evidence from eye witness accounts of crime that the presence of a gun in a crime scene dominates memory of other cues in the scene [10]. This phenomenon has been termed a "weapon focus," again showing that guns draw people's attention far more than other cues in a crime scene.

Just as cigarette smoking continues to be used by Hollywood to signify risk-taking characters, guns appear to be a cue to danger that gives characters additional power as protagonists. Guns are frequently featured to advertise movies in posters [11], and gun use in popular movies is often employed by virtuous protagonists to defend themselves and others from attacks by less admirable characters [12]. One could speculate that the widespread use of guns in the media has further enhanced the weapons effect, since most people are not exposed to real guns on a frequent basis. Nevertheless, there is little research on the question of whether exposure to guns in entertainment media reinforces the association of guns with violence.

How does the weapons effect occur? The General Aggression Model [13] provides a theoretical basis for understanding the weapons effect.

General Aggression Model

The General Aggression Model (GAM) [13] is a useful framework for understanding why people behave in an aggressive manner. The GAM has also expanded to violent behavior [15]. As can be seen in Fig. 3.1, in the GAM two types of input

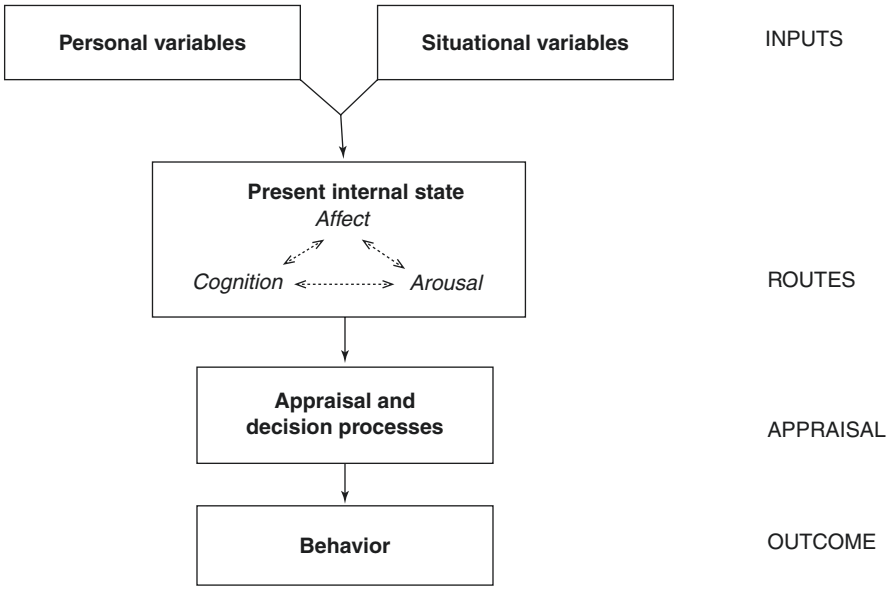

Fig. 3.1 The General Aggression Model. (Based on [13, 14])

variables can influence aggression: personal and situational. Personal variables include all the characteristics that the person brings to the situation (e.g., gender, age, genetic predispositions, hormones such as testosterone, personality traits, attitudes, values, beliefs). Situational variables include all the external factors that can influence aggression (e.g., exposure to aggressive cues such as weapons and violent media; aversive events such as provocation, frustration, hot temperatures, and crowding; alcohol intoxication, influence of aggressive peers).

According to the GAM, personal and situational variables jointly influence one's internal state, which includes aggressive thoughts, angry feelings, and physiological arousal (e.g., skin conductance, heart rate, blood pressure). Thus, there are three possible routes to aggression — through aggressive thoughts, angry feelings, and physiological arousal. However, these routes are not mutually exclusive or even independent, as indicated by the dashed lines with double-headed arrows shown in Fig. 3.1. For example, someone who has aggressive ideas might also feel angry, and have elevated blood pressure.

According to the GAM, internal states can influence appraisal and decision processes. First, there is an immediate initial appraisal of whether the situation is dangerous, threatening, or warrants aggression. This initial appraisal might lead directly to an automatic or impulsive behavior, or it might lead to a reappraisal. If the initial appraisal is judged to be unsatisfactory and if the person has sufficient time and cognitive resources, reappraisal occurs [16]. During reappraisal, the person considers alternative explanations of the situation and different behavioral options. When the appraisal is judged to be satisfactory, or when time or resources become

insufficient, the appraisal process terminates and the person engages in the behavior. People who make hostile appraisals (e.g., perceiving the ambiguous actions of others as aggressive, expecting others to respond in an aggressive manner) are more likely to respond in an aggressive manner [17].

The General Aggression Model and the Weapons Effect

In the 2018 meta-analysis of weapons effect studies [5], two of the three routes to aggression were examined — aggressive thoughts and angry feelings. There were not enough studies to examine the effects of weapons on physiological arousal. One study found that weapons increased self-reported arousal [18]. But we could find no studies that tested the effects of weapons on physiological arousal (e.g., heart rate, blood pressure, skin conductance). The meta-analysis also considered the effects of weapons on hostile appraisals, and on aggressive behavior.

As can be seen in Fig. 3.2, exposure to weapons increased aggressive thoughts. In one study [19], for example, participants saw photos of "good guys" (i.e., police officers, US soldiers) with guns, "bad guys" (i.e., criminals) with guns, or "good guys" (i.e., plain clothes police officers) without guns. After viewing photos,

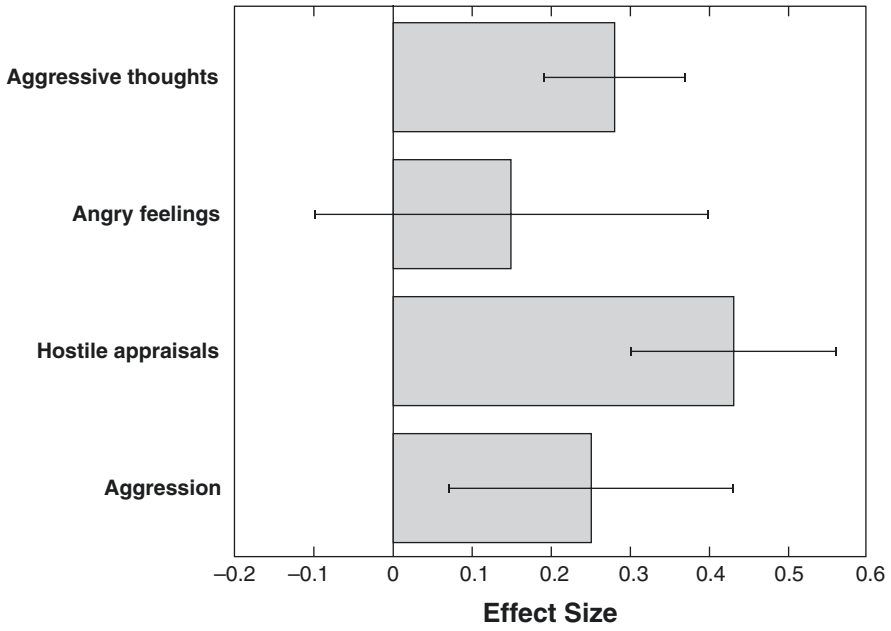

Fig. 3.2 Effect sizes for weapons on aggressive thoughts, angry feelings, hostile appraisals, and aggression. Effect sizes are expressed as Cohen's *d*. Capped vertical bars denote 95% confidence intervals

participants completed word fragments as quickly as possible. For example, the word fragment K I _ _ can be completed to form an aggressive word (e.g., KILL, KICK) or it can be completed to form a nonaggressive word (e.g., KIND, KITE). The results showed that participants provided more aggressive word completions (e.g., KILL rather than KIND) if they saw photos of men with guns than if they saw photos of men without guns, regardless of whether they were "good guys" or "bad guys." Seeing the guns automatically brought aggressive thoughts and ideas to mind, which is a process called priming [20].

Aggressive affect is most often measured using mood scales that contain adjectives such as whether participants feel ANGRY, FURIOUS, and IRRITABLE at that moment in time. Participants in one study [21], for example, reported more aggressive affect after seeing magazine photographs of guns than after seeing magazine photos of nature scenes. However, the effect of weapons on aggressive affect is not as strong as the effect of weapons on aggressive cognition. As can be seen in Fig. 3.2, weapons did not significantly increase aggressive affect. Although the effect was positive, the 95% confidence interval included the value zero. However, only 7 studies have tested whether weapons increase aggressive affect. Thus, more research is needed before firm conclusions can be drawn.

As can be seen in Fig. 3.2, weapons increase hostile appraisals. Although there were not enough studies to examine primary and secondary appraisals separately, weapons appear to influence both types of appraisals. For example, one study found that weapons increased the speed of fist clenching [22]. Another study found that participants thought a target person was more disagreeable, hostile, and angry if they were holding items that could be used as weapons such as garden shears than if they were holding other items such as watering cans [23].

As can be seen in Fig. 3.2, weapons also significantly increase aggressive behavior. In laboratory experiments involving adults, physical aggression is generally measured using unpleasant stimuli such as electrical shocks (e.g., [2]), noise blasts (e.g., [24]), or allocation of hot sauce (e.g., [25]) to an accomplice. Verbal measures of aggression have included negative evaluations of experimenters and accomplices (e.g., [26]). In field experiments involving adults, aggression has been measured using the number of horn honks at an accomplice who is stalled at a traffic light (e.g., [27]), the number of wet sponges thrown at an accomplice (e.g., [28]), or the number of physical assaults against police officers [6]. In field experiments involving children, aggression has been measured using behaviors observed in interactions with other children, such as pushing, shoving, kicking, tripping, and hitting (e.g., [29]).

In summary, the results from the 2018 meta-analysis [5] are generally consistent with the General Aggression Model. However, only 7 studies examined the effect of weapons on angry feelings, and only 1 study examined the effect of weapons on self-reported arousal. The results from this meta-analysis indicate that the mere presence of weapons can increase aggressive thoughts and ideas. Seeing weapons

can cause people to believe that others are threatening, angry, and disagreeable. Most important, seeing weapons can make people more aggressive.

It is worth noting that larger effect sizes for aggression ($d > 0.40$ versus $d = 0.25$) are obtained when people are shown actually using weapons, such as in TV programs, movies, or video games (for meta-analytic reviews see, for example, [30–34]).

Implications of the Weapons Effect for Public Policy

The United States (US) is currently facing a public health crisis of excessive mortality and injury arising from the use of guns for violent purposes [35]. Both self-inflicted and assaultive injuries due to the use of guns have increased in recent years [36, 37], along with mass shootings in public places [38]. These trends raise the question of whether the presence of guns in communities has contributed to these patterns. The study of police openly displaying TASERs in their confrontations with citizens (described above) suggests that merely displaying weapons even by police can instigate hostile interactions.

One of the policy questions that the weapons effect raises is whether allowing people to openly carry firearms enhances the potential for violence and the use of those weapons. Forty-four states in the US allow people to openly carry firearms [39]. This practice can be regarded as a form of intimidation [40], which may therefore increase rather than decrease firearm injury. In January 2012, California not only banned the open carry of loaded firearms but also of unloaded firearms. This policy change provided an ideal test of the potential effects of openly carrying a weapon whether it was loaded or not. Researchers examined changes in fatal and non-fatal gun injuries in California in comparison to nine other US states that had not changed their gun laws for 3 years prior to and 2 years after 2012 [41]. They found a significant decline in non-fatal firearm injuries in California compared to the other states in the 2 years following the ban in California. The effect on fatal injuries was in the same direction but not significant.

In sum, the weapons effect may have implications for gun control policies that aim to reduce firearm injuries and deaths. As we have seen, people are sensitive to the appearance of weapons, and these experiences can introduce hostile perceptions that would otherwise not exist. It remains to be seen whether other states will follow California's lead in outlawing open carry of firearms except for hunting and law enforcement.

To reduce the weapons effect, parents can also keep guns out of sight of family members. As the English writer John Heywood said, "Out of sight out of mind." Parents can also give their children toys other than guns to play with.

Conclusion

The National Rifle Association notes, "Guns don't kill people; people kill people." But guns are not just neutral stimuli either. As Professor Len Berkowitz noted, although the finger pulls the trigger of a gun, "the trigger may also be pulling the finger." Research on the weapons effect shows that the mere sight of a weapon can make people more aggressive. Our hope is that this weapons effect research will be included in discussions of gun violence.

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Chapter 4
Adolescent Gun Violence Prevention: Reducing Access to Lethal Means of Suicide

Michael J. Luke and Hina J. Talib

Adolescent Suicidality

Public health efforts have made notable progress in reducing the mortality rates of the most prevalent ailments taking children's lives in the past few decades. Among these, sudden infant death rates have dropped significantly after the introduction of safe sleep campaigns [1] and physician-driven prevention strategies implemented by the National Highway Safety Bureau catalyzed the decline in motor vehicle accident victims [2]. Meanwhile, the incidence of suicide has risen unabated. Suicide represents the eleventh leading cause of death among Americans, and the second leading cause of death among those aged 10 to 24. Between 2007 and 2017, the suicide rate increased by approximately 30% among all Americans, but by 56% among those aged 10 to 24 years [3].

Adolescent suicidality is impacted by many personal and societal factors, which have each been extensively investigated, including race, gender, sexuality, family trauma, media, and psychopathology. Despite the expanding recognition of the importance of addressing each of these factors in promoting wellbeing, medicine's efforts have been unsuccessful in protecting children and adolescents from lethal self-harm. Moreover, public health efforts have failed to prevent our youths from acting upon this impulse, particularly in moments of crisis.

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Suicidal Crisis

The suicidal crisis remains a phenomenon in psychiatry that describes the ultimately transient and often brief period that drives patients with active suicidal ideations to attempt suicide. This process of suicide deliberation is marked by intrusive thoughts and impulsive behavior, often set in motion by an acute stressor. This period can range from minutes to days, with multiple studies of individuals who attempted suicide suggesting a relatively short time frame. While the numbers vary with each population analyzed, nearly half of all participants of studies report a suicidal crisis lasting no more than 10 minutes [4–6]. One case control study focusing on people aged 13–34 years noted that a quarter of participants reported less than 5 minutes between the time the decision was made to complete suicide and the time an attempt was actually made [7]. While healthcare providers recognize that the factors driving patients to die by suicide can often be chronic and insidious in nature, the evidence overwhelmingly suggests that the immediate drive to carry out the act is relatively brief.

According to NVISS data from police and coroner reports, at least a third of those under age 18 that died from suicide experienced a crisis within 24 hours of their suicide. This data further notes that the proportion of victims with a suspected crisis decreased with age, indicating a particularly high prevalence of suicidal crisis among younger patients. Consequently, this suggests that addressing the suicidal crisis could play a profoundly pivotal role in reducing adolescent mortality [8].

Attempters & Completers

The suicidal crisis drives adolescents into a phase of contemplating and, at times, subsequently attempting suicide. The factors facilitating this transition from attempting-to-completing suicide has been yet another area of scientific investigation.

The evidence is unequivocal that participating in self-harming behaviors such as cutting places patients at much higher risk of suicide compared to the general population. In fact, prior self-harm is consistently recognized as the highest risk factor for eventual death by suicide among adolescents. However, this does not suggest that self-harm inevitably leads to a fatal outcome.

A systematic review from 2002 offers reassuring data that nine out of ten individuals who survive a suicidal act will not die later from suicide [9]. Similarly, a review of 170 studies reported that only 4.2% of suicide attempters completed suicide in the 10 years following their attempt, with only 22% making another non-fatal attempt in the following 5 years [10]. A prospective cohort study following individuals who attempted suicide by jumping in front of London's subways in the 1970s found that 90% of attempters did not later die by suicide [11]. In total, the promising message suggested by this research is that patients that survive an

attempted suicidal act are likely to live the rest of their lives and die from a cause other than suicide.

What about the individuals who have died by suicide? A systematic review of a number of case control studies has discovered that about 40% of individuals that completed suicide had a previous attempt. This ratio is lower among youths, where only 23–33% of completers ever made an attempt in the past. Thus, the majority of individuals who die by suicide do so on their first attempt [12–15]. In conjunction with the previous data, this illustrates that focusing on preventing at-risk youths from completing suicide on their first attempt could provide profound lifetime benefits.

Among adolescents, the estimated ratio of attempted suicide to completed suicide is approximately 50–100:1. When this data is broken down by sex, among those aged 15 to 19 years, the completed suicide rate is nearly 3 times greater among adolescent boys than girls, while the attempted suicide rate is twice as high among girls compared to their male counterparts. In other words, girls attempt suicide more often, but boys die by suicide more often. While there are likely multiple confounding factors contributing to this discrepancy, including gender psychology, one consistently identified factor is adolescent boys' use of more lethal methods of suicide [16].

Methods of Suicide

The data on attempters and completers offers an important conclusion that suicide method determines lethality. In moments of suicidality, adults and adolescents turn to various methods. According to the CDC, firearms accounted for half of all suicides from 1999–2016, with suffocation or hanging accounting for 26% of suicide causes, and poisoning or overdose making up 12% of causes. Other less prevalent methods include cutting, jumping/falling, and gas inhalation. Among those aged 15–19 years old, in 2017 the leading causes of suicide included firearms at 44%, suffocation at 41%, poisoning at 7%, and falls at 3% (see Fig. 4.1) [17]. This suggests that among the wide variety of suicide methods, firearms represent a substantial contributor of suicide mortality for the entire population, with youths as no exception.

Lethality of Methods

The lethality of a suicide attempt is influenced by deadliness of means, ease of use, accessibility, inability to abort mid-attempt, and acceptability to the attempter. Case fatality rates by suicide method among people aged 5–14 years and 15–24 years from 2007–2014 can be seen in Fig. 4.2 based on a cross-sectional study analyzing national mortality and hospitalization data [18]. While firearms serve as the means

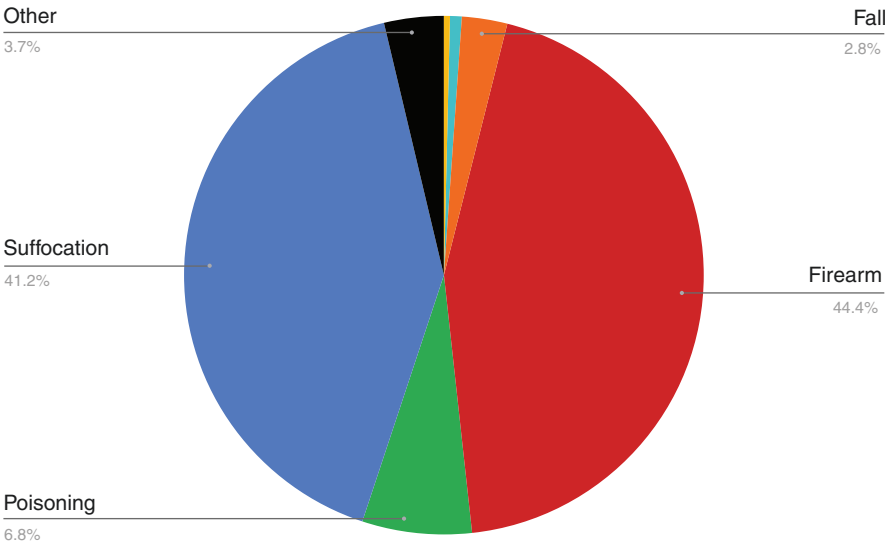

Fig. 4.1 Injury mechanism among suicide deaths of adolescents aged 15–19 years in 2017. (CDC Wonder) [17]

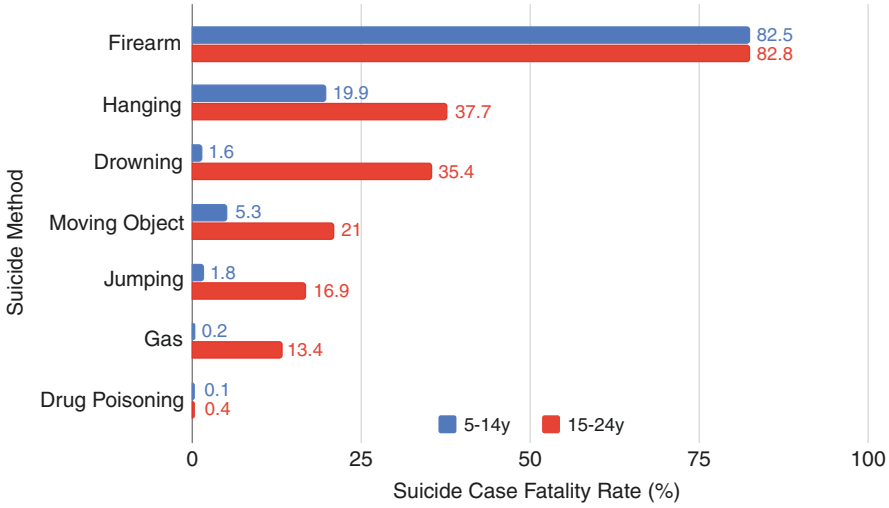

Fig. 4.2 Case fatality rates by suicide method among youths aged 5 to 14 years and 15 to 24 years from 2007–2014. (Adapted from Conner et al. 2019 [18])

for greater than half of all deaths by suicide, they are involved in fewer than 1% of all suicide acts. Meanwhile, while greater than 80% of attempts with a firearm are fatal, the other most commonly used methods all maintain fatality rates well below half that of firearms. Additionally, intentional overdoses or poisonings and self-inflicted wounds from sharp instruments serve as the first and second most common methods of attempt, respectively, but with <2% of cases being fatal [18–20]. This

speaks to the lethality of firearms. While firearms are not the initial method used in most suicidal acts, if one does choose a firearm, the likelihood of survival is grim.

What drives attempters to choose firearms? Some have hypothesized that a high degree of suicidal ideation may drive attempters to select more lethal means. However, a number of studies have come to no clear conclusion about such a relationship [21–26]. One study from 2001 interviewed youths and young adults who had committed either nearly lethal or less lethal suicide attempts about their expectations of dying from their attempt, their level of impulsivity, the amount of planning made prior to the attempt, and any precautions they had taken in the event of their death. The results found no clear association between any of these factors with the medical severity of their chosen method [27]. Thus, degree of suicidal ideation does not appear to be the prevailing factor driving at-risk individuals to firearm-assisted suicide. Availability, understanding of lethality, and media portrayals appear to influence method choice [28]. In fact, when individuals that attempt suicide are asked the reason for their chosen method, the most frequent answer is availability [29, 30].

Access to Firearms

While it remains difficult to assess the number of firearms in the country given the absence of a standardized registry, surveys have estimated approximately 43% of Americans live in a household with a gun [31]. The high rate of gun ownership in the United States has often been correlated with the country's high burden of suicide. State-to-state comparisons have further elucidated this relationship [32]. A 2014 quasi-experimental study using four different methods to estimate regional gun prevalence found that a 1-percent increase in prevalence of individuals with household firearms in a state was associated with a statistically significant increase in firearm suicide, as well as a statistically significant increase in total suicides [33].

A case control study of homes of adolescent suicides noted that guns were twice as likely to be found in the homes of adolescent suicide completers compared to homes of attempters, regardless of storage practice [34]. Another case control study of youth suicides exhibited that each individual practice of safe storage (e.g. locking away a firearm, unloading the firearm, storing ammunition separately) were associated with a protective effect against suicide [35]. Safe storage, however, is not a guaranteed prevention tactic. According to an NVISS study, 82% of youths who committed suicide via firearm used their family member's gun. In these scenarios, two-thirds of the guns were unlocked, while the remaining cases involved guns that were locked but still accessed. In a study interviewing gun-owning parents who reported their children had never handled their firearms, 22% of the children reported they had [36]. This highlights that while safe storage can be an effective practice, it may still be insufficient as parents can at times have a skewed perspective on the efficacy of their storage practices.

Lethal Means Reduction

Lethal means reduction refers to a broad range of public health interventions aimed at decreasing access to lethal means of suicide, in the hopes of ultimately reducing suicide mortality. A conceptual model of lethal means reduction can be found in Fig. 4.3. Historically, a number of such interventions have been implemented with notable success. Aside from firearms, over the years many other lethal means have been identified as targets for public health initiatives, including jumping off bridges, inhaling toxic gas, and ingesting pesticides.

Bridge barriers serve as the most promising historical model for lethal means reduction. Similar to firearms, bridge jumping is highly lethal with little-to-no chance to abort an attempt midway. Bridge barriers have long served as a method to combat this [38]. Most studies have shown that bridge barriers are effective at reducing suicides at those locations, and notably do not result in an increase in jumping attempts at other nearby areas. While there is conflicting data on whether bridge barriers drive attempters to seek other methods [39–42], there has been sufficient encouraging data for it to serve as the hallmark of reducing lethal access [43–46].

In the 1950s, almost half of suicides in the United Kingdom were attributed to gas exposure from household ovens and heaters. To address this, carbon monoxide in domestic gas was gradually replaced with a less toxic, cheaper form. After this detoxification process, suicides via domestic gas decreased from 2,499 in 1960 to just 8 in 1977. This intervention ultimately resulted in increased rates of alternative suicide methods, but a 30% decrease in suicide completion overall [47, 48].

Additionally, in attempts of reducing deliberate self-harm through analgesic overdose, the United Kingdom passed legislation limiting prescribed medication pack sizes. Smaller pack sizes of paracetamol resulted in a 22% reduction in suicide by paracetamol overdose in the year following the reduction [49].

Pesticide ingestion proved to be a particularly traumatic epidemic in rural Asia and the pacific islands [50]. In Sri Lanka, due to the agricultural revolution from

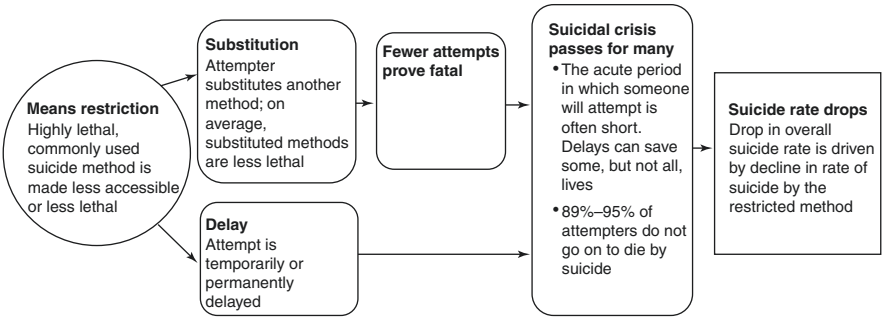

Fig. 4.3 Conceptual model of lethal means reduction saves lives at the population level ([37] Used with permission from Cathy Barber)

1950 to 1995, suicide via toxic pesticides increased dramatically. In 1995, governmental regulations were put in place to ban the most highly toxic and commonly used pesticides in the country. As a result, the suicide rate decreased by half over the next decade [51]. Similarly, in Western Samoa, pesticides containing paraquat were banned, which subsequently resulted in a decrease in the suicide rate [52].

A summary of common examples of lethal means reduction interventions and their associated desired outcomes can be found in Table 4.1.

Table 4.1 Operational logic model: examples of means restriction interventions [37]

Inputs	Outputs	Outcomes (at population level)		
		Short	Medium	Long
Train providers and gatekeepers on lethal means counseling	Providers and gatekeepers counsel at-risk individuals and their families to make household guns inaccessible to at-risk person	Families take action (e.g., store guns with a friend or at a gun club)	At-risk individuals attempt with less lethal method or crisis passes before alternate attempt is made	Fewer suicides overall, driven by fewer firearm suicides
Train providers and gatekeepers on lethal means counseling	Physicians monitor prescriptions of at-risk individuals to keep total supply below toxic dose, advise families to dispose of unused medications, and substitute less toxic for more toxic medications when possible	Fewer pills on hand at home	Low-planned attempts occur with fewer pills	Lower severity of overdoses
Educate insurance companies on dangers of mandatory 90-day prescription policies	Amend 90-day prescription policies to allow opt-out for at-risk patients	At-risk patients continue receiving smaller quantities at each refill	Low-planned attempts occur with fewer pills	Lower severity of overdoses
Collaborate with gunowning groups on suicide prevention and means restriction	Gun owner groups incorporate message in firearm safety training classes, brochures, and websites (sample message: Store all guns locked and unloaded; consider temporarily storing firearms offsite if a household member is at risk of suicide)	Families take action	At-risk individuals attempt with less lethal method or delay attempt; for many, crisis passes	Fewer suicides overall, driven by fewer firearm suicides

(continued)

Table 4.1 (continued)

Inputs	Outputs	Outcomes (at population level)		
		Short	Medium	Long
Induce motor vehicle manufacturers to make engineering changes	Reduce toxicity of motor vehicle exhaust; install carbon monoxide-sensing gadgets that shut off idling engines when highly toxic levels accumulate	Attempts with motor vehicle exhaust less likely to prove fatal	For many thwarted attempters, crisis passes	Fewer carbon monoxide suicides
Induce civil engineers to make engineering changes	Bridge barriers erected at targeted jump sites	Barriers prevent attempts by jumping	Most methods substituted for jumping are less lethal	Fewer jumping suicides
Educate hospital administrators about environmental changes to reduce inpatient suicides	Hospitals install collapsible curtain and shower rails and reduce other points of ligature in psychiatric wards	Changes prevent attempts by hanging	Most other methods are unavailable in inpatient rooms	Fewer inpatient suicides overall, driven by fewer hanging suicides

Used with permission from Cathy Barber

Lethal Means Reduction for Firearms

These historical examples plead a convincing case for lethal means reduction as a worthwhile public health initiative. As they have proven effective for several lethal methods, it remains plausible that it could similarly have a valuable impact on firearm related suicides.

Recent data from Israel offers promise on this front. From 2003 to 2005, the Israeli Defense Force had taken note that a large portion of their soldiers had fallen victim to suicide via firearm. In 2006, a policy was put into place that prohibited soldiers' access to firearms on the weekend. In the aftermath of this policy, there was a 40% decrease in the total suicide in the Israel Defense Forces, due predominantly to a fall in firearm-related suicides during weekends. Even more reassuring from this data, suicide via other methods did not subsequently increase, suggesting that this method of lethal means reduction resulted not only in decreased suicides via firearms, but likely prevented a number of soldiers from taking their lives altogether [53].

In March 2003, Switzerland instituted an Army XXI reform which reduced the number of troops by half. During the year following the change, there was a substantial decline in firearm assisted suicides. A retrospective study analyzing this data noted a significant reduction in gun-related suicide in the male age group directly impacted by the aforementioned reform, with only a quarter of the at risk population turning to an alternative method of suicide. The study utilized an interrupted time series analysis to control for any preexisting trends and concluded the results were likely not an artifact. While the change could be attributed to reduced

stress from increased army discharge, it is purported that the reduction in available household firearms due to the reform was a key factor in preventing suicide [54].

In 1992, restrictive firearms legislation was enacted in New Zealand, after which there was a notable reduction in firearm-related suicides, particularly among youths [55]. Also in 1992, the Canadian Firearms Act was instituted to ensure safe gun storage, which subsequently noted a decrease in firearm suicides, particularly among those under the age of 25 years [56]. Following a mass shooting in Australia in 1996, government legislation was put into place to remove firearms from civilians and regulate firearm sales through law enforcement, resulting in a significant drop in firearm homicides and suicides with no clear method substitution [57–59]. Similarly, in 1997, restrictive firearm legislation in the European Union also resulted in a reduction in firearm suicides in Austria [60].

Substitution

While lethal means reduction portends promising results, caution must be taken, as means reduction of low lethality methods may counter-productively increase suicide rates by driving attempters towards more lethal methods.

The implementation of lethal means reduction practices suggests that if a preferred method of suicide is not available, attempters will either delay their attempt or substitute with another method. Critics of lethal means reduction may argue that suicide prevention should focus primarily on the factors motivating suicide, as enforcing legislation on firearm reform will not address the social determinants driving suicidal ideation, and attempters will find another way. The substitution hypothesis reinforces the concept that when one method is unavailable, a suicide attempter may seek out an alternative.

In the grand scheme of suicide mortality, how significant of an issue is substitution? Overall, every other commonly recognized alternative for suicide is less lethal than firearms. Despite the risk of still completing suicide via another means, substitution offers a slightly-to-significantly increased chance of survival depending on whichever alternative is chosen, and the time required to contemplate alternative means may offer individuals the opportunity to escape their acute suicidal crisis, and subsequently increase their chances of lifetime survival.

Best Practices Counseling

Counseling our patients on the complexities of suicide risk and firearm access can be tense topics of discussion for even seasoned providers. Moreover, it remains controversial whether specific details about the lethality of different suicide methods should be shared.

Safe storage counseling serves as one strategy for homes that are not willing to completely remove firearm access. For storage methods inside the home, the triple safety method remains the gold standard, which involves (1) storing the firearm in a gun safe or lock box, (2) removing a component of the firearm and using a trigger or cable lock, and (3) removing the ammunition and locking it away with a separate combination lock.

For storage methods outside the home, patients can request that friends or relatives store their firearms in their homes. Additionally, some shooting ranges, law enforcement buildings, and gun shops offer storage rentals. If your patient opts to store their guns outside of the home, there is currently no clear evidence to suggest when it would be safe to bring the firearm back into the home.

Self-defense counseling aims to offer suggestions on how to interrupt suicidal impulse in the moment for patients who do have access to lethal means. Placing barriers to accessing lethal means, such as sprays, flood lights, alarm systems, or dogs, can be very strong but involved methods of prevention. Some simpler methods might include putting pictures of loved ones on a lock box [61].

Prior to initiating a conversation regarding lethal means counseling, it remains important to have an understanding of effective attitudes towards the discussion. For patients or families who own guns, several studies emphasize the efficacy of counseling that (1) uses non-judgmental language, (2) respects the autonomy of patients and families, and (3) offers options [62–65]. Above all, ultimately the goal of the conversation is to broach the subject and develop a plan with the patient and family. Based on studies on lethal means counseling with youths and parents, the most important aspects of this includes (1) asking for permission from the patient to discuss with family members, (2) involving family members in strategizing, and (3) assigning tasks and roles to everyone who wishes to be involved [66, 67].

Key best practices for lethal means counseling can be found in Table 4.2. For more resources, the Suicide Prevention Resource Center (SRPC) offers an online training course which includes detailed recommendations on effective phrases for various scenarios during lethal means counseling.

Table 4.2 Best practice recommendations in lethal means counseling for patients

Best Practices: Lethal Means Counseling
1. Use non-judgmental language
2. Respect autonomy
3. Offer safe storage options
4. Recommend self-defense strategies
5. Engage support networks in developing a plan

Current Campaigns

Many factors contribute to adolescent suicidality. As such, many regions have chosen to address this public health crisis through a multi-faceted approach, from expanding mental health resources to enforcing anti-bullying interventions to controlling social media influence. Lethal means reduction has served as another additional avenue many governments, organizations, and providers have chosen to pursue.

In the world of academics, the Harvard School of Public Health created the Harvard Injury Control Research Center dedicated to reducing injury through research, training, and dissemination of knowledge. This center launched the Means Matter Campaign to shift more of the focus of suicide prevention towards lethal means reduction. Consequently, the Means Matter website offers a plethora of evidence-driven conclusions regarding lethal means to be used for academics, providers and concerned members of the public [68].

There are currently several state-specific initiatives to reduce access to lethal means, from expanding access to safe storage means to education on counseling for healthcare providers. Legislative initiatives targeted towards lethal means reduction, as they relate to firearms, are centered primarily on Red Flag Laws.

Red Flag laws, also known as Extreme Risk Protection Order (ERPO) laws, allow for the removal of firearms in the setting of an acute safety concern such as a firearm owner endorsing suicidal or homicidal ideation. Such laws garnered national attention in the wake of the school shooting in Parkland, Florida, in which several people had expressed concern about the shooter's violent statements prior to the day of the tragedy. As of 2020, such legislation has passed in several states including Florida, Connecticut, Indiana, California, New York, and Washington. The process involved in activating this system varies by state. In general, the process is launched once a concerned individual makes a report to the police or courts about a potentially at-risk person with access to firearms. Once a report has been made, law enforcement investigates the situation. If there are signs of any immediate risk, the firearms may be temporarily restricted from the at-risk individual while the investigation is underway. A hearing is held in court to determine the need for any extended restriction of firearm access. The courts will then use pre-established criteria to determine whether or not the at-risk individual can regain access to their firearms and when.

Overall, preliminary data suggests red flag laws have decreased violence and suicide risk, though they have more frequently been utilized in incidences of suicide risk, rather than interpersonal violence. Moreover, these laws have offered an opportunity for treatment intervention, as at-risk individuals whose firearms were removed have frequently been taken for psychiatric evaluation, with 30% remaining in treatment a year later [69].

Conclusion

Overall, a number of historical examples support the use of lethal means reduction strategies in reducing suicide mortality for the general population. Given the relatively high prevalence of suicidal crises among adolescents and the strong implications of using a lethal method in an initial suicide attempt on lifetime survival, lethal means reduction could serve as a particularly promising strategy to tackle rising adolescent suicide rates. As firearms continue to be an accessible means of self-harm, the most fatal method of suicide, and a leading cause of total adolescent mortality, individual-level and community-wide efforts of harm reduction by firearms could promise to be a key tenant of better adolescent health.

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Chapter 5
Gun Violence as an Infectious Disease

Alyssa H. Silver and Eniola F. A. Yeates

Adolescent Gun Violence

Gun violence is a major public health issue affecting children and adolescents in the United States (US). Death via firearms is the second leading cause of death in children and adolescents in the US behind car crashes [1]. In 2016, firearms were responsible for 15% of deaths in children and adolescents. Approximately 60% of these deaths were attributed to homicide, while 35% were attributed to suicide; the remainder was due to unintentional fatal injury [1].

Violence as an Infection

Dr. Gary Slutkin, an infectious disease epidemiologist, pioneered the notion of violence as a contagious disease. After studying gun violence in Chicago, he proposed that violence has characteristics in common with infectious diseases such as clustering, spread, and transmission [2]. For example, he observed that violent incidents within Chicago were spatially grouped, had a non-linear spread, and appeared in waves, similar to epidemics such as cholera [2]. He concluded that "violence begets violence," similar to the way "influenza begets influenza." [2] Using such principles, he proposed that public health measures could be used to treat gun violence similar to those used in the management of epidemic infectious diseases [2]. Prior

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to this framework, gun violence had been viewed mainly as a law enforcement issue to be addressed principally by the police and justice systems [3].

In Dr. Slutkin's model of violence as a contagious disease, he proposes that "infected" individuals include those who suffer from the *dysregulation* of violence. The definition of "infected" includes individuals who have directly suffered injury from a violent act or those who have witnessed such violence [2]. The definition also extends to perpetrators of violence, that is, individuals who inflict injury onto others. He proposed that like other infectious diseases, not all people infected with violence will show overt signs of infection. Thus, the definition also extends to those who inhabit an atmosphere where social norms are negatively influenced by violence. Therefore, "infected" individuals are not only those who suffer from gun injury or witness a gun-related violent event, but also include shooters and other individuals in society who suffer negative consequences from indirect exposure to gun violence.

Clustering of Gun Violence

Like other infectious diseases, incidents of gun violence tend to cluster [2]. Spatial clustering of gun violence has been demonstrated in Chicago and other cities (Fig. 5.1). For example, in an analysis of gun-related crimes in a 29 year period between 1980 and 2008 in Boston, investigators noted a clustering of crimes in "hot spots" or micro-places [4]. The majority of crimes within the city were clustered into specific areas rather than being evenly distributed throughout the city. Investigators proposed that anti-crime efforts could be targeted specifically to these areas [4].

Not only has gun violence demonstrated clustering in spatial areas, but it has also been shown to cluster within social networks. For example, in a study of non-lethal firearm incidents in Chicago from 2006 to 2012, 70% of gunshot victims comprised only 6% of Chicago's population. After finding that 80% of individuals identified had at least one prior arrest for a non-gun related violent event, investigators were able to delineate social networks of co-offenders based on police arrest records with two or more individuals arrested during the same incident. The investigators found that 89% of individuals could be clustered into a single social network [5].

Transmission of Gun Violence

In relation to infectious diseases, transmission typically refers to the passing of a pathogen between hosts, or communities of hosts via direct contact or indirect means. Typically, being exposed to an infected person makes it more likely for an individual to become infected with the disease. Likewise, several investigators have

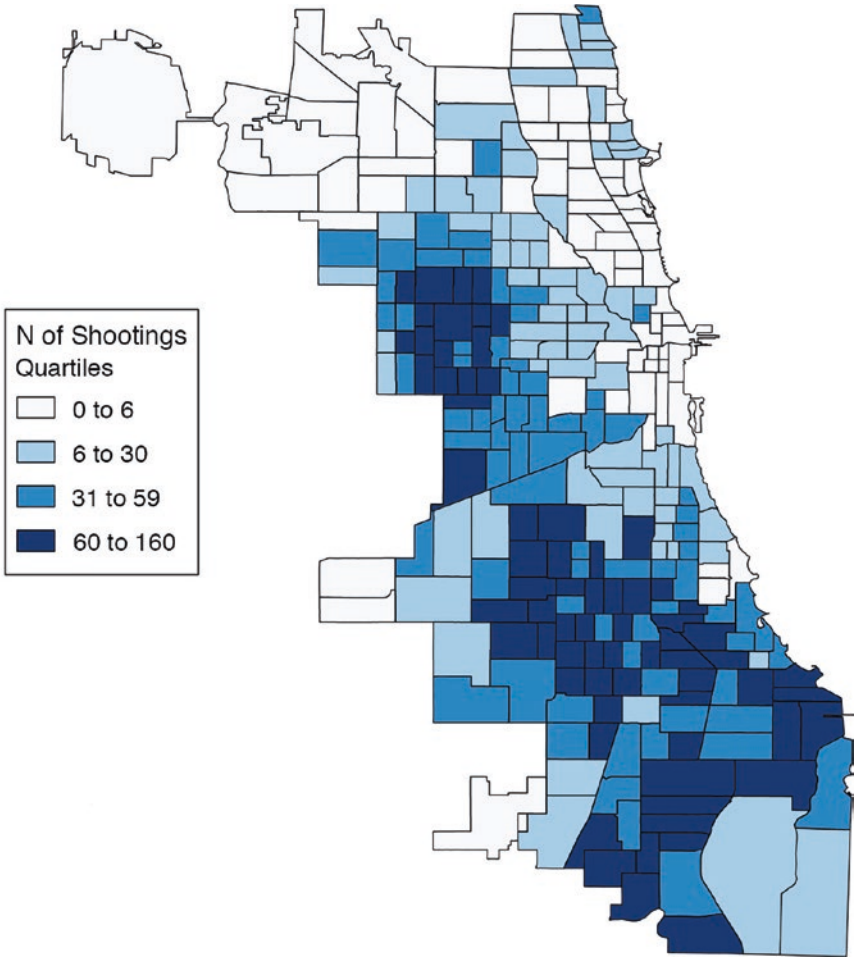

Fig. 5.1 A map of nonfatal gun injuries in Chicago shows spatial clustering of gun violence. (Reprinted with permission from Papachristos et al., *Social Science & Medicine*, 2015)

proposed that being exposed to violence makes an individual more likely to become "infected" by violence. Although there is no discrete pathogen per se in the "disease" of violence, recent research has shown that gun violence displays some of the principles of social contagion [5]. Social contagion involves the spread of ideas or behaviors through social connections or crowds of associated individuals [5, 6].

While guns are not literal pathogens, guns have been described as a "social toxin." [6] Guns in an environment can create an "ecology of danger" among members in a community, propagating gun violence through a "contagion of fear" and resultant "contagion of violent identities and behavior" that members of a community believe are necessary to navigate the toxic environment [6].

Gun Violence Begets Gun Violence

In a longitudinal study by Beardslee et al., investigators followed male juvenile offenders in Pennsylvania for 7 years. Participants were 14 to 19 years old at the initiation of study. In this study, young men were 43% more likely to report carrying a gun at time points directly after being exposed to gun violence than at other times [7].

Furthermore, being exposed to an individual victimized by gun violence increases the risk of one also becoming a victim of gun violence. After Papachristos et al. determined that 70% of nonfatal gunshot victims were concentrated in small social networks of co-offenders comprising 6% of the Chicago's population [5], investigators used logistic regression models to calculate the risk of social contagion, defined as the "extent of one's probability of victimization as related to direct and indirect exposure to gunshot victims in one's social network." [5] Results suggested that as an individual's exposure to gunshot victims increases, so does an individual's risk of victimization. For every 1% increase in exposure to gunshot victims in one's immediate network, there was a 1.1% increase in the odds of also suffering an injury from a firearm [5].

In a similar study that used police records to investigate both fatal and non-fatal gun injuries in co-offender networks, it was determined that approximately 60% of gunshot incidents could be accounted for by a model of social contagion [8]. In this model, being associated with a gunshot victim increased the risk of becoming a victim of gun violence [9]. Not only was gun violence propagated though social networks, but there was an "incubation period" where subjects were shot on average 125 days after their "infector." [8] One limitation to this study was that investigators were not able to explore other social ties of subjects besides co-offender status, for example kinship or friendship.

Host Susceptibility to Gun Violence

An individual who is susceptible to an infection is at risk of developing it. Apart from associations within social networks, other factors, for example individual demographics such as age or race may make someone more at risk of becoming "infected" by gun violence. In multiple studies, Black adolescent males have been shown to be disproportionately affected by urban gun violence. National Inpatient Sample data for hospitalizations in 46 states in a 14-year period between 1998 and 2011 show that for children younger than 16 years old, three-quarters of firearm-related hospitalizations occurred in children 11 to 15 years old, and 82% of patients were boys. Black children had the highest rate of hospitalizations for firearm-related injuries (72 per 100,000), 4 times the hospitalization of white children (17 per 100,000) [10]. Notably, there was a statistically significant increase in assault-related hospitalizations for Black children and a decrease for

all other racial and ethnic groups over the time period studied [10]. Comparable to these differences, there are also racial disparities in gun carrying. In a cohort of boys followed from 10 to 17 years of age in Pittsburgh, 27% of Black boys reported carrying a gun during the study period in contrast to 12% of white boys [11].

Other factors such as parental involvement and peer behavior can also affect susceptibility to gun violence. A longitudinal study followed first grade boys in Pittsburgh from the age of 7 years old to the age of 20 years. Investigators found that higher parent disengagement during childhood was associated with greater odds of gun carrying during adolescence. Moreover, higher peer delinquency, including peer drug use, was associated with greater gun carrying behavior [12].

Gun Violence and Co-Infections

Not only does exposure to gun violence propagate gun violence, but exposure to other types of violence may also have a similar effect. Rowan et al. showed that both witnessing and being a victim of non-gun violent acts increases the likelihood of engaging in gun violence [13]. This was a longitudinal study of serious adolescent male offenders from Philadelphia, Pennsylvania and Phoenix, Arizona who reported shooting or shooting at someone in the three-year study period. Investigators found that both witnessing, and victimization by non-gun violence (being beaten, raped, or chased by someone threatening harm) increased the likelihood of engaging in gun violence by 2.6 times and 1.3 times respectively for each additional standard deviation increase in number of events witnessed or experienced [13].

Similarly, there is a correlation between exposures to domestic violence in childhood to increased involvement in gun violence. Wamser-Nanney et al. interviewed individuals hospitalized for gunshot injury at a level I trauma center in New Orleans [14]. 98% of participants were Black men, between 18 to 34 years old. Approximately 19% of subjects reported routinely carrying a gun more than half the days in the preceding month. 24% of subjects had a prior gun related arrest. Individuals with a history of exposure to domestic violence in childhood were more likely to have a history of violent arrest and gun arrest [14].

Witnessing or being a victim of gun violence not only increases the risk of committing a violent act with a gun, but also increases the risk of a person demonstrating other types of violent behavior. Bingenheimer et al. used a model to analyze data from adolescents aged either 12 or 15 years old from 78 neighborhoods in Chicago. They assessed whether adolescents had been shot, shot at, or witnessed a shooting. Adolescents with more exposure to firearm violence were more likely to report perpetrating violent behavior 2 years later. Violent behavior included carrying a hidden weapon, attacking someone with a weapon, shooting or shooting at someone, and being in a gang fight in which someone was injured [15].

Methods of Infectivity and Pathogenesis

Pathogens work by causing dysregulation in cells and organs of the infected host. Violence may similarly cause dysregulation in brain pathways. Investigators examined whether community violence exposure, including witnessing or experiencing acts of violence, contributed to long term changes in the connectivity of the hippocampus or amygdala [16]. In a longitudinal study, adolescents in Los Angeles, California were recruited at age 11 to 13 years, and assessed for exposure to community or family violence. Participants had brain magnetic resonance imaging 3 to 5 years later. Community violence exposure in early adolescence was associated with smaller hippocampal and amygdala volumes in later adolescence [16], suggesting that community violence is a stressor that can affect brain structure and function. Although several limitations of the study preclude certainty, these findings suggest a need for further research to understand the physiological effects of witnessing violence.

Evidence-Based Methods to Stopping Gun Violence Transmission

Community health workers (CHWs) have often been used to stem the spread of disease [17]. Typically, these individuals do not have educational backgrounds in healthcare, but are trained in specific skills including the screening, treatment, and referral of individuals afflicted with the infection of interest, serving as an invaluable link between community members and hospital-based or community-based resources. In low-income countries, CHWs have been used to provide services such as rapid testing for illnesses like malaria and human immunodeficiency virus (HIV), and have also been utilized to distribute medications. Increasingly, CHWs in high income countries have been used to address chronic, non-communicable diseases such as diabetes [18].

Community health workers are often recruited from the same populations that they serve. These workers thus are able to move among the population, identifying infected individuals and facilitating the treatment of these individuals [18, 19]. Community health workers also use their knowledge of the population to provide health education and peer psycho-social support [18–20].

Dr. Slutkin developed the CeaseFire program, later renamed Cure Violence, with the primary goal of influencing attitudes and behaviors by utilizing community outreach workers to decrease gun violence. The CeaseFire program was developed in Chicago and implemented in 1999. At its initiation, high risk neighborhoods were identified, in which at-risk individuals were selected. Clients were typically between 16 and 25 years old and had prior arrests, gang involvement, incarcerations or had been victims of recent shootings [21]. Clients were recruited “in the streets” by violence interrupters who were hired and trained by the program. Violence

interrupters usually had no prior training in social work or public health, with the only requirement being a high school diploma or equivalent. These individuals were chosen due to their ability to develop rapport with members of the community. Some violence interrupters had prior criminal offenses and may have been former gang members, increasing their credibility and connection to many of their clients [21]. In their new role, violence interrupters worked to negotiate conflicts and to prevent retaliatory shootings by friends of the victim.

A descriptive study of a cohort of violence interrupters in Chicago and Baltimore showed that they were predominantly male; 75% of those interviewed had been formerly incarcerated. Many described "credibility" as being an important factor in their ability to relate with their clients [22]. Equally important was that violence interrupters were respected in their community, and that clients felt respected during mediations. Barriers to relating with clients included initial distrust and an assumption that violence interrupters worked with the police [22]. Violence interrupters used tools like empathy and validation of emotions, while encouraging clients to find healthy ways of managing emotions. Conflict mediation methods included forming non-violent agreements between parties. Violence interrupters often highlighted consequences of committing violent acts and sometimes shared personal experiences. They also used their knowledge of the community to involve friends or family, who would be able to convince clients to avoid retaliation [22]. Violence interrupters worked alongside outreach workers, who connected clients with other community services. Outreach workers helped enroll participants in General Education Diploma (GED) programs or services for employment and health. Limitations to the implementation of the program included limited organizational infrastructure in some high-need areas [21].

Since its initial implementation in Chicago, Cure Violence has spread to several major US cities including New York City, Baltimore, San Antonio and New Orleans. The program has also been implemented in cities across the globe including Port of Spain, Trinidad and Tobago and Cape Town, South Africa [23]. Common to each program is the model which comprises three components. The first goal is to interrupt the transmission of disease by using trained workers to prevent retaliations, and to mediate ongoing conflict. The second goal is to identify individuals at highest risk, assess their needs, and provide treatment by working to change behaviors. Finally, the third goal is to change community norms by spreading positive norms and engaging community leaders [23]. The Cure Violence Model is illustrated in Fig. 5.2.

An adaptation of CeaseFire called Safe Streets was implemented in 2007 in three neighborhoods in East Baltimore and later extended to one neighborhood in South Baltimore. The program utilized outreach workers as conflict mediators for high-risk youth primarily between the ages of 14 and 25 years, often with a history of violence, gang involvement or involvement with selling illicit drugs [3, 24]. Outcomes varied by neighborhood. Safe Streets was associated with a reduction in either homicides or nonfatal shootings in 3 out of 4 neighborhoods. The largest reduction was a 56% decrease in homicides and a 34% decrease in non-fatal shootings in one neighborhood [3]. Furthermore, Safe Streets was shown to change

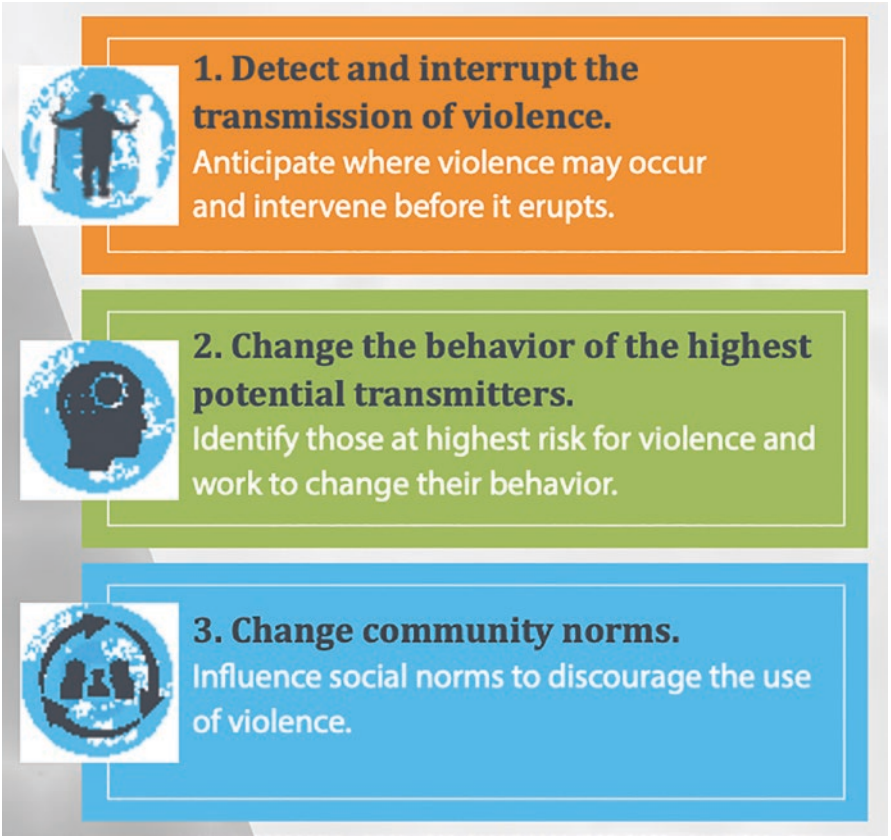

Fig. 5.2 Cure violence Model. (Reprinted with permission from Cure Violence, accessed from cvg.org/wp-content/uploads/2020/03/CV_International_v18_Eng.pdf)

attitudes within neighborhoods with respect to gun violence [24]. In one Baltimore neighborhood, prior to and 1 year after the implementation of Safe Streets, 18- to 24-year-olds in the neighborhood were anonymously surveyed to examine violent and non-violent responses to personal conflicts, conflict involving friends, and gun threats. Overall, after Safe Streets was implemented, there was a decrease in violent attitudes to personal conflict. There was a statistically significant improvement in 13 out of 30 items on the survey (43%), whereas, in a control neighborhood, there was only a statistically significant improvement in 4 of 30 survey items (13%) [24].

Clustering and Transmission of Suicides

Suicide, a form of self-inflicted injury, is a leading cause of death in adolescents [1]. Like other types of violence, suicide shares some of the characteristics of infectious diseases [25]. Clustering of suicides has been demonstrated in multiple studies

[25–27]. Patterns observed include point clustering and mass clustering. Point clustering refers to the concentration of suicides spatially, beyond what is expected by chance, in small geographical areas, like towns, communities, and schools. Mass clustering refers to the concentration of suicides in time, in particular the temporary rise in incidence after a celebrity suicide or other well-publicized suicide [27].

Studies estimate that 1–13% of adolescent suicides occur in clusters [28, 29]. Although clustering is uncommon, it is more prevalent in adolescents and young adults than in other age groups [29, 30]. Social contagion plays a role in the transmission of adolescent suicidal behavior. In adolescents, being exposed to a suicide or suicide attempt of a friend or family member increases an individual's risk of attempting suicide [31–33]. This finding has been observed in both low-risk and high-risk individuals, such as those reporting concurrent substance use or depression [31, 33].

While suicide of a friend or family member increases a teenager's risk of suicidality, the suicide of a fellow schoolmate does not appear to raise the likelihood of suicidal behavior in the general student population [32]. In a case-control study by Gould et al. comparing suburban New York high school students from schools that experienced a student suicide within 6 months prior to the study to students in similar schools, there were no significant differences in self-reported suicidal ideation or behavior in the general student population [32]. In contrast, self-reported friends of the suicide decedent had greater odds of reporting suicidal ideation or behavior. Furthermore, students who also reported negative life events had greater odds of reporting suicidal ideation or behavior with exposure to a schoolmate's suicide [32].

Firearms as an Infectious Agent in Suicides

Guns have been described as a "toxin" and an "agent" of gun violence [6, 34, 35]. Another framework for viewing the firearm epidemic as an infectious disease uses the Host–Agent–Vector–Environment model. This concept analogizes the host as the victims of gun violence, the agent as the gun and ammunition, the vector as the gun industry, and the environment as firearm policies, culture, political and economic factors [34, 35].

Access to firearms is an independent risk factor for suicide. Increased gun ownership has been associated with increased suicide by firearm [36]. Investigators have also found an association between household gun ownership and adolescent suicide rates. Knopov et al. compared gun ownership rates in different US states in 2004 to suicide rates in children ages 10 to 19 years old over the following 10 years. A 10% increase in household gun ownership was associated with a 27% increase in adolescent suicides, after controlling for state-specific factors known to influence suicide rate such as unemployment and drug use. This association was strong for suicides by firearm, but not for other suicides [37].

Similarly, less restrictive gun laws have been associated with an increased rate of firearm-related suicide attempts [38, 39]. Less restrictive gun laws have also

been associated with greater adult and adolescent gun carriage [40, 41]. Guns utilized in adolescent suicides are often obtained from the decedent's home or from the home of a friend or relative. In a small study looking at gun suicides in four states in children and adolescents, over half of guns utilized for suicides were owned by parents and other relatives, while 12% of guns were owned by the adolescent [42]. Both hand guns and long guns are utilized in adolescent suicides. In data available from 13 states between 2005 and 2015, 60% of adolescent gun suicides were committed with handguns compared to approximately 40% with long guns. Even though handgun use was more common overall, long gun use was more prevalent in children and adolescents than in adults. Strikingly, approximately 50% of firearm associated suicides involving adolescent males in rural regions utilized long guns [43].

Preventing access to lethal methods of suicide is an effective way of reducing the rates of suicide deaths. Multiple stakeholders including firearm safety educators and hunting safety educators are important in providing education to adult gun owners regarding limiting adolescent access to household firearms, including long guns, given adolescent risk of suicide [43].

Prevention of Firearm Suicide

Prevention of adolescent suicides is a public health priority. A multidisciplinary approach is needed to identify and respond to suicide clusters [26, 44, 45]. While psychologists in schools and in the wider community are important in the prevention of adolescent suicide, suicide prevention based only on a mental health treatment approach has not been completely successful [45]. Teachers and other school officials are often at the frontline and are vital in identifying suicide clusters, as well as vulnerable students after an incident of suicide in a school or in the community [46]. As such, "postvention strategies," defined as activities to promote healing after a suicide and reduce risk of further suicides, were created to be initiated by schools. Services include identifying individuals at risk, and providing them with support, counselling, and referrals when needed to prevent further suicides [26, 47]. Likewise, other community members such as clergy and social workers also play an important role [46].

Missing Elements in Pathogenicity of Gun Violence

In 2017, the Firearm Safety Among Children and Teens (FACTS) consortium, sponsored by the National Institute for Child Health and Development (NICHD) was formed to identify gaps in research and thus prioritize research goals to further the prevention of pediatric firearm injury [48]. From January to October 2018, multiple stakeholders including experts in pediatrics, psychology, and public health

collaborated in various forms (workgroup meetings, video conferences and surveys) to identify multiple priorities for future research. Some priorities included [48]:

- Creating resources to educate researchers and policy makers.
- Understanding the epidemiology of firearm injury and death, including risk factors and protective factors within individuals, communities, and families.
- Understanding the factors contributing to child and adolescent gun carriage, including patterns of defensive firearm use.
- Determining how community models of mediation interrupt firearm violence.
- Determining how police can use *hot spots* to reduce violence in communities.
- Determining the effectiveness of healthcare-focused firearm injury prevention strategies, as well as school-based strategies.
- Examining the effectiveness of interventions after firearm injury and suicide in reducing negative outcomes, like depression, post-traumatic stress disorder and other long-term sequalae.
- Understanding how the presence and storage of firearms in the home affect adolescents.

Reframing Gun Violence as Public Health Issue

In recent years, gun violence has been framed as a public health problem. Several professional health organizations have published statements advocating for increased involvement in the primary prevention of pediatric firearm related injuries. For example, in 2012 the American Academy of Pediatrics published a reaffirmation of its policy calling for physicians to continue to provide counseling (including discussing safer gun storage) to parents during routine visits, to advocate for stronger gun laws, and to support research related to the prevention of gun-related injury [49]. Similarly, the American Academy of Family Physicians published a statement in 2018 describing gun violence as a "public health issue, not a political one—an epidemic that needs to be addressed with research and evidence-based strategies." The statement also acknowledged that gun violence prevention is multidisciplinary involving both office-based and community-based strategies [50]. Likewise, the American College of Physicians published a statement in 2018 stating that the "medical profession has a special responsibility to speak out on prevention of firearm-related injuries and deaths, just as physicians have spoken out on other public health issues." [51]

Increasingly, healthcare professionals and professional organizations have recognized the need for their actions to address the gun violence epidemic, and have called for additional healthcare providers to advocate for both national and institutional policy changes [52–55]. Greater involvement is also needed in changing societal norms and examining factors contributing to societal attitudes to gun carriage and use [35]. Similar to multidisciplinary efforts needed to contain the spread of other contagious diseases, coordinated multidisciplinary efforts are needed to contain the spread of gun violence.

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Chapter 6
Exposure to Violence Involving a Gun Is an Adverse Childhood Experience

Nina Agrawal, Sonali Rajan, Danielle Johnson, and Ceri-Lune Renneboog

EVG: What we Know

Box
"Everyone knows someone who got shot and they lash out."
Youth focus group participant
Safer Streets Community Access to Children's Health Project
South Bronx, New York

Lashelle was a typical 6-year-old on the outside, with a red tee shirt, blue jeans, and black hair in 2 braided pigtails. Up close, she appeared weathered for her young years. Her eyes were dark, distant, and framed by fine, tethered lines. In pediatrics, we often say that children are not mini-adults, but here was one standing in front of me. I sat and offered her a chair. She chose to stand. Her eyes stared distantly at the beige colored exam room wall. I asked her the usual questions about school, eating, and sleeping as part of a child abuse medical evaluation. She didn't sleep well. Loud noises outside her bedroom window kept her up at night. They were gunshots. I asked her what she did about the noises. "I get a snack and go back to sleep."- Nina Agrawal MD, Pediatrician, NYC

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Gun violence persists as a public health epidemic in the United States (U.S.). Nearly 40,000 Americans die from firearm-related injuries annually [1], and, of those, more than 7,000 are youths (1 to 24 years old) [2, 3]. Black youths are disproportionately affected and comprise nearly 50% of these deaths [2, 3]. Firearm-related deaths have been trending upwards in recent years, and surpassed motor vehicle accidents as the leading cause of death in children aged 1 to 19 years old in 2019 [4, 5]. Homicide is the most common intent for firearm-related deaths in youth, followed by suicide and unintentional injuries [2].

These numbers are staggering, but do not begin to capture the full scope of gun violence. For every death and disability, there is an extenuating ripple effect on family, friends, neighbors, and communities, from locally to nationally. Children are uniquely impacted by EVG, in part because of their need for an environment conducive to achieving critical developmental milestones. If we broaden the definition of "gun violence" to include exposure, the impact of gun violence on American youth becomes even more alarming.

Youth who have sustained EVG have been referred to as "Silent Victims," as they are at risk for sustaining trauma not visible to child health providers and underrecognized by parents, while still having serious long-term consequences [6]. A study at a South Bronx hospital pediatric clinic by Agrawal et al. found that nearly 10% of parents reported their child had experienced EVG [7]. Exposure was defined as hearing gunshots and/or having a friend/family member who died by a gunshot injury. It should be noted that this study drew on a well child clinic population and the mean age of study participants was five years. Had this study involved more adolescents, the prevalence of gun violence exposure would have likely been higher.

The problem of EVG in American youth is well documented in the literature. In the early 1990s, coinciding with a spike in gun violence, Osofsky described chronic community violence as "frequent and continual exposure to the use of guns, knives, drugs, and random violence in children's neighborhoods" [8]. A 1993 study of New Orleans elementary school children found that 26% of students had witnessed a shooting and 73% had heard about a shooting [9]. During that time, studies on the South Side of Chicago found that 26% of youth (7 to 14 years old) and 39% of youth (10 to 19 years old) had witnessed a shooting. Of the latter group, 50% knew the victim (classmate, friend, family, neighbor). The study also found that youth who had perpetrated violence had often experienced EVG beforehand. EVG exposure included witnessing violence and being threatened with a gun [10]. Gun violence studies subsequent to the mid 1990's are limited, likely associated with Congressional passage of the Dickey Amendment in 1996, which effectively banned federally-funded firearm research and stymied prevention efforts [11, 12].

A resurgence in attention to children's EVG occurred in response to the Sandy Hook elementary school shooting, which took the lives of 20 children and 6 school staff in 2012 [13]. Since then, there have been almost three dozen attempted school mass shootings, of which nearly a third met the commonly accepted criteria for a mass shooting (i.e., four or more people shot) [14, 15]. Children are now often referred to as being a part of the "mass shooting generation," a cohort of youth growing up in the presence of these tragedies [16]. Communities across the United

States have been affected, with over 40% of United States residents fearing that they or an immediate family member could become a victim of a mass shooting [17]. The challenges associated with the anticipation of gun violence in our communities are being observed across a variety of youth-serving sectors. School staff must now contend with the possibility of intentional gun violence in their schools, and prepare children through active shooter drills [18]. The survivors of the 2018 Marjory Stoneman Douglas high school shooting raised national attention to the traumatic effects of EVG on youth survivors [26]. Schools are working to create resources to manage the emotional and physical toll of gun violence on students, a notion which has been termed "secondary traumatic stress" by the National Education Association (NEA) [19].

While public discourse tends to focus on mass shootings, it is important to note that they account for a small percentage of gun violence in adolescents [1–5, 14]. Most EVG occurs in the context of chronic community violence and outside the confines of adolescents' home and school environments. Economically disadvantaged communities where gun violence is often an everyday reality have been referred to as "urban war zones" and areas with "slow motion mass murders" [20, 21]. EVG can be characterized as direct and indirect victimization. *Direct* victimization refers to individuals who sustain firearm related injuries physically. *Indirect* victimization refers to individuals who see and/or hear about a firearm related incident, such as witnessing a shooting, hearing gunshots, and/or knowing peers who have been shot with a gun [22]. Both direct and indirect EVG have important implications for adolescent health and development [20].

The CDC is the primary source of youth violence data [23]. A limitation of current datasets is that most survey questions do not distinguish violent experiences involving a gun from experiences involving other weapons (i.e. knives, rocks, sticks) [24]. Yet, guns are highly lethal in comparison to other weapons. The literature suggests EVG invokes a greater sense of fear compared to violent experiences involving other weapons. According to a study using National Crime Victimization Survey data, nearly 40% of individuals victimized by a firearm (i.e. threats, attacks) experienced it as "severely distressing" compared to 25% of those victimized without a firearm (other weapon or no weapon). The authors noted that personal experiences with firearm violence invoked a "fear of one's life" at distress levels more than other weapons [25].

According to National Surveys of Children's Exposure to Violence data from 2008, 2011, and 2014, 8% of youth (2 to 17 years old) experienced indirect EVG (i.e. hearing gunshots or seeing someone shot). The highest levels of EVG (13%) were reported by adolescents aged 14 to 17 years old. Using a socio-ecological framework, risk indicators at the (1) *individual level* were Black youth with a history of child maltreatment; (2) *family level* were poverty, substance abuse, incarceration, single or non-parent households; and at the (3) *community level* were urban environment, high community disorder, and lack of social cohesiveness [24].

A study of 15-year-old youth in 20 randomly assigned cities, from 2014 to 2017, reinforced systemic inequities in gun violence prevention. The authors found that 63% of girls and 59% of boys had a gun related homicide occur within a mile of

their home or school. Youth living in close proximity to gun homicides were more likely to be Black, have socioeconomically disadvantaged families, and reside in under-resourced communities. Living within half a mile of the homicide was associated with high rates of anxiety. The authors concluded that "the U.S. gun violence epidemic will be understated without acknowledging the victims who may not have visible wounds, but are hurt by the violence nonetheless." [27].

EVG: Why it Matters

Box
"What they'll see is what they'll be."
Jailen M. Leavell, Youth Activist - Community Justice Action Camp, 2021

Exposure to violence can negatively impact children's long-term health and well being [28]. Family violence and community violence are recognized as adverse childhood experiences by the CDC [29]. Building on the existing literature, this chapter calls for classifying exposure to violence involving a gun as an adverse childhood experience due to the long-term impact these incidents pose on youth physical and mental health [30, 31].

In a 2019 systematic review of 81 journal articles spanning two decades, Rajan et al. drew critical comparisons between exposure to gun violence and adverse childhood experiences (ACEs) [29]. The authors defined exposure to violence involving a gun as direct and indirect victimization. Specific experiences include *injury from a gun; being threatened by a gun; witnessing gunfire; hearing gunshots; knowing a friend or family member who has been shot; and having close friends or a sibling who carry a gun.* The review concluded that EVG during childhood should be classified as an ACE and, importantly, should be measured, documented, and intervened upon [29]. Our work further argued the importance of screening for exposure, regardless of location, as we know gun violence can – and does – occur in homes, schools, and more generally within a child's neighborhood [29].

EVG is associated with high rates of post-traumatic symptoms. [23] [42], There is highly compelling research that adolescents indirectly exposed to gun violence (having peers shot or who have seen someone shot) are more likely to commit a crime with a gun [43]. Youth who are victimized by EVG often experience multiple adverse childhood, community, and societal experiences. According to a study of male youth in economically disadvantaged Chicago communities, 83% of youth experienced at least three or more violent events and nearly 15% had witnessed someone be shot or killed [10]. Youth at highest risk of exposure to violence had families who were struggling financially and had poor parenting practices and low emotional cohesion. Violence exposure in middle adolescence was associated with greater likelihood of

perpetrating violence later in adolescence. The authors concluded that chronic exposure to community violence increases risk of violent behavior, compounded by co-occurring child maltreatment, social adversities and systemic inequities [9].

About ACEs

The CDC defines Adverse Childhood Experiences (ACEs) as 'potentially traumatic events that occur in childhood', from birth to 17 years [29]. Black and Hispanic children living in economically disadvantaged communities are disproportionately at-risk for ACEs [39, 40]. Nationally, data illustrates that 61% of Black children and 51% of Hispanic children have experienced at least one ACE in comparison to 40% of White children [40].

Historically, research on ACEs has focused on child maltreatment and household dysfunction, including exposure to intimate partner violence [29]. However, research on ACEs has begun to encompass a wider range of events, including youth experiences with bullying and general violence in one's community [33, 34, 35]. Research on the cumulative and long-term influence of ACEs on behavior and health, from infancy to adulthood, has established that ACEs increase young people's risk for poor mental health, self-harm behaviors, substance abuse, cardiovascular disease, diabetes, obesity, cancer, chronic pulmonary disease, and premature death [29, 36, 37, 38]. These findings highlight that preventing ACEs and mitigating their impact on child health and development is a critical public health priority.

Research has established a clear relationship between an increased number of ACEs and poor academic outcomes in children [41]. ACEs often lead to prolonged stress, disrupted adjustment, and an inability to regulate emotions among children. Affected children may manifest problematic behaviors immediately, ranging from displays of internalizing behaviors such as depressive symptoms to externalizing behaviors such as increased aggression [42, 43]. It is well established that there is a relationship between ACEs and an increased likelihood of engagement in violent behaviors among early adolescent youth [36]. Therefore, if ACEs are not identified early on in childhood and if protective factors in the form of family, community, and societal support are not promoted and available, then youth remain at heightened risk for a range of violent behaviors [36]. This is particularly important as we consider EVG and its subsequent risk of gun violence victimization and perpetration as an ACE [45].

The Physiology of ACEs

Early life stress is another term used to describe ACEs [32]. The stress response system is a complex, dynamic network that is activated when the brain perceives a threat or stressor. A coordinated physiological response is elicited to the stressor

through the interplay of multiple biological systems: primarily the central nervous, neuroendocrine, immune and metabolic systems. This response is also influenced by environmental factors, gene-environment interactions, and protective factors which include resilience, social support systems and coping strategies. While the ability to cope with stress is necessary for children's healthy development and survival, excessive or prolonged exposure to stress can cause dysregulation of the body's natural stress response system, which leads to maladaptive stress responses and toxic stress [36].

Stress responses can be categorized into 3 types: *positive, tolerable, and toxic.* Stressful experiences have the potential to promote healthy development of the stress response system through positive or tolerable stress, or alternatively, can result in toxic stress, leading to damaging, lifelong effects on brain architecture and biological systems [36, 44]. Positive stress is considered essential to normal, healthy development and refers to short-lived stress responses that increase an individual's blood pressure, heart rate or stress hormone levels. An example of an experience that may provoke a positive stress response in children is receiving an injected vaccination. Tolerable stress responses occur within a limited time period and have the potential to disrupt the architecture of the developing brain, resulting in damaging effects throughout the lifespan. An experience that may provoke a tolerable stress response is a natural disaster. The key to navigating tolerable stress is its occurrence in the context of a safe and stable environment and positive, supportive relationships that encourage adaptive coping strategies and help to buffer a child from stress-related adverse effects.

Toxic stress responses, the most harmful stress responses, are provoked when children experience chronic, uncontrolled stressful events, particularly without the buffering provided by a safe environment and positive, supportive relationships with adults [45]. Stressful experiences classified as ACEs include child maltreatment and household dysfunction, with specific examples such as parental substance abuse, family violence, and severe maternal depression [29]. Toxic stress is characterized by frequent or prolonged activation of the body's stress response system, leading to disruption of the circuitry between the brain and body's central and peripheral nervous systems, thereby affecting the complex interplay between multiple biological systems. Chronic exposure to toxic stress weakens the architecture of the developing brain, altering biological functions and taking a cumulative toll on a child's physical and mental health throughout their lifetime [36].

The impact of the toxic stress associated with ACEs on children's brain development is well-documented [46]. Excessive exposure to toxic stress in early life can alter the stress response system by shifting physiological and psychological resources from long-term development to addressing the immediate threat. During sensitive periods of brain development, this maladaptive response can ultimately change brain architecture by becoming integrated into long-term regulatory processes, eventually leading to increased risk of adverse biological, developmental, psychological, and behavioral health outcomes. One of the mechanisms by which this can occur is called biological embedding [47, 48].

Biological embedding is the process by which human experiences "get under the skin" and modify developmental and biological processes. This process is influenced by the differences in social environments and genetic predispositions experienced uniquely by each individual during sensitive periods of rapid brain development and increased plasticity in the first few years of life. Emerging research suggests that early life experiences during these sensitive periods lead to epigenetic processes such as DNA methylation that become stable, and ultimately develop the capacity to modify gene expression, thus potentially changing life course trajectories [49].

The Interrelatedness of ACEs and EVG

The effects of chronic stress exposure or toxic stress on the brain are determined by the timing and duration of the exposure, and the areas of the brain that are developing at the specific time of exposure, whether prenatal period, infancy, childhood or adolescence [44, 50]. The impact of EVG on children can begin as early as prenatally, as developing children experience that trauma along with their parents. How it affects a mother's psychological state and her ability to be a capable, emotionally sound caregiver cannot be ignored, even in the prenatal period [51].

According to a study in three geographic areas (Boston, Philadelphia, and eastern Tennessee), one-third of young children (2-9yo) had a history of EVG, as reported by their caregivers. Young children experienced more distress from hearing gunshots when compared to older children. Children who were more likely to demonstrate self-protective actions (hiding somewhere until it was over, asking to move to a different place to live, going a different way to get somewhere) were more likely to be urban; have a lower sense of safety; have family adversity experiences such as homelessness, parental imprisonment, or family substance abuse; and reside in areas of higher community disorder. The authors concluded that indirect EVG, "*just seeing and hearing gun violence*" may be as traumatic as direct EVG, but is less likely to be addressed [21]. It should be noted that indirect EVG did not include the loss of family or friends to gun violence.

Exposure to gun violence in children, both directly and indirectly, is strongly linked to developing internalizing symptoms (depression, anxiety, PTSD, cognitive impairment, attentional deficiency) and externalizing symptoms (substance abuse, carrying a weapon such as a gun, trouble in school, fighting) [52, 53]. This problem is of particular concern in urban communities of the United States, where exposure is chronic and co-exists with other stressors [54]. Parallels have been drawn between children in "urban war zones" and those living in actual war zones [55]. Individuals exposed to gun violence prior to18 years old self-report poor health more often than those who are not exposed [56]. Additional research is needed on the physical health consequences of exposure to gun violence.

EVG: What we Can Do: The Role of the Adolescent Health Provider

Case Illustration
A 15-year-old female adolescent is seen for an annual check up at a South Bronx clinic. Their past medical history indicates multiple emergency room visits for heart palpitations. Cardiac work-up was negative. The pediatrician finds that the palpitations are triggered by hearing gunshots in her neighborhood. The patient had recently migrated from El Salvador, where she lost several family members to gun violence. Recognizing that EVG can present as physical health symptoms, a referral was made for PTSD to the integrated pediatric mental health and primary care program.

ACEs-related clinical practices range from screening for ACEs to interventions that respond to the poor health outcomes that manifest in response to ACEs [57]. Most existing screening efforts take place in healthcare settings [58]. The responses to these screenings are typically for health providers to make a "warm hand-off" to a social worker for referrals to services. However, the effectiveness of such referrals are contingent upon the availability and accessibility to a community's resources.

There are few evidence-based strategies for primary prevention of ACEs. Newborn home visitation is a family-centered community-based approach that has been found to reduce child maltreatment. Nurses work with pregnant women to promote a mother's physical and mental well-being, and follow high-risk new mothers until children are 2 years old. A similar family-centered approach in early childhood has not been implemented for exposure to gun violence, but may be effective given high rates of co-occurring polyvictimization and the intergenerational aspect of violence [59].

Gun safety education in the pediatric practice setting has been primarily targeted towards reducing unintentional injuries in young children and youth suicide occuring in children's homes [60]. There has been a lack of attention to prevention and intervention of EVG affecting children living in disadvantaged communities and exposed to chronic community violence.

Recently-developed screening tools for EVG in the health care setting include the **Youth First Tool** and the **Safety Tool** [61]. The **Youth First Tool** screens for access to guns (including peer use of guns), gun attitudes (the feeling that guns are safe), gun safety education, and exposure to gun violence.

Current trends invite us to consider the known implications that exposure to gun violence has on mental health. Poor mental health symptoms among youth predict extensive co-occurring adverse outcomes, including a higher risk for chronic disease and injury, impaired child development, poor academic outcomes, and increased likelihood of suicide attempts. There is strong evidence to support

youth-focused interventions that integrate components of behavioral health with clinical services [62].

Conclusion

In sum, our work builds on the existing literature base to provide a compelling case for EVG to be classified as an ACE. A growing body of literature substantiates the association between EVG and emotional, behavioral and academic problems. EVG increases the risk for violence perpetration and victimization, particularly among Black youth. The evidence proposed in this chapter argues for the necessity of including EVG in the ACEs definition as a means of establishing EVG as a public health problem and establishing equitable prevention and intervention programs in the adolescent health and communal setting to mitigate the risk of long-term consequences. The authors of this chapter are therefore calling for the official classification of EVG as an ACE and for the promotion of cross sector efforts to create safer communities, in which youth no longer live in fear of dying from gun violence.

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Chapter 7
Fighting Gun Violence from the Doctor's Office

Jillian B. Parekh and Olga Myszko

Abbreviations

AAFP	American Academy of Family Physicians
AAP	American Academy of Pediatrics
ACP	American College of Physicians
ASK	Asking Saves Kids
CHAM CAREs	Children's Hospital of Montefiore Clinical, Academic, Research and Education
CHAM	Children's Hospital of Montefiore
EHR	Electronic Health Record
HIPAA	Health Insurance Portability and Accountability Act
NRA	National Rifle Association
STAR	Straight Talk about Risks
TIPP	The Injury Prevention Program

Introduction

When we first sat down to work on this chapter we had two competing thoughts about the topic: we are passionate about protecting children from the gun epidemic, but are we best suited to write this as pediatricians working in New York City, where registered gun ownership is low? Practicing in the Bronx for the last 14 years (J.P.) and 3 years (O.M.), we have become acutely aware that violence affects too many of our patients—from bullying to emotional, physical, sexual abuse and domestic

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violence. But over our nearly two decades of combined experience as pediatricians, we have directly cared for very few patients injured by gun violence. More recently, since we have begun to routinely screen for guns in the home, generally the families that report ownership are those that work in law enforcement. However, a study done on our inpatient units revealed that 61% of patients hear gunshots in their community [2], and a teenage patient shared with us how easy it is to access shared guns stored outside of his home. There is no regionality to the dangers of the gun epidemic; in the United States, regardless of where you live, guns affect our youth and their communities. As our nation struggles to figure out how to address this epidemic, we hope to illuminate a few strategies to help empower pediatricians to start the conversation with our patients.

What Do Patients and Families Want?

Parents typically underestimate the likelihood of their children handling a gun. A survey of parents in 2003 showed that, when asked what their children would do if they found a gun, the vast majority of parents predicted that their children could be trusted to act responsibly (i.e., leave the area, tell an adult, or leave the gun alone). Only 13% of parents predicted their child would touch the gun (to bring it to an adult, to remove it, to examine it, or to play with it) [3]. In another study, almost half of all gun owners believed that children 6 years old or younger could distinguish between real and toy guns. However, when groups of school-aged boys were observed in a controlled environment with both a hidden toy gun and a real unloaded gun, over 70% of the groups discovered the real handgun and handled it, and at least one member in half of the groups pulled the trigger. Only half of the boys who found the handgun thought it was a toy or were unsure whether it was real. Almost all of the boys who handled the gun or pulled the trigger reported previous gun safety instruction, and boys who were perceived by their parents as having "little" or "no" interest in guns were just as likely to handle the gun as those who were thought to have more of an interest [4]. This landmark study and its chilling results (in which children pointed a real gun at each other and at themselves, sometimes pulling the trigger) shows that children cannot be entrusted to act responsibly around guns; rather, the responsibility is for parents to ensure that children do not gain access to guns.

Providers also underestimate families' exposures to firearms. When asked to predict the likelihood of gun ownership of specific families, pediatricians incorrectly predicted "no ownership" for one-third of families that disclosed owning a gun. This makes physician estimates of gun ownership only 65% sensitive [5]. Further, adherence to other good safety practices, such as childproofing the home and using car seats, has not been associated with safe firearm storage practices or an absence of handguns from homes [6].

With this in mind, it is important to assess our personal biases as providers, and to recognize that no family or community is immune to gun violence. Counseling

about firearm safety should be as ubiquitous as discussions about safe sleep, child-proofing, and other safety practices. However, the hesitation remains: do parents want this sensitive topic to be addressed by their pediatricians, and are physicians equipped to provide this counseling?

Time and again, parents have answered affirmatively that they want firearm safety information from their pediatrician. A study in Maryland in the 1990s found that a majority of the surveyed gun owners reported they would be likely to follow their pediatrician's advice about gun storage, except for the recommendation to remove guns from the home [7]. A 1993 series of focus groups done in pediatric urban clinics in Seattle again found that parents appreciated safety advice from their pediatricians, especially if the provider combined it with an interest in the family's personal situation [7]. In a related survey given out in the same clinics, only 11% of parents reported having received firearm injury prevention counseling from their pediatrician. Yet almost half would follow the doctor's advice to not have a gun in the home and another third would consider the advice. Only 3% would ignore the doctor's counsel and another 3% would be offended by it [7]. In a much more recent study published in 2016, over a thousand families were surveyed amongst clinics in St. Louis, Missouri and it was similarly found that only 13% of parents had been asked by their pediatrician about household firearms. However, 75% of these parents thought that pediatricians should be talking about safe storage, and only a slightly lower percentage (66%) thought they should also be asking about gun possession [1].

Like parents, adolescents and young adults generally have a favorable view of physician-led violence counseling, particularly with providers with whom they feel comfortable. A study of teen and young adult Black male patients (one of the groups most often victimized by gun violence) found that over 80% who received brief violence counseling felt it was important for physicians to talk to them about gun violence. On post-visit surveys, the discussion about firearms was well received and recalled more than any other preventive medicine issue discussed [8]. A survey of New York City high school students found that, while almost half of all teens thought it was okay for anyone to have a gun, only 12% had felt the need to talk to an adult about guns and even fewer listed their physician as this adult (and only 6% had ever been counseled on the topic by a physician). Interestingly, over 60% of teens would discuss the issue with a physician if asked [9]. Notably, teens in Rhode Island who had personal experiences with, or close contacts affected by violence felt that, while violence played a large role in their lives, few would openly discuss violence and safety with their primary care providers. Common explanations included a perceived lack of interest on the part of the physician and a perceived lack of the physician's ability to effect change. However, participants felt they would be more willing to discuss these issues with empathetic and compassionate providers with whom they had a relationship [10].

These data remind us of the importance of the physician-patient relationship and the unique position that we have as pediatricians. Ours is a field with an inherent continuity of care that allows us to establish strong ties with our families as both invested caregivers and as health experts whom they rely upon for information on a

wide array of topics. This is the foundation upon which we are able to provide anticipatory guidance, and it is to our advantage to use this relationship to advocate for improved safety in our patients' lives. The onus lies with us to identify firearm safety as an important topic for patients and families, and to lead the discussion.

Barriers to Counseling

Despite acknowledging the importance of counseling, few pediatricians routinely provide firearm safety counseling to their families. When surveyed, 75% of pediatricians felt it was their responsibility to counsel patients about firearms, but only 20–30% had ever counseled or screened for firearm access [11–14]. Similar trends are seen amongst our adult colleagues, with over 50% of internists surveyed having ever asked about gun ownership and over 75% having never counseled on the risks, even though most agree that it is their responsibility [15].

One important and commonly cited barrier to counseling is a lack of education on firearm safety. In a national survey of U.S. pediatric residency programs, only one third of programs offered residents formal training on firearm safety counseling. In another survey, over 75% of pediatric residents and 80% of attending practitioners rated their firearm safety training as "inadequate." In that same study, approximately half of surveyed residents believed their clinics lacked educational materials for patients, and those who felt less comfortable and less effective in their counseling skills reported a lower likelihood to routinely counsel their patients. Yet, 99% of the residents surveyed believed that it is a pediatrician's responsibility to counsel families about the safety risks associated with gun ownership [16]. This sentiment is reiterated in more recent resident surveys, where 20–60% of residents reported "never" counseling on firearm safety due to a lack of familiarity with the topic despite its importance to their patients [17, 18]. Other specialties cite a similar lack of training and materials: only 20% of surveyed psychiatric residency programs [19] and 25% of preventive medicine residencies [20] include some form of formal firearm counseling training.

Following, we will address some barriers by reviewing medical associations' published policies and recommendations for firearm counseling; examine the legal issues surrounding gun safety discussions; and offer strategies and resources available to guide practitioners. Our hope is that by doing so, our readers will recognize that firearm safety counseling can be feasibly incorporated into routine clinic visits.

Policies and Laws

The American Academy of Pediatrics' (AAP) policy, "Firearm-Related Injuries Affecting the Pediatric Population" was originally published in 1992 and most recently updated in 2012. Their recommendations are summarized below:

1. The most effective measure to prevent suicide, homicide and unintentional firearm-related injuries is to remove guns from homes and communities.
2. Inform parents: counsel them about the dangers of children and adolescents having access to guns inside and outside the home. Ask about the presence of guns in homes, and counsel on safe storage. Reiterate to parents of teens that the presence of guns in the home increases the risk of fatal suicidal acts and reinforce the removal of guns and restricted access for patients with mood disorders and substance abuse issues. Remind families that the safest home is one without a firearm.
3. Guns should be subject to consumer product regulation regarding child access, safety and design.
4. Funding should be provided for research related to firearm injury prevention.
5. Education should be provided for physicians and other professionals interested in understanding the effects of firearms and how to reduce the morbidity and mortality associated with their use [21].

Despite this policy, controversy ensued in 2011 when the Florida Legislature heard of a pediatrician reportedly asking a mother to find a new doctor for her child after she refused to disclose firearm ownership in her home. Based on this and 5 more anecdotal reports of "unwelcome questions" or "improper comments regarding ownership of firearms", Florida enacted the "Firearm Owners' Privacy Act" (FOPA), colloquially known as the physician gag law. This law was meant to "subject health care practitioners to possible sanctions, including fines and loss of their license, if they discussed or recorded information in a patient's chart about firearm safety that a medical board later determined was not 'relevant' or was 'unnecessarily harassing'" [22]. After multiple appeals, the law was finally found to be unconstitutional in 2017 and was revoked.

In response to the gag laws, seven professional physician societies, including the AAP, American Academy of Family Physicians (AFP), American College of Emergency Physicians, American College of Obstetricians and Gynecologists, American College of Physicians (ACP), American College of Surgeons, and American Psychiatric Association, with the help of the American Public Health Association and the American Bar Association, authored a collaborative policy statement regarding gun violence in 2015 [23]. Their joint position was reaffirmed in their 2019 statement [24]. Amongst their many calls to actions they write: "Conversations about mitigating health risks are a natural part of the patient–physician relationship. Because of this, our organizations oppose state and federal mandates that interfere with physicians' right to free speech and the patient–physician relationship, including laws that forbid physicians from discussing a patient's firearm ownership. Patient education using a public health approach will be required to lower the incidence of firearm injury in the United States" [24].

Since 2011, fourteen other states have tried to pass similar laws, none with success. Dr. Rathore expresses it clearly: "It is of paramount importance that determination of the content of patient-physician conversations remains outside the halls of

politics and legislatures and in physicians' offices. Optimal health care can only be delivered when physicians and patients feel free to discuss relevant issues openly" [25]. Even without becoming law, proposed gag laws may have created a "chilling effect" that will discourage firearm safety counseling. Physicians may incorrectly believe that their state has a gag law, or they may be uncertain whether a gag law exists and decide not to take the chance. It is important for all health providers to know, unequivocally, that as of 2021 their right to ask and counsel about gun safety practices is protected in all 50 states and the District of Columbia.

Although the studies are limited in number, data shows that pediatricians want to discuss gun safety and that the majority of families are ready to listen. Furthermore, the leadership of the largest physician professional societies assert that "[physicians] have a special responsibility and obligation to our patients to speak out on prevention of firearm-related injuries and deaths, just as we have spoken out on other critical public health issues" [24].

Extreme Risk Protection Order Laws ("Red Flag" Laws)

While there are currently no gag laws in any state preventing firearm counseling as it pertains to the health of a patient, there are laws that affect patient-physician confidentiality. As local and state laws vary widely, it is prudent for providers to familiarize themselves with the regulations in their area. Most states maintain the minimum federal levels for reporting persons deemed "medically unfit" to purchase firearms.

The shooter in the 2018 massacre at Marjorie Stoneman Douglas High School in Parkland, Florida, had alarmed many people with his violent words and social media posts; yet, the police had no cause to remove his guns because he had not yet committed a crime. In the wake of this shooting, many states considered and passed Extreme Risk Protection Order (ERPO) laws, or "Red Flag" laws, which allow law enforcement to remove the guns from the home of someone that a judge deems to be a danger to themselves or others. Although physicians typically do not file ERPOs, we can make patients aware of the laws in our state, and help them navigate the filing of an ERPO. For example, pediatricians could counsel a mother who disclosed that their partner was abusive and armed; or the parents of a young adult if they had concerns about suicidality. ERPO laws vary by state [26]; the Giffords Law Center to Prevent Gun Violence provides up-to-date state-specific information on ERPO laws at https://lawcenter.giffords.org/gun-laws/policy-areas/who-can-have-a-gun/extreme-risk-protection-orders/#state. It is important to understand your state's reporting requirements and how they interact with federal Health Insurance Portability and Accountability Act (HIPAA) privacy rules. At our academic medical center, we educated the division of pediatric social workers on ERPO laws so that they would be able to help patients navigate the filing of such an order if the need arose.

Approaches to Gun Violence Counseling

The positive impact of physician-initiated firearm safety counseling on families' gun storage habits is well documented. Results of randomized control trials have shown that brief physician counseling directed at parents, when combined with the distribution of gun storage devices, can be effective in promoting safer storage of firearms in homes with children [27–29]. In one study, over half of families with guns in their households who received verbal and/or written safety information made safe changes in their gun storage practices (and 12% removed the guns altogether) when compared to the control group [30]. In another study, similar changes in gun safety practices were seen among families who received gun safety counseling and a free gun lock in their pediatrician's clinic. And of those who kept guns in their household, 50% of the intervention group showed sustained improvements in gun storage habits on follow-up visits [31].

Although gun avoidance programs (such as the National Rifle Association [NRA]'s Eddie Eagle and the Straight Talk About Risks [STAR] program) have been developed to educate children about the risks of firearms, studies suggest that these programs do not prevent risky behaviors and may even increase gun handling among children [32–34]. Instead, appropriate modeling and reinforcement of safe behaviors by caregivers is important in establishing good safety practices.

Therefore, rather than focusing on child behaviors, providers should direct their counseling towards parents and encourage caregivers to, ideally, remove all firearms from the home, or barring this, store firearms safely. To store firearms safely, families must keep all guns locked up and unloaded, and stored separately from ammunition. A multisite study found that keeping a gun (including handguns, rifles, and shotguns) locked and keeping a gun unloaded reduced the risk of both unintentional injury and suicide in children and teens by 73% and 70%, respectively [35].

Only eight states require safety training as a prerequisite for gun ownership, and there is no federal requirement [36]. While organizations like the NRA and local gun clubs may provide firearm safety training, there is little data available regarding the efficacy of these programs or their popularity among gun owners. Research does show, however, that safety information is rarely provided at the time of most gun purchases [37]. This stands in contrast to the vast majority of adults and children in the U.S. who have contact with a healthcare provider annually (over 80% and 90% respectively), with over 50% being primary care visits [38]. This exposure provides ample opportunity for physician-initiated safety counseling, which might reach individuals who would not otherwise receive training or safety information.

Resources & Strategies for Counseling

Over recent years, the public discussion around gun violence has shifted away from the interpretation of the Second Amendment of the U.S. Constitution and has started to reframe the debate about gun policies to focus on the safety of children and adolescents. This change in rhetoric aligns with our concerns as pediatricians and advocates, and presents a way to engage our patients' families in a dialogue about gun safety. By framing firearm safety as a public and personal health issue, much like car seat use, infant safe sleep, and secondhand smoke exposure, clinicians can create a framework for consistent and unbiased patient screening and counseling.

As pediatricians, we are trained to provide anticipatory guidance and education regarding injury prevention on a multitude of topics as part of our regular clinical work, and firearm safety should be no exception. Familiarity with guns and/or their use should not be seen as a prerequisite to providing effective counseling on gun safety and the associated health risks. Non-gun owning pediatricians should feel just as comfortable as gun-owning pediatricians in discussing this topic with patients. There are many resources available to the general practitioner to help begin the conversation about firearm safety and to provide information for families, including locally and nationally endorsed programs. Developing a clinic workflow by utilizing pre-visit questionnaires or Electronic Health Record (EHR) prompts to document screening results can help create a consistent system for discussing firearm safety with families and help to de-stigmatize the topic.

The Developmental Approach to Firearm Safety Counseling

A developmentally appropriate and age-oriented approach can make firearm safety counseling a routine part of every well-child visit. Rather than risk-stratifying families based on the presence of household guns, diagnoses (e.g., depression, substance use), or individual characteristics of the child, taking a universal approach with every visit helps reinforce to both the provider and the family that this is a routine safety issue meant to be discussed as importantly as safe sleep and emotional health. Parental focus groups have shown that families are receptive to firearm safety counseling when it is presented in a relevant context and in a nonjudgmental manner which supports parents' rights to make informed decisions about the well-being of their children [39].

By tailoring our counseling to the developmental age of our patients, we can provide families with timely and practical recommendations that they can implement to improve their household's safety. It also creates an accessible script for providers during the visit that can be updated as patients mature, and incorporates the topic longitudinally into visits' anticipatory guidance. In our practice, we divide patients into the following categories, based on age and developmental milestones: newborns, infants and toddlers, school-aged children, and teenagers and young adults (Table 7.1).

Table 7.1 Developmentally targeted approaches to firearm safety counseling

Ages & Stages	How to Incorporate Counseling	Helpful Facts for Families
Newborn	Use ACES screening to ask about parent's childhood experiences with guns Ex: "Did your family own a gun while you were growing up? Do you know anyone who has ever been shot?" Focus on the newborn period as a time to create the safest home possible for the future	The presence of a firearm in the home increases the risk of all types of gun violence (including suicide, homicide, and unintentional shootings) [40–43] Children exposed to gun violence have an increased risk of mental health diseases (posttraumatic stress disorder, depression, and anxiety), poor school performance, and an increased risk of substance use and criminal activity as they grow older [44–48]
Infant & Toddler	Include in the baby-proofing and household safety discussion Ex: "Now that your baby is learning to stand and move, it is very important that dangerous items, such as household cleaners and guns, be locked away safely. All guns should be unloaded and locked away, and the ammo should be separate"	A child as young as three years old has enough strength to pull the trigger of a handgun [49] 70% of unintentional shootings happen in a home with a family-owned gun [50, 51]
School-aged	Educate and encourage parents to ask about firearms (and their storage) in others' homes Ex: "Does your child spend time in places outside your home? Do you feel comfortable asking about guns in those places with the rest of your safety questions?"	Up to 75% of children aged 5 and older who live in a home with a gun know where it is stored, even if parents have never shown them, and up to one-third of children have handled a gun at some point [52]
Teenager & Young Adult	Use the confidential history to assess personal and peer behaviors, concerns about safety, and to educate about firearm safety Ex: "Are you ever worried about your safety? Do you ever carry a weapon for protection? Do you know where to get a gun if you wanted one?"	Gun violence often occurs within known social groups, rather than strangers [58] Gun violence is the leading cause of death for children and teens [59]
Parents of teen	Discuss the elevated risk of violence when guns are present in the home, and formulate safety plans for critical moments Ex: "What would you do, or who would you call, if you had thoughts about hurting yourself? What would you do if you were in a situation where you felt worried about your safety?"	The presence of a gun can increase household risk of suicide by 300% [55–57] Gun suicides have an 85% success rate (the highest mortality of any method) [55–57] 85% of child and teen firearm suicides involve a gun belonging to a family member [54] Moments of suicidal thinking happen to teens even if they don't have a history of mental health issues

We find the newborn period a time when parents are very enthusiastic and receptive to safety information. Combined with the frequent visits in the first months of their baby's life, this is an opportune time to begin the conversation about firearm safety. Safe storage practices can be incorporated into the "baby-proofing" discussion about household safety. Parents should be reminded that before they know it, their tiny swaddled newborn will be a toddler constantly on the move.

Parental exposure to gun violence can be incorporated into the Adverse Childhood Events (ACEs) screening or the family medical, psychiatric, or social history. This can give way to a discussion about how the presence of a firearm in the home increases the risk of all types of gun violence (including suicide, homicide, and unintentional shootings) [40–43] and the profound impact exposure to this violence has on a growing child's mental health (including an increased risk of mental health diseases such as posttraumatic stress disorder, depression and anxiety, poor school performance, and an increased risk of substance use and criminal activity) [44–48].

The gross motor developmental milestones of the infant and toddler age groups, such as grasping, crawling, and walking, present a well-known and justifiable parental concern for safety. Capitalizing on this, recommendations for safe firearm storage should be included with other recommendations for securing dangerous household items, such as medications, cleaners, stairs, and pools. We find it helpful to point out the child's developmental milestones, and use it to create a scenario for parents. For example, a toddler who has just started to crawl or walk can now access a cabinet where a gun may be stored. A reminder that abstract thought, and therefore the notion of consequences, is not yet developed, is also helpful for parents to understand that toddlers cannot comprehend rules or dangers, no matter how well-intentioned. The sobering fact that a child as young as 3 years old has enough strength to pull the trigger of a handgun [49], and that 70% of unintentional shootings happen in a home [50, 51], also puts the danger into context.

Addressing firearm safety in the school-aged group requires a shift in counseling as children become more independent. While the focus of our counseling remains safe storage practices, ensuring safety in spaces outside the home now needs to be addressed. Parental modeling of good safety practices is paramount, as up to 75% of children aged 5 and older who live in a home with a gun know where it is stored, even if parents have never shown them, and up to one-third of children have handled a gun at some point [52]. When thinking of safety outside the home, it is fundamental that we encourage parents to ask about the presence of firearms in others' homes in addition to the rest of their safety evaluation (such as supervision, pets, and allergens).

The Asking Saves Kids (ASK) campaign from the AAP and the Brady Campaign to Prevent Gun Violence promotes a universal approach to asking about household gun safety for all ages, regardless of gun ownership status. It provides helpful resources and tips for navigating the conversation with family, friends, household members, and more (Table 7.2). While parents should always ask about the presence of guns in households where their children visit (including family, friends, and neighbors), the ASK Campaign encourages all individuals to ask whenever planning to spend time in another's home. This includes young adults moving into

Table 7.2 Tips for asking about firearms in others' homes

Use text or email because it's easier to ask awkward questions that way Ask as a three-part question Offer information about your own house first Lump the question with other safety questions (supervision, pets, allergies, pools, etc) Acknowledge the awkwardness of the topic. Don't be confrontational Save the question as a "note" in your phone so you can quickly paste it into a text with other parents Sharing statistics when you ask can put the question into context Asking many people, often, helps practice the question. Ask family, friends, neighbors, hosts, and anyone else you visit	"Do you have a gun? Is it secured? Is it stored separately from the ammunition?" "We have a gun at home that's stored in a locked safe away from the ammo. How do you store yours, if you have one?" "This is always awkward, but I took a pledge that I would always ask/tell about unsecured guns whenever my children go to someone else's house. We don't have any guns in our home. Do you have any, and if so, how are they stored?" "Did you know that 46% of gun owners don't lock up their guns? So I always ask about guns in the house when we visit. Do you have one, and how do you store it?"
Visit the asking saves kids (ASK) campaign at https://www.bradyunited.org/program/end-family-fire/asking-saves-kids for more tips	

dorms or group homes, teens taking a babysitting job, and when a new member joins a household (such as elderly family members). One recommendation is to acknowledge the topic as uncomfortable but necessary (e.g., "My child is very curious and I am paranoid about their safety, so I always ask if there are any unlocked guns in the house?") This can avoid a confrontational tone. It can also be easier to ask through text or email. Utilizing the ASK campaign can be an effective way to teach families how to approach the topic. A 2017 study that showed that almost 85% of parents who received verbal and written educational information about ASKing from their pediatrician felt both more comfortable and more willing to ask about the presence of guns in spaces where their children play [53]. The ASK Campaign is a pragmatic resource that pediatricians and families can use to implement firearm safety into their daily living.

As teenagers and young adults become even more independent, we find it helpful to have separate approaches for parents and teens. When discussing firearm safety with parents, the focus is on household and individual safety, specifically as it relates to homicide and suicide. It is helpful to frame the discussion around the socio-emotional development of the teen. During this time, when peer groups and interpersonal relationships are more influential than parents, and impulsivity is common, a moment of emotional vulnerability can quickly become a tragedy when there is a gun in the home, regardless of psychopathology [54]. Highlighting that the presence of a gun can increase household risk of suicide by 300%, and that gun suicides have an 85% success rate (the highest mortality of any method) [55–57], can underscore the danger for parents and teens. Another fact that we find helpful

and eye-opening for parents is that almost all child firearm suicides involve a gun belonging to a family member [54]. Developing safety plans with teens and parents, such as who to contact if suicidal thoughts occur (i.e., crisis hotlines) or how to extract the teen from a potentially violent situation outside the home (i.e., safety words, parent check-ins), can help to mitigate these dangers. Further counseling on the importance of removing guns from the home, or barring this, storing them appropriately, is important for all households with teens, regardless of a history of mood disorders or history of self-harm (although removal becomes paramount when this history is present).

Our approach to counseling teenagers focuses on the confidential interview as a time to assess behaviors and provide education. As always, asking about their friends and peer pressure is a way to open the conversation, as are questions about individual safety. Asking, "Are you ever worried about your safety?" or, "Do you ever carry a weapon for your protection?" can provide insight into the teen's risk for violent situations. Other questions about availability of guns, such as, "Could you get a gun if you wanted to?" can also shed light on the risk of community violence. Screening for intimate partner violence during the sexual history is another opportunity to ask about the availability of firearms. Acknowledging that gun violence often occurs within known social groups, rather than strangers [58], and is the leading cause of death for children and teens [59], can help to identify those at-risk for violence and empower teens to ask about the presence of firearms in the spaces they use.

The AAP has developed multiple resources for the general pediatrician with the aim of reducing unintentional injuries to young children and suicide risk among adolescents by providing developmentally- and age-appropriate counseling. The current AAP policy endorses the use of the *Connected Kids: Safe, Strong, Secure* violence prevention program (available online with an AAP subscription) [21]. It provides a clinical guide, patient information brochures, and supporting training materials regarding a variety of violence-related topics. *The Injury Prevention Program* (TIPP), also developed by the AAP, provides safety counseling guidelines for every age, from newborn through adolescence, and a counseling framework that can be used in conjunction with the *Connected Kids* patient materials. Additional resources provided through TIPP include a package of materials designed for office use, including parent safety handouts, patient safety surveys, and a schedule for recommended counseling for each preventative health visit. This age-oriented approach has also been incorporated into the *Bright Futures Guidelines* violence prevention resources.

Several professional physician societies, including the AAP, AAFP, and ACP, have a devoted section to firearm safety education and advocacy, with websites listing resources for both providers and patients (Table 7.3). The National Physicians Alliance also provides resources for practitioners regarding how to counsel about firearm safety, and legal issues surrounding the topic. Other national organizations and campaigns, such as the Brady Campaign, Project ChildSafe, the Coalition to Stop Gun Violence, and Moms Demand Action for Gun Sense's Be SMART campaign, all have online and community resources available to parents

Table 7.3 Resources for education and advocacy on gun safety and violence

American Academy of Pediatrics (AAP)	https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Pages/Gun-Violence-Community.aspx
American Academy of family physicians (AAFP), familydoctor.org	https://familydoctor.org/gun-safety/
American College of Physicians (ACP)	https://www.acponline.org/practice-resources/patient-education/online-resources/gun-safety
American public health association	https://www.apha.org/topics-and-issues/gun-violence
Brady campaign to prevent gun violence, asking saves kids (ASK) campaign	https://www.bradyunited.org/ https://www.bradyunited.org/program/end-family-fire/asking-saves-kids
Project ChildSafe	https://projectchildsafe.org/
Be SMART campaign	http://besmartforkids.org/
Moms demand action for gun sense in American	https://momsdemandaction.org/
Everytown for gun safety	https://everytownresearch.org/
The coalition to stop gun violence	https://www.csgv.org/
U.S. National Library of Medicine	https://medlineplus.gov/gunsafety.html
Physician's for the prevention of gun violence	http://ppgv.org/
Massachusetts medical society firearm violence resources	http://www.massmed.org/Patient-Care/Health-Topics/Firearm-Violence-Resources
Harvard School of Public Health means matter suicide prevention campaign	https://www.hsph.harvard.edu/means-matter/

and providers. Their offerings include written information, educational videos, social media campaigns, and local advocacy chapters. Several programs also offer educational presentations, which may be used in clinic waiting rooms. For example, utilizing the *Connected Kids* campaign at community Head Start pre-K programs was well-received by parents in Kansas City, Missouri [60] and suggests that pediatricians may take counseling beyond the walls of their clinics with good success, and vice versa. Be SMART is a non-political gun safety campaign designed by Moms Demand Action for Gun Sense that reviews the basics of safe storage and asking about guns in the home using a simple and memorable framework (Fig. 7.1) [61].

The AAP encourages pediatricians to familiarize themselves with local community resources that can assist families at high risk of firearm injuries. In a 2016 national survey of U.S. gun owners, respondents ranked law enforcement personnel, hunting or outdoors groups, active-duty military, and the NRA as most effective in communicating safe firearm storage practices [62]. While healthcare professional counseling was not included in the survey, these responses indicate potential allies for safe storage campaigns, particularly those who can provide patients with access to safe storage devices. Other local resources include hospital- and

Fig. 7.1 The BeSMART Framework for Firearm Safety

community-based violence reduction groups, which work to identify youth and adults at high-risk for community violence and provide educational interventions and support groups.

In Practice

In ambulatory pediatrics, patient loads are increasing, visit times are shortening, and there is a need to screen for more and more health risks. Screening burnout for both patients and physicians is real. It is important to make gun ownership and safety questions practical and impactful.

We have made some simple changes in our own clinical setting to increase firearm safety counseling. Our hospital, The Children's Hospital at Montefiore (CHAM) formed a committee, CHAM CAREs about Gun Safety and Ending Gun Violence, for physicians and staff concerned about gun safety and eager to promote change in the Clinical, Academic, Research, and Educational (CARE) arenas throughout the hospital. Through this committee we realized that even the pediatricians most

passionate about this topic had not yet figured out how to address gun ownership or safety in a routine office visit. With the committee's support, a group of us worked with our EHR team to have the following questions included:

- Are there ever any guns in any of the homes your child spends time in?

  If the answer is yes, the following cascade of choices appears:

- How are the guns stored? Locked? Unlocked? Loaded? Unloaded? Stored separately from bullets/ammunition? Stored in same place as bullets/ammunition?

  – Locked.
  – Unlocked.
  – Loaded.
  – Unloaded.
  – Stored separately from bullets/ammunition.
  – Stored in same place as bullets/ammunitions.

This is now incorporated in all pediatric patients' charts within the health care maintenance section with the hope that a visual cue will help normalize the question and encourage pediatricians to ask. The question does not need to be completed to proceed in the chart and completion is not monitored. Note that we do not ask about personal gun ownership—rather, we ask about the child's exposure to guns in any setting. The literature varies on whether asking about gun ownership is the best approach to safety counseling, but we believe a cue of any sort is the best first step to increasing counseling.

The script we have adopted is as follows: "Gun violence has become such a big problem in our country that I have started to talk to all my patients about gun safety. Is there a gun in your home or any home your child spends time in?" Regardless of their answer I advise: "The safest home for a child is a home without a gun, but in case you or your child is ever in a home with a gun it's really important for you to know the safe way to store it. Guns should be stored unloaded, locked out of reach of children, and locked separately from bullets. Please be sure anyone you know with a gun is storing theirs safely. Do you have any questions?"

Given how long it took us to incorporate gun safety into our anticipatory guidance, we have been surprised by how well it has been received. Many families are taken aback when we first ask, but they all are attentive and many have expressed gratitude for including the discussion in the visit. On a few occasions where a parent has reported there are no guns in the home, the patient (child) has corrected them by telling them of a family member who has one. Yet another reminder of how important it is to start the discussion.

We are also in the process of creating a system-wide message that succinctly reviews safe gun storage to be included in the after-visit handouts. While these new prompts help as visual cues, many providers still feel uneasy giving anticipatory guidance about safe gun storage. Next we hope to aim our efforts at educating providers to feel better prepared, similar to the way we feel when discussing other pediatric safety concerns.

Conclusion

In this chapter, we have reviewed the literature and professional recommendations for firearm safety screening and counseling. We have offered suggestions and resources to improve current practices. However, evidence-based guidelines and interventions remain scarce as research into this topic is limited. With the recent announcement that Congress hopes to approve more national funding towards gun violence prevention research [63], we must strive to design studies with a rigorous methodology for evaluating interventions and practices. Areas for future research of particular importance to firearm safety counseling include: content and delivery of counseling messages; testing of firearm safety devices; and the preferences of gun owners when using and discussing firearm safety. The development of educational strategies for both practicing providers and physicians-in-training also require further study. Greater insight into these topics will help to design and implement effective and practical counseling practices. But for now, the data is clear: pediatricians should embrace universal gun safety counseling as part of their anticipatory guidance.

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Chapter 8
Adolescent Suicidality and Homicidality: Who Is at Risk?

Caroline Bjorkman and Timothy Rice

Introduction

Adolescent suicide is the second leading cause of adolescent death in the United States [1]. Suicide attempts peak in middle adolescence, and suicide rates rise into the teenage years [2]. For every American adolescent suicide, there are 100–200 suicide attempts [3], and as many as one in six adolescents have seriously considered suicide within the last 12 months [4]. These data convey the public heath importance of the difficult task to determine which patients will be at greatest risk for suicide. Accurate risk assessments are a crucial component for prevention [5].

Simultaneously, adolescent-perpetuated homicide is the third leading cause of adolescent death [6]. As with adolescent suicide, homicide rates are currently rising [1], and as with prevention efforts in suicide, educators, clinicians, and public officials play a role in risk assessment. While many homicides are most appropriately managed through the juvenile justice and legal system, many involved in the lives of youth can make an impact by recognizing risk and intervening. The prevalence of psychiatric disorders in individuals who commit homicide are as high as 90% [7], and as the presence of many untreated psychiatric diagnoses raise the risk of homicide [8], the provision of care to those in need may reduce individual homicide risk as well as homicide rates on a population level [9].

Fortunately, education on risk assessment is both feasible and effective in increasing the accuracy of risk assessment among healthcare clinicians and trainees of many disciplines and specialties [10]. Among healthcare providers, the greatest impact on attitudes towards assessing for suicidality in patients is their perception of being sufficiently trained [11]. Providers who felt they were adequately trained appeared to be able to trust their knowledge and were found to be better able to deal with suicidality in patients [11]. In individuals without any mental health

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knowledge, providing training in suicide risk substantially improves confidence in staff dealing with suicidal patients [12]. Accurate risk assessment is a crucial key step in selected and indicated prevention; adolescents at risk can not only be targeted for intervention, including referral to specialty care, but risk stratification can guide and inform public policy and community-based interventions for youth in need.

In this chapter, we delineate the importance of definitions for accurately classifying the thoughts and behaviors of adolescents at risk, discuss risk factors for adolescent suicide and homicide with an emphasis upon divergences from the adult psychiatric literature, review protective factors including family system strengths, help-seeking behaviors, and resilience and provide guidance on the risk-assessment interview and mental status examination for a non-specialist healthcare clinician and/or trainee, educator, and public official. As firearms are the leading means of death in both adolescent suicide and homicide, risk assessment is of paramount importance in efforts towards adolescent gun violence prevention.

Definitions

Suicidologists, forensic child and adolescent psychiatrists, and researchers have created several classification schemes in order to create a common language for differentiating between various types of thoughts and behaviors related to suicide and homicide. Vague language such as "suicidal gesture" is generally avoided in favor of classification of behaviors based on intentions behind the action, with various objective modifiers such as low-lethal or high-lethal provided for additional information [13].

In order for an attempt to be considered suicidal behavior the patient must have performed a suicidal act with the intent to end their life. If a patient states that they had intended to end their lives through a low-lethal means, such as the swallowing of a single tablet of ibuprofen, for example, and there is no reason to believe that the patient is distorting report or with a medical knowledge or developmental understanding that suggests that the patient knew this could not realistically end the patient's life, then this will be classified as a low lethal suicide attempt.

The Columbia-Suicide Severity Rating Scale (C-SSRS) is a key classification scale [14]. The C-SSRS is a tool that is designed to aid in determining who is at risk for suicide as well as what level of support they will require. The C-SSRS is a scale comprised of simple, straightforward questions that can be asked by any provider about suicidal ideation, suicidal intensity, and behavior. A patient's answers are marked and reviewed by an examiner to determine whether the patient has suicidal ideation, and also the severity of such ideation. This aids the examiner in determining what type of treatment is required. Treatment options range from no intervention to inpatient hospitalization [15].

In adolescent and in particular early adolescent populations, it is important to take into account developmental capabilities and health literacy when assessing

suicidal behavior. As a common example, many youth will not have the knowledge of the high lethality of acetaminophen when taken in even low quantities [13]. The low lethality of many methods of suicide in young children, such as holding their breath or swallowing dirt, does not discount from the need for clinical attention of a child who engages in such behaviors with the intention of ending their lives.

Adolescent Suicide Risk Factors

Demographics

Age

Older adolescents and teens are more likely to attempt suicide than younger children [16]. It is unlikely for a patient under 5 to attempt suicide; most attempts happen from ages 15–24 [16]. Early adolescents that attempt suicide are found to have lower rates of psychopathology; are less likely to have suicidal ideation; and have less cognitive ability to plan and attempt suicide than older adolescents [16]. This suggests that in this age group impulsivity plays the largest role in suicidal behavior [17]. Suicide attempts and mortality increase in the late teens and continues into the early 20s for male and female adolescents and emerging adults alike. The most common method of suicide in younger adolescence is by means of hanging/asphyxiation and in older adolescence and teens by firearms [17].

Sex and Gender

Although females are more likely to attempt suicide than males, males are found to be three to five times more likely to die by suicide [17]. Methods used for attempts differ from those in completed suicide. Teenage females, like younger adolescents, are most likely to attempt suicide by ingestion, but die by hanging/ strangulation/ suffocation. Males are more likely to complete suicide by firearm.

Transgender teens are at higher risk for suicide attempts compared to cisgender teens [18]. This may be due to the fact that transgender teens face more bullying, harassment, and family rejection. Along with suicide attempts, transgender teens are at increased risk for depression and non-suicidal self-injury (NSSI) [19].

Ethnicity

Among ethnicities, white adolescents had the highest rates of suicide [20]. The second highest is found among Native Americans/Alaskan Natives. Much lower rates are found among Black and Asian Americans. Hispanic females have high rates of suicide attempts, though these attempts are less likely to be fatal.

Religion

In adolescence, religion is a protective factor against suicide; individuals who affiliate and participate in religious activities are at lower risk for suicidal ideation or attempt [21]. It is unknown whether this is due to the feeling of community and belonging which religion often provides for individuals or whether religious beliefs themselves are protective.

Immigrant Status

Suicidal ideation and attempts occur among immigrant adolescents at a higher rate than nonimmigrants [22]. This may be due to socioeconomic factors, school integration, and difficulties in access to appropriate health care. Immigrant adolescents may have a more difficult time feeling like they fit in with peers, leaving them feeling isolated and increasing their risk for suicidal ideation. These students are at higher risk of bullying as well [22]. This risk is further increased by documentation status: adolescents who are undocumented are unlikely to seek treatment from mental health providers as access to health care is limited [23]. Cultural differences as well as language barriers may also discourage individuals from seeking treatment.

Socioeconomic

Low socioeconomic status, lower levels of parental education, and having a single parent all raise suicide risk [24]. Similar to immigration status, risk may derive from less available preventative and mental health care, as well as from the toxic effects of poverty itself.

Geographic Area in the United States

Adolescents in rural areas are at greater risk than those in urban areas [25]. In rural areas, there are more barriers to psychiatric treatment such as limited mental health-care providers, long distances to travel, and lack of insurance coverage. In rural areas, there is also higher access to means of lethal harm, notably, to firearms [26].

Access to Firearms

Having access to lethal means impacts the method of suicide attempt. The United States has the largest number of guns per capita; the amount of guns in the United States outnumbers the population of the country [27]. Eighty-four percent of guns used in suicide attempts are found in the home [28]. At least one firearm is present

in 34% of households with children in the United States, and 21% of households keep at least one gun unlocked and loaded [28].

Firearms are a quick and lethal means of suicide [28]. These suicides are normally in the context of impulsivity towards a specific painful stressor, such as loss of a loved one, job, imprisonment, or separation. Individuals who die by firearm suicide are less likely to have had previous suicide attempts or psychiatric treatment than people who die by other methods of suicide.

Having a firearm in the home increases the risk for adolescent suicide [28]. Therefore, restricting access to firearms can be a key step in reducing the overall risk of teen suicide. Parents must be educated on how to mitigate this risk. Parents with children above the age of 12 are likely to have firearms stored unsafely: of children in gun-owning households, 73% of children aged 5–14 are able to locate their family's guns and 36% report having previously handled the weapon. The safest option is to remove the firearm from the home. In homes where removal is not an option, firearms should be stored locked, unloaded, and kept separately from ammunition to reduce the risk of suicide in youth [29].

Psychiatric Diagnoses/Conditions

Depression

Mental illness is a strong risk factor for suicide in adolescents; many who die by suicide have a previous mental illness. The most common diagnosis associated with suicide is Major Depressive Disorder, but others diagnoses, including anxiety disorders, eating disorders, schizophrenia, conduct disorder, and substance use disorders all increase risk [16].

The prevalence of depression is approximately 1% in children [30]. This rises to a point prevalence of 5%, and a lifetime prevalence as high as 25%, by late adolescence [31]. Depression is the strongest risk factor for suicide among adolescent psychiatric disorders. It increases the risk of a suicide attempt by a factor of 12 in boys and 15 in girls [5].

Substance Use

Alcohol and drug use in adolescents increase the risk for suicidal ideation and attempts, with highest risk found when alcohol and drugs are used together [32]. Substance use is especially significant for older adolescent males and when present in an adolescent with an affective disorder.

Cannabis use is a risk factor found to be more relevant in adolescent populations than in adults. Adolescents who smoke cannabis are more likely to suffer from depression and have suicidal thoughts than adults [33].

First Break Psychosis

Individuals diagnosed with first break psychosis have been found to report higher rates of suicidal ideation and intentionality. Individuals diagnosed with psychosis regardless of age or gender are at highest risk during the first 6 months of onset of symptoms [34]. By the time of their first hospitalization, up to 26% of patients diagnosed with schizophrenia have attempted suicide, with a higher rate found among adolescents than among adults [35].

Attention-Deficit/Hyperactivity Disorder

Attention-deficit/hyperactivity disorder (ADHD) is a risk factor for adolescent suicidal ideation, suicide attempts, and NSSI [36]. Children with ADHD exhibit poor impulse control, have difficulty paying attention, and are overly active, which can lead to poor functioning in all aspects of life. This difficulty in performance can lead to loss of confidence and self-esteem. Those diagnosed with ADHD are also at higher risk to suffer from other disorders such as depression, substance use disorders, and conduct disorders. These factors along with impulsivity and aggression often seen in ADHD put the individual at greater risk.

Personality Traits

Thirty to forty percent of individuals who completed suicide were found to be diagnosed with personality disorders, such as borderline and antisocial personality disorder [5]. Borderline personality disorder and borderline personality traits in adolescents put them at higher risk for suicide due to impulsivity [37]. Borderline personality disorder is the only personality disorder that includes suicidal and self-injurious behavior in its diagnostic criteria [38]. Non-suicidal self-injury, such as superficial self-laceration or cutting, is classified as self-harm and is not performed with the desire to die; rather, these behaviors are engaged in for a myriad of reasons, often as a maladaptive means of relieving stress.

Although in NSSI there is no suicidal intent, a patient that engages in NSSI is still at a higher risk for suicide attempts and suicide: 70% of patients with a history of NSSI have attempted suicide at least once, and 55% have attempted more than once [39]. The risk of suicide is highest during the first six months of engaging in the first episode of NSSI [40].

Other Clinically Salient Considerations

Stress

Adolescence is a time full of change and multiple psychosocial stressors. Today, young adults are given more responsibility than in years past, including more expectations in school and social settings. Fourteen percent of suicides in this age group

are due to academic stress [41]. An even higher risk is found in adolescents who lack structure and are neither attending school nor working [16].

Other life stressors that put them at higher risk for suicidal behavior include lack of social support, non-intact families, poor relationships and communication within adolescents' families, and low provision of care by adolescents' parents [42]. Adolescents may have a difficult time expressing and regulating their emotions leading to impulsivity: In one-fifth of suicides, adolescents suffered from some form of interpersonal loss prior to the suicide [43]. This can include social rejection, death of a peer, or a relationship or friendship ending. These losses have great impact on adolescents when social inclusivity and fitting-in are important factors for adolescent self-esteem. Young adults often have a difficult time with confidence and with understanding themselves and will base these strengths through interaction with their social surroundings.

Previous Suicide Attempts and Family History

Among adolescents who have completed suicide, one-quarter to one-third had made prior attempts [44]. The risk for completed suicide increases with each attempt. An increased risk is associated with family history of suicide, depression, and substance abuse [16].

Homicide Risk in Relation to Suicide Risk

Risk factors for homicide are similar to those for suicide, including social and psychological factors. Relative to suicide attempts, males rather than females are more likely to engage in violent and homicidal behavior, with the incidence of these behaviors peaking in late adolescence [45]. Rates of homicide perpetration are higher among Black and Hispanic males than among white and Asian males [46].

Individuals who engage in violent behavior early in their lives are at an increased risk for more persistent and serious violence. Hyperactivity and impulsivity in children are associated with aggressive behavior. Children and adolescents with ADHD who show aggression and oppositional behavior are at higher risk for later violence [47]. Older adolescents are at greater risk than younger teens, and those with lower socioeconomic status are at higher risk [48].

Like suicide, homicide is a much greater risk for those who have access to firearms [49]. Firearms are the leading cause of adolescent homicides with the rate of firearm homicide peaking into young adulthood [50]. Gun violence has expanded to schools with school shootings creating new fears for students and families. Since Columbine in 1999, there have been over 200 school shootings [51].

Trauma and adverse childhood experiences increase violence risk in adolescence as a person's ability to deal with difficult situations is linked to the stability and attachment they received in childhood. Overall the greatest predictors of chronic violent behavior are early onset of aggression, oppositional behavior, and substance use.

Protective Factors

Along with risk factors, there are many protective factors for suicidal and homicidal behavior in adolescents that mitigate risk. A thorough risk assessment will include an inventory and consideration of protective factors alongside risk factors.

Some important protective factors include good cohesive family and social supports [52]. Adolescents from families with close relationships, acceptance and reasonable boundaries, and appropriate expectations are at lower risk of harm to self or others. Adolescents were found to be less likely to have suicidal ideation, suicide attempts, and violence when they feel their families are more cohesive and adaptable and when they have positive friendships [52]. Academic achievement as well as school connectedness and social supports are also strong protective factors for adolescents. Resilience, coping skills, and impulse control are key protective factors against suicide and violence.

Conclusion

A knowledge and application of key risk and protective factors for adolescent suicide and homicide is essential in adolescent gun violence prevention. All individuals who interact with adolescents may apply this knowledge in risk assessment, with intervention and referral to specialists taken as needed. The application of this knowledge in tandem with the assessment of an adolescent's current presentation or mental status examination, including the presence of suicidal or homicidal ideation, can make a tremendous difference. Fortunately, as with adults, there is no risk of introducing suicidal thoughts into an adolescent by inquiring as to their presence [53]. Direct questioning, simple empathic support, and attentiveness yield the greatest rates of emotional and behavioral disclosure from adolescents [54] and their guardians [55]. Comfort in inquiry derives from experience, and given that these inquiries in at-risk adolescents can save adolescent lives, now is the best time to begin asking and helping these youth in need.

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Chapter 9
Teens, Screens, and Violence: Promoting Healthy Media Use Among Adolescents

Julie A. Dunbar

Introduction to Media Violence

In the twenty-first century, consumer media has expanded from television and film to include the widespread consumption of music, video games, and social media, especially among adolescents and youth. Social media like Facebook, Twitter, and Instagram introduced a new participatory component, in which users both created and consumed mass media, with high rates of use and low rates of censorship and oversight. The widespread dissemination of news media across television, internet, and social media is yet another way in which violent media can be passively absorbed.

Nearly every American teen is exposed to consumer media on a daily basis, with most reporting hours of daily use. Eighty-four percent of teenagers report owning smartphones in 2019, with numbers increasing every year [1]. They spend a significant portion of their day streaming media content, and many report multitasking [2]. There is an urgent need for an evidence-based understanding of evolving teen media consumption. Novel methods of parental supervision, advocacy to limit media violence, and guidelines about healthy media use are opportunities for the medical provider to get involved.

Violence on Television

Not long after television sets became commonplace in the American household in the mid-twentieth century, concerns were raised about the impact that television shows depicting violence could have on the American public. The first

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congressional hearings on the potential relationship between television violence and homicide were in 1952. The House Interstate and Foreign Commerce Committee (1891–1981; now the Energy and Commerce Committee) held hearings to investigate "the extent to which the radio and television programs currently available to the people of the United States contain immoral or otherwise offensive matter, or place improper emphasis upon crime, violence, and corruption" [3–5]. In 1954 and 1955, the Senate Special Subcommittee on Juvenile Delinquency, formed the year prior to investigate a perceived rise in adolescent criminal activity, convened to review television violence in crime and Western-themed shows. They proposed no new legislation but encouraged ongoing research into the topic [6].

What ensued was a decades-long pursuit of evidence that community and personal violence and aggression could be explained by exposure to rising rates of violence in television and other emerging media formats. Relying on 43 completed psychological studies, the Surgeon General's Scientific Advisory Committee on Television and Social Behavior in 1972 found that even with steady rates of violent content on television, most youth are not adversely affected. Rather, small groups of adolescents predisposed to aggression may be influenced by violence on TV [7]. Movie ratings were introduced in 1968 by the Moving Picture Association of America (MPAA). These ratings require that, prior to public distribution, new films must be submitted to the Ratings Board, which then decides the film's rating by majority vote. Criteria to serve on the board stipulate that members must be parents themselves, in order to "have the capacity to put themselves in the role of most American parents" [8].

The amount of violence in television and film has only continued to increase over time. Work by Bushman et al. in analyzing the 30 top-grossing films for each year from 1950 to 2012 found that the rate of violence sequences (defined as 5-minute segments of uninterrupted use of one weapon or action continuously by a character in the film) doubled, with an overall increase in gun violence [9]. About 90% of movies today include some depictions of violence, as do 68% of video games, 60% of TV shows, and 15% of music videos [10]. As of 2000, every G-rated movie contained violence, as did 60% of primetime television [11]. An independent report by the Parents Television Council found a 28% increase in violence on shows rated TV-PG and more than twice as much violence on shows rated TV-14 in the 2017–2018 television season compared to 10 years prior [12]. Guns are the most popular weapon choice in scenes depicting violence on broadcast television [13].

In 1996, Congress passed the Telecommunications Act that included a section on "Parental Choice in Television Programming." This law stipulated that (1) the telecommunications industry develop a television ratings program and that (2) television manufacturers include hardware (the V-chip) in all TV sets sold after 2000 that can block programming based on these ratings [14]. In a 2016 study by Gabrielli and colleagues, in which television shows were manually coded for violence, results showed that 70% of shows contain violence, and the ratings system did little to limit exposure since it was so pervasive. Interpersonal violence can be found in shows rated for audiences as young as TV-Y7 (for children 7 years old and above) [15].

Nielsen TV Ratings reports show that traditional television watching among teenagers has significantly declined over the last several years. In their 2020 Q1 Total Audience Report, teens ages 12–17 years old reported watching what averaged out to less than 1.5 hours of traditional TV per day [16]. That's not to say they're not consuming programming in other ways. They are now devoting more time to social media and other media platforms. Internet-streamed videos and programming have become increasingly popular [17].

Among teenagers 13 to 18 years old, 69% report watching videos online every day in 2019, compared to 34% in 2015. The average time per day spent streaming also increased [1]. Teens report spending 33% of their daily video consumption on Netflix, followed by YouTube at 31% [18]. When taken in sum, older children and teenagers are spending more than 11 hours per day in front of screens, making it the most time-consuming daily activity in this age group other than sleeping [2]. The ability for adolescents to stream video not just on television sets but also across nearly all available mobile devices poses new challenges in supervision for parents and pediatricians.

Modern streaming devices and SmartTVs (with built-in streaming capabilities) are typically equipped with parental controls that can be customized to allow programming based on the ages of children at home. YouTube and Netflix, available as websites and applications ("apps") offer "safe modes" that can be set by parents. Many parental monitoring apps are available on the market to monitor children's mobile media use, with new patents being developed every day. Many of these apps essentially spy on the message exchanges and social media posts of the adolescent user. WiFi routers also typically come with some type of parental controls that can limit total daily WiFi use as well as block access to potentially unsafe content. Whether these methods are effective in limiting the exposure of teenagers to violent content will require more research in years to come.

The American Academy of Pediatrics takes the position that well-child visits are an opportunity for pediatricians to inquire about media habits in the home. They recommend asking the following two screening questions:

1. How much recreational screen time does your child or teenager consume daily?
2. Is there a TV set or an Internet- connected electronic device (computer, iPad, cellphone) in the child's or teenager's bedroom?

In the case of teenagers, these questions may be directed to the patient. It's appropriate to take a more detailed media history for teenagers with a history of aggression or depression [2]. For example, there was a notable spike in online searches for "suicide" and copycat presentations to hospitals after *13 Reasons Why*, a TV show about a teenager's suicide, premiered on the streaming platform Netflix in 2017 [19]. In patients with a history of depression or suicidality, it is advisable to counsel families on the passive negative effects such violent media exposure can have on the psyches of vulnerable adolescents.

Video Games and Violence

Video games have become a ubiquitous part of life for children and teenagers growing up in America. The worldwide video game industry generated $119.6 billion in revenue in 2018, with $196 billion annual revenue predicted by 2022 [20]. An increasingly popular genre among action-type games is the first-person shooter (FPS) perspective, in which the player appears to be holding a gun and is responsible for carrying out some type of combat objective. Wolfenstein 3D, a 1992 first-person perspective game in which the player must escape from prison and kill Nazi mutants with knives and guns, is largely considered to be one of the archetypes of this genre [21].

Hundreds of FPS games are now commercially available. Similar to television and film, video games are held to a ratings standard that labels potentially inappropriate content for children. The current rating system, developed by the Entertainment Software Association (ESA) in 1994, allows for games marked for Teens (T-rated; for 13 years and older) to contain "moderate amounts of violence (including small amounts of blood)" and for those marked for Mature audiences (M-rated) to contain "intense and/or realistic portrayals of violence (including blood, gore, mutilation, and depictions of death)" [22].

Video games have become a favorite scapegoat of politicians and talking heads in the wake of real shooting events. A supposition is made that the increasing popularity of violent video games is to blame for inspiring real-life violent events. However, there is insignificant evidence to support such a causal relationship. Meta-analyses have been able to demonstrate an association between exposure to media violence and aggressive behavior, aggressive thoughts, angry feelings, and physiologic arousal [11]. Aggression in this case refers to intention to injure or irritate another person, but may or may not include violence, which is a subset of aggression [23, 24]. However, this relationship between media violence and aggression may not be causal. Longitudinal studies into the effects of violent media on aggression demonstrate a small effect or none at all. A better explanation of the association may be that aggressive individuals seek out violent media [25]. One theory of aggression, the General Aggression Model by Anderson and Bushman, posits that playing violent electronic games again and again strengthens aggressive attitudes, perceptions, expectations, and behavioral scripts, and also furthers the emotional desensitization against the victims of aggressive behavior [26].

While the effects of violent video games on the general population may at times be overstated, their passive effects on vulnerable individuals should be considered. Chang and colleagues were able to demonstrate that pre-adolescents aged 8–12 years old exposed to violent video games were more interested in firearms than those who played a non-violent control. Participants who played a version of Minecraft that glorifies gun violence were more likely to pick up and handle a disarmed firearm hidden in a playroom, as well as pretend to shoot at themselves or their partners. The same research group had similar results in a prior study in

which the exposure was a movie clip with gun violence instead [27]. Significant gaps in research about the potential harms of violent video games exist, including effects on younger children, the relationship between degree of exposure and outcomes, media literacy, and the role of competition and cooperation in games, among others [24]. Education for parents and physicians around the interpretation of video game ratings and their potential effects is also paramount to safe video game consumerism.

There is no federal authority governing the content and ratings of video games. The Entertainment Software Ratings Board (which operates independently within the ESA) determines video game ratings, and this is optional [22]. In an analysis of all T-rated video games on the market prior to 2001, Haninger and colleagues found that ratings were largely accurate, but as many as 48% of games may be missing so-called "content descriptors" that further qualify the rating as containing violence, gore, sexuality, etc., leaving room for potential oversight by consumers and parents [28]. Enforcement of these ratings standards is also loose. The state of California (in *Brown v. Entertainment Merchants Association*) tried to make it illegal to sell video games labeled for mature audiences to minors, but the law was struck down by the Supreme Court based on First Amendment rights since games can "confer ideas and social messages" [11]. Adherence to age-based ratings is typically enforced in stores by photo identification, which has obvious challenges to enforcement for adolescent consumers. Most games have moved to digital purchasing from home directly on the video game consoles. Parents have the option to restrict purchases with preset parental controls.

Social Media and Violence

Social media, meaning any websites or applications which enable users to create and share content or to participate in social networking, has experienced a meteoric rise in the last two decades [29]. Starting with MySpace in 2002 and Facebook in 2004, the public was introduced to the concept of creating a personal online identity, making connections, and participating in communities of typically like-minded users. The popularity of these platforms has risen every year since and expanded to include microblogging sites like Twitter, photo-sharing applications like Instagram, and multi-media messaging apps like Snapchat. As of 2019, 69% of U.S. adults report ever using Facebook. Instagram and Snapchat are particularly popular with younger users [30].

Social media is a place where users determine content, which can be broadcast to a wide audience with minimal censorship. The benefits are many, including the ability to forge relationships in spite of geographical separation, build communities around common interests, and foster free speech and creativity. However, recent years have seen the emergence of more nefarious uses, including cyberbullying and dangerous physical challenges for teenagers. Cyberbullying, like regular bullying which is intended to intimidate and threaten, uses online posts and messages to

harass other users. In at least one study, 20% of a random sample of students ages 11–18 years report having been victims of cyberbullying at least once in their lives [31]. Autistic children and youth identifying as LGBTQI are particularly vulnerable to cyberbullying tactics [11]. Social media is particularly useful for facilitating cyberbullying because users can choose to be anonymous or create false profiles (so-called "cat-fishing") [11]. Websites, chatrooms, and instant messaging have existed for decades and provide another means of direct messaging to other users. The possibility of posting and interacting anonymously in all these formats can serve as a protective shield behind which users can act cruelly toward their peers if they choose. Research has linked anonymity to increased hostility in interpersonal interactions [31].

By interacting in this way, social media can be used to incite fear in victims or inspire and motivate violent actions in others. Simckes and colleagues found that school-aged adolescents who reported being bullied or cyberbullied were more likely to report access to loaded guns, making them particularly vulnerable to self-inflicted injury and perpetration of interpersonal violence [32]. Several studies have shown that both bullies and their victims are more likely to carry weapons, including firearms, than uninvolved teens. This holds particularly true for relational bullying, which focuses on social interactions or gossip, compared to physical bullying [33].

Another phenomenon, "cybersuicide," describes the act of posting thoughts of suicidal ideation on social media, many times to seek feedback and support. Responses typically encourage the poster not to follow through with suicide plans, but certain platforms exist to encourage and teach suicidal acts [31]. So-called "pro-suicide" websites and chatrooms are easy to find. In a 2008 study by Recupero et al., a search for suicide-related content (*suicide, how to commit suicide, suicide methods*, and *how to kill yourself*) on the most popular search engine sites at the time returned 11% pro-suicide resources, in addition to other anti-suicide and neutral content [34]. Cybersuicide pacts are also a relatively new phenomenon that occurs when a group of people, typically strangers, agree on an internet platform to kill themselves at the same time by the same means. The increasing prevalence of these dangerous motivational discussions in combination with the increasing availability of firearms may be contributing to the rising rates of suicide among teenagers [35].

Perhaps most frightening of all, social media is sometimes used to boast about violent intentions and even organize violent acts. Gangs with technical proficiency are able to use social media for harassing or threatening people online, using something said online to motivate attacking someone on the street, and posting videos of violence and threats online, among other aggressive and illegal activities [31]. 8chan.com, an unmoderated messageboard site, has become known as a platform that mass shooters use to brag about their plans in advance. The creator of the site originally envisioned it as a place where free speech could be exercised without criticism (the moniker means "infinite"-chan, a response to the moderated messageboard site 4chan.com). In the absence of oversight, it has become "a venue for extremists to test out ideas, share violent literature and cheer on the perpetrators of

mass killings." Three mass shootings, including a mosque shooting in Christchurch, New Zealand, and a synagogue in Poway, California, have been announced in advance in posts on 8chan. The creator of the site has since called for it to be shut down [36].

Most social media platforms require users to abide by some type of user guidelines. Some platforms have been quicker than others to adopt strict guidelines on posts related to explicit violence. Facebook, for example, has a set of Community Standards which users agree to adhere to. If a user posts content in violation of these standards, the company maintains the right to remove or restrict access to the violating content. If a user repeatedly abuses the guidelines, Facebook may suspend or disable the user's account. Current Community Standards prohibit posting content that "encourages suicide or self-injury" or promotes bullying "meant to degrade or shame" [37]. Twitter takes these protections one step further by limiting posts that promote "glorification of violence." Twitter states that "[u]nder this policy, you can't glorify, celebrate, praise or condone violent crimes, violent events where people were targeted because of their membership in a protected group, or the perpetrators of such acts." The company maintains the right to address violations on a case-by-case basis, which may vary from correcting the content violation, removing the tweet, or account suspension if the concern goes unaddressed [38].

Facebook has also prohibited the sale or transfer of firearms or ammunition between individuals since 2016, but some clandestine sales still occur in Facebook Marketplace [39]. Some users have found that by listing gun cases and boxes at inflated prices, they can initiate private conversations with buyers to sell the corresponding gun [40]. Some lawmakers want stricter policies. The primary obstacles to limiting weapons-related content, in addition to the sizeable pro-firearm lobbying effort, are concerns about First Amendment free speech rights. Because the content on social media sites is generated by the users, there are limitations to the restrictions these companies can place on the nature of the content. Whether these social media platforms have a role as a "publisher," which is to say responsible for the content they distribute, will be a topic of much debate in years to come.

One important benefit of social media is that public data can be gathered from these platforms, providing new opportunities for measuring patterns in gun violence. Big data extracted from Twitter has already been successfully analyzed to predict public health patterns, like the epidemiologic patterns of influenza and Ebola and attitudes toward public health awareness campaigns. There are 70 million tweets per year containing the words "gun" or "guns," which creates a rich trove of free public data that can be analyzed for public sentiment and for predictive patterns of gun violence [41]. It's also proposed that social media like Twitter can be used to screen for suicide risk in real-time [42]. Data retrieved from search engine queries can also show public interests and attitudes at a given point in time.

Some community organizations have found social media useful as a means to interact with their target groups. One such example is the E-Responder program, led by the Citizens Crime Commission of NYC, that uses trained facilitators on social media to de-escalate online provocation that can lead to in-person violence. On the potential of social media as an opportunity for service in the community, they state:

> Social media is a space ripe for intervention because youth are freely sharing grievances, violent intentions, emotions, and arguments on a public platform. Furthermore, social media allows public and private modes to reach out to those experiencing conflict, making it a natural place to facilitate conversation, mentorship, and growth.

"Credible messengers," who have prior personal experience with violence themselves, identify at-risk youth using software that scans Facebook posts for language that may indicate a risk of violence. Once identified, the messengers employ an "Interruption Toolkit" approach that uses evidence-based strategies in de-escalation and empathy-building [43].

As we search for solutions to our national youth gun violence epidemic, we should not allow a focus on media to distract from the need for meaningful changes to U.S. gun laws. But neither should we ignore the potential impact of media exposure on the mental health of adolescents. Health professionals should further research the relationship between violent media and violent acts, the impact of pro-suicide websites, and the population-level data on guns available through sites such as Twitter. Such findings can inform smarter public policy.

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Chapter 10
Adolescent Violent Trauma Prevention and Intervention

Noé D. Romo

Community Violence as a Public Health Issue

Community violence is a public health problem that disproportionately affects Black and Hispanic youth. In the United States, Blacks, males, and young adults are disproportionately represented as both homicide victims and offenders [1]. From 1999 to 2015, U.S. firearm-related homicides were highest in Black non-Hispanic males ages 0–24 years old (31.4/100,00) and Hispanic males of the same age group (8.1/100,000) [2]. The estimated combined lifetime medical and work-loss cost of fatal and non-fatal assaulted-related injuries in 2017 in the United States was estimated at $8.7 billion [3]. The cost of violence-related injury and mortality extends beyond monetary costs and into significant effects on physical, psychological, and economic health at both the individual and community levels that only further exacerbate already existing socioeconomic inequieties [4–7].

In 1999, the American Academy of Pediatrics (AAP) Task Force on Violence urged pediatricians to engage in preventive education, develop screening tools, and optimize linkages to existing community violence intervention services [8]. Despite this call to action over 20 years ago by the AAP, there still exists no clear evidence-based guidance for pediatricians and adolescent medicine subspecialists on violence prevention strategies for at-risk populations. Many studies assessing physician screening and evaluation of patients presenting with violent traumatic injuries have focused on emergency medicine physicians. Evidence suggests that when surveyed, the majority of emergency department (ED) staff report routinely asking patients with violent injuries about the context and circumstances surrounding the injury, but they reported less frequently performing formal risk assessments and linking patients to social support resources in the hospital or community. [9] Clinicians

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typically cite a lack of time or skills, concern for personal safety, and upsetting family members as reasons for not performing these functions, along with a lack of available community resources to refer patients to clinicians [9].

The existing barriers to appropriately assessing violent injury, screening for associated risk behaviors, and subsequently linking to existing community and hospital resources, contributes to violent injury recidivism rates that can range between 11% and 44%, within 2 to 5 years of the initial injury [10–15]. Recidivism rates in the adolescent population ≤ 18 yo presenting with a firearm- related injury are reported at 8.8% within 2–20 years of the initial injury, with 53% of those patients presenting with a subsequent firearm-related injury within 2 years of the initial injury [16–20]. The high rates of recidivism after violent injury, in our adolescent population, highlight the need for both community and hospital-based resources as a means of intervention to improve outcomes in vulnerable populations.

Community-Based Violence Intervention Strategies

In 2011, the Institute of Medicine described gun violence as being a social contagion that spreads among individuals and increases in prevalence in high risk communities [21]. The spread of community violence largely results from a cycle of retaliatory shootings largely perpetuated by violent reactive responses to shooting victims [22–24]. There is evidence to suggest that a particular code exists on the streets dictating that individuals must react with violent means to a shooting in order to maintain a certain level of respect among their peers [23–25]. The expanded understanding of community violence as a social contagion has resulted in the establishment of community violence prevention programs using community outreach workers to act as violence interrupters that can mediate conflicts and help prevent violent means of conflict resolution [26, 27].

Initial community violence intervention programs using a social contagion were established by Dr. Gary Slutkin in Chicago who established the “Cure Violence” program[26, 27]. The model established by Dr. Slutkin included the recruitment of individuals from areas of high-community violence prevalence, who themselves had been involved in high-risk activity who now acted as conflict mediators to prevent shootings from ever occurring [25–27]. The outreach workers carried a case load to help connect high-risk participants to social services and promote longer lasting healthy lifestyle modifications [26, 27]. The initial study out of Chicago found a reduction in community violence in 57% of participating neighborhoods [26, 27]. Subsequent studies evaluating programs modeled after Cure Violence and implemented in other U.S. cities have also reported similar decreases in community violence [28–32].

Despite the reported decrease in community violence in neighborhoods implementing the cure violence model, there exists limited detailed data on specific community participant outcomes along with limited extensive data analysis of community violence measures controlling for potential confounding factors. Even further limited evidence exists on the specific impact on the young adolescent

population living in communities with cure violence model-based programs. Nonetheless, qualitative data analysis examining trends in some of these cure violence-based programs has found that the effectiveness of community outreach workers in mediating conflicts relies heavily on individual credibility and intricate knowledge of behavioral patterns that can identify specific conflicts in targeted communities [5]. Furthermore, specific identified factors associated with successful conflict mediation include assessing for possession of weapons, addressing outside influences in the groups involved with the conflict, and incorporating previous knowledge of situations and using previously established relationships with individuals involved in the conflict [5].

The establishment of community-based violence prevention programs has resulted in promising preliminary evidence suggesting it may be an effective way to reduce community violence with further study required to confirm their effectiveness. Furthermore, the role that community-based violence prevention programs can play in conjunction with hospital-based measures of violence prevention remains to be fully determined.

Hospital-Based Violence Intervention Strategies

Medical centers have a primary obligation to address the medical and psychological needs of patients presenting with traumatic violent injuries, but they can also play a role in primary, secondary, and tertiary violent injury prevention [33]. The American College of Surgeon's (ACS) updated official recommendation is that all adult and pediatric ACS-certified trauma centers be engaged in "major activity in prehospital management, education, and injury prevention." [34] The fact that a significant portion of injuries presenting to major urban trauma centers is violence related has resulted in the establishment of hospital-based violence surveillance and prevention programs that are hospital based [33, 35, 36]. These programs are limited but have been initiated in major urban hospital centers like Chicago and Baltimore, with variable documented outcome data [33, 37–39].

The interest in hospital-based injury prevention has led to the establishment of a national network of hospital-based violence intervention programs (HVIPs), with the goal of consolidating evidence-based practices to improve outcomes and available guidance to medical providers [35–39]. All recently established programs incorporate interventions utilizing social workers and psychologists to target some of the social and psychological consequences of violent trauma. [40] Some, but not all of these programs also encompass community partnerships with organizations geared at addressing other socio-economic factors contributing to violent trauma victimization [40]. The multidisciplinary approach to HVIP's has been expanded to also include community leaders and community outreach workers as have been used in previous community-based interventions. [35, 36]

An example of an HVIP in San Francisco General Hospital examining long-term outcomes over a 10-year period found a recidivism rate of 4% compared to

a historical control of 8% [41]. This specific HVIP program utilized case managers to assess violent trauma patient needs and address those specific needs [41]. The most frequently identified violent trauma patient needs identified included mental health services (51%), crime victim compensation (48%), employment opportunities (36%), and housing needs (30%) [41]. The findings in this study highlight the multifactorial socioeconomic contributing factors to violent trauma victimization and suggest that when addressed they can decrease recidivism rates in violent trauma victims.

Recent evidence also suggests that HVIPs may be a cost-effective way to limit recidivism in patients presenting with violent trauma [42–47]. The monetary savings of having an HVIP are reported to range from $82,765 in the narrowest simulation models to $4,055,873 in the broadest simulation models along with having a significant positive effect on quality-adjusted life-years [42–47]. Even when considering factors that could potentially decrease cost effectiveness such as costs associated with hospitalization and program implementation, the presence of an HVIP has still been shown to result in an acceptable cost per health outcome gained. [42–47]

Future Direction for Adolescent Violence Prevention and Intervention Strategies

Although there exists limited evidence to establish clinical guidelines for adolescent violence prevention and intervention, the existing evidence suggests cost-effective approaches to both community and hospital-based violence prevention/intervention programs to improve rates of recidivism and outcomes in adolescent violent trauma patients. It is imperative for adolescent health providers to advocate for the implementation of HVIPs in medical centers to mitigate the multiple factors that contribute to adolescent violent trauma victimization. Adolescent health centers must also aim to improve collaboration with existing community-based resources such as community violence prevention programs to address other factors that contribute to adolescent violent trauma victimization and rates of recidivism. Specifically, formal community partnerships must be established to improve access to mental health and employment training services, along with decreasing rates of homelessness and assisting with the cost of violent trauma victimization through linkages to crime victim compensation opportunities. The establishment of such multidimensional programs/services will require extensive collaboration between adolescent medicine divisions and departments of pediatrics, surgery, emergency medicine, and social work.

The prevention and treatment of adolescent violent trauma requires a similar approach to addressing the multiple socioeconomic factors that impact the multitude of other health issues that affect the adolescent population. It seems like a daunting task to address, but the establishment of both community and hospital-based resources as a means of adolescent violence prevention can improve outcomes and mitigate contributing risk factors in the adolescent population.

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Chapter 11
Legislative Solutions to Adolescent Gun Violence

Melissa Menezes and Jeffrey Oestreicher

The epidemic of pediatric gun violence in the United States has become a critical public health issue. And while federally funded scientific data have historically driven life-saving policy from lead poisoning to sudden infant death syndrome, there remains scant data on public policy designed to prevent children from being injured or killed by a gun.

In 2016, the authors in the *Journal of the American Medical Association* (JAMA) compared mortality rates for the thirty leading causes of death with their corresponding research funding, finding that—in relation to mortality rate—gun violence was the second least-funded cause of death overall [1]. Put into perspective, gun violence kills as many Americans as sepsis every year, but receives just 0.7% of the funding allocated for sepsis research, and comprises 4% of its publication volume.

Ironically, it was a series of research studies that set in motion the political events that would lead to this enormous research-funding disparity. On August 13, 1992, *The New England Journal of Medicine* (NEJM) published the first of two large Center for Disease Control (CDC)-funded studies that found that people who kept guns in their home did not gain protection; instead, they had an almost threefold greater risk of homicide and fivefold greater risk of suicide [2, 3].

National Rifle Association (NRA) leadership, upset by these data, responded by campaigning to eliminate the arm of the CDC that had funded these studies, the National Center for Injury Prevention and Control (NCIPC). The NRA's self-described point person in Congress at the time, Arkansas Congressman Jay Dickey, inserted an amendment into the 1996 Government Appropriations bill stating that

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"[n]one of the funds made available for injury prevention and control at the Centers for Disease Control and Prevention may be used to advocate or promote gun control."

The $2.8 million that had been earmarked for NCIPC's gun violence research was soon removed and the Dickey Amendment, as it became known, persisted in every appropriations bill through the present day. And while the amendment technically banned "advocacy" and not "research," its unstated goal—and one that it achieved—was an NRA-sanctioned warning to scare federal agencies and researchers to think twice about even collecting data that might reflect badly on gun ownership. The chilling effect worked. CDC funding for gun violence research fell by 96% and over the ensuing 20 years—during which time 600,000 Americans would die from a firearm injury—the CDC would avoid nearly all research on gun violence.

The Dickey Amendment and its downstream and far-reaching effects have left policy makers with very few evidence-based solutions to this epidemic. This dearth of evidence was recently highlighted in the non-partisan Rand Corporation's research report "The Science of Gun Policy," which analyzed thousands of studies to examine the effects of gun policies on gun violence and found little persuasive evidence for the effects of most policies on outcomes such as firearm suicide, homicide, and unintentional shootings (see Table 11.1).

Table 11.1 Summary table from a 2018 RAND Report entitled The Science of Gun Policy: A Critical Synthesis of Research Evidence on the Effects of Gun Policies in the United States. (Santa Monica, CA: RAND Corporation, 2018. https://www.rand.org/pubs/research_reports/RR2088.html. Reprinted with permission from the RAND Corporation.)

Gun Policies	Defensive Gun Use	Gun Industry Outcomes	Hunting and Recreation	Mass Shootings	Officer-Involved Shootings	Suicide	Unintentional Injuries and Deaths	Violent Crime
Background Checks				INCONCLUSIVE		MODERATE		MODERATE
Bans on the Sale of Assault Weapons and High-Capacity Magazines		LIMITED		INCONCLUSIVE				INCONCLUSIVE
Child-Access Prevention Laws				INCONCLUSIVE		SUPPORTIVE	SUPPORTIVE	INCONCLUSIVE
Concealed-Carry Laws		INCONCLUSIVE		INCONCLUSIVE		INCONCLUSIVE	LIMITED	LIMITED
Firearm Sales Reporting Requirements								
Gun-Free Zones								
Licensing and Permitting Requirements				INCONCLUSIVE		INCONCLUSIVE		INCONCLUSIVE
Lost or Stolen Firearm Reporting Requirements								
Minimum Age Requirements				INCONCLUSIVE		LIMITED	INCONCLUSIVE	INCONCLUSIVE
Prohibitions Associated with Mental illness						LIMITED		MODERATE
Stand-Your-Ground Laws	INCONCLUSIVE					INCONCLUSIVE		MODERATE
Surrender of Firearms by Prohibited Possessors								INCONCLUSIVE
Waiting Periods				INCONCLUSIVE				INCONCLUSIVE

For 6 of the 13 policies they examined, there were either no available studies or the evidence was inconclusive.

In this chapter we aim to highlight the policies that are supported by the data that would impact pediatric and adolescent gun violence. Such policies include Safe Storage or Child Access Prevention laws, Extreme Risk Protection Orders, Stand-Your-Ground Laws, Campus Carry laws, Minimum Age Requirements, Waiting Periods, and Background Checks.

Child Access Prevention or Safe Storage Laws

Perhaps no policy has been proven more effective at protecting children and teens from gun death than Child Access Prevention (CAP) laws, also known as Safe Storage Laws. CAP laws impose criminal liability on adults who negligently leave firearms accessible to children. Across the U.S. roughly one-third of homes with children have guns, and nearly a quarter of gun owners report storing all of their guns in an unlocked location in the home [4]. While some data suggest that gun owners with children are more likely to safely store firearms, roughly 4.6 million children and teens live in homes with loaded, unlocked firearms [5]. CAP Laws seek to drop this number dramatically by requiring that guns be stored in a locked container or disabled with a gun lock when not in the adult's direct possession.

Safe storage practices may include keeping guns in a locked gun safe or storage cabinet, or using safety devices, such as trigger locks. The American Academy of Pediatrics (AAP) recommends keeping firearms unloaded, locked, and separate from ammunition, thereby reducing both access and the risk of unintentional injury should underage access occur [6]. The rationale for the passage of such laws is straightforward: unintentional injury, suicide, and homicide have long been the leading causes of adolescent and young adult morbidity and mortality [7]. More specifically, firearm-related injury is the second leading cause of death, behind only motor vehicle accidents, as mentioned above [8]. Adolescent suicides in particular are strongly associated with access to firearms, as found in a meta-analysis by Miller et al. as early as 1999 [9] and corroborated by several studies since [10–13]. For example, Johnson et al. found that of 145 adolescent firearm suicides across six geographically diverse states, 80% of the adolescents used a gun from their own home [14].

Compared with other gun laws, CAP laws are supported by robust data. A study in *JAMA* in 2004 found that CAP laws were associated with a reduction in suicide rates among 14- to 17-year-olds (18 being the legal age of purchase in many states) [15]. Analysis of the Youth Risk Behavior Survey (a nationwide biennial survey conducted by the Center for Disease Control and Prevention) from 1993 to 2013 found that CAP laws were associated with an 18.5% decrease in the rate of gun carrying among adolescents [16]. The study also found a 19% decrease in students being threatened or injured with a weapon on school property. In 2018, the National Bureau of Economic Research found that CAP laws were associated with a 19%

reduction in juvenile firearm-related homicides, while having no association with non-firearm-related homicides [17]. These studies represent a fraction of the data available supporting safe storage. In the RAND Corporation's widely cited meta-analysis, more qualifying studies provided supportive evidence for CAP laws than for any other piece of legislation. Specifically, the data support the association between safe storage and reduction in all unintentional and intentional firearm self-injuries, including suicide attempts [18].

As of the date of this publication, 27 states and the District of Columbia have enacted CAP/safe storage laws. There is no federal CAP law, although there are other pediatric-focused federal gun safety laws such as the Gun-Free School Zones Act of 1990, discussed below with regard to Campus Carry. Federal law also mandates safe storage by gun dealers, although not by owners. The Protection of Lawful Commerce in Arms Act (PLCAA), while more broadly serving as protective of firearms manufacturers and dealers in the event of unlawful use of their products, also carries a stipulation that it is unlawful for any licensed gun dealer to transfer firearms without safe storage. This, however, does not include private sellers.

Red Flag Laws and Extreme Risk Protection Orders (ERPO)

Under federal law, a person found to be suffering from a severe mental illness, such as one that requires involuntary hospitalization, may be prohibited from accessing firearms. However, many people who go on to die by suicide or commit homicide display worrisome behavior before they act, but that behavior does not meet the threshold of hospitalization or criminal arrest. For example, the family of the shooter in the Parkland, FL mass shooting of 2018 called the police multiple times during the year prior. The police visited his home on multiple occasions for physical threats to his family and for a battery of threatening social media posts about guns and violence. During these incidents he did not meet criteria for hospitalization or criminal arrest, and police were powerless to do anything about the multiple firearms known to be in his home. The tragedy in Parkland drew national attention to this shortcoming in our system of public safety.

Extreme Risk Protection Orders, or "Red Flag laws," provide law enforcement and families with a proactive tool to keep firearms out of the hands of high-risk people who are a danger to themselves or others, but who have not yet committed a crime and may not meet the threshold of involuntary psychiatric hospitalization. Because of insensitive language often used regarding people with mental illness, we will use the term "Extreme Risk Protection Orders" rather than the more stigmatizing "Red Flag laws." ERPOs empower family members or law enforcement to petition a state court to *temporarily* remove access and possession of firearms from an individual whom the petitioner believes may be at risk of carrying out a violent act. The resulting order, (Extreme Risk Protection Order or ERPO), constitutes a set period of time, after which another court hearing may extend the confiscation. Gun

rights proponents have argued that the confiscation of firearms from a person who has not yet committed a crime denies their constitutional right to due process. However, significant due process is built into the law. Similar to a domestic violence ex parte order, the petitioner must file an affidavit with the court alleging that a person of concern poses an immediate threat to him/herself or others. The judge then determines whether the standard of proof has been met. If the ERPO is issued, the subject of the order is entitled to a full hearing before the judge within a short time frame, usually around 21 days, to determine if the order should be dismissed. Despite the controversy over due process, recent polls have shown that the overwhelming majority of Americans support the passage of a federal ERPO law [19]. As of January 2020, 17 states and DC had adopted ERPO laws.

Swanson et al. conducted the largest study ever done on ERPO laws, in which they examined 14 years of data from Connecticut. In 762 cases over 14 years (1999–2013):

- Police found weapons in 99% of instances when an ERPO-warrant was issued, removing an average of seven guns per warrant.
- People subject to ERPO had an annual suicide rate 40 times higher than general population. In other words, this was clearly a high-risk population.
- Nearly one-third of all ERPO subjects received mental health and substance abuse treatment after filing.
- For every 10.6 warrants issued, researchers calculated that 1 firearm suicide was averted [20].

With regard to the adolescent population, the legal age of possession in many states is 18 years old, with a minimum age of 16 or even 14 years old for possession of long guns in some states. ERPO laws could help protect these youngest gun owners from dying by suicide and/or carrying out homicide. There are, again, limited data on the effects of ERPO laws, but a 2018 study by Kivisto et al. found a 7.5% reduction in firearm suicides in Indiana in the 10 years following the enactment of its firearm seizure law, and a 13.7% reduction in firearm suicides in Connecticut [21]. As suicide is the third leading cause of death in the adolescent population, limiting access to adolescents showing signs of suicidal ideation or intent would likely help decrease teenage suicide rates.

There was a surge of new interest in ERPO Laws after the mass shooting in Parkland, FL, at the Marjory Stoneman Douglas High School, which claimed the lives of 17 students and faculty members. There are unfortunately insufficient data to draw any conclusive associations between ERPO laws and rates of mass shootings, which have affected the US school system with alarming frequency. However, a 2019 case series by Wintemute et al. examined 21 cases in California in which ERPOs were used to prevent mass shootings in situations in which direct threats were made. The authors concede that while it is impossible to know whether violence would have occurred if firearms had not been confiscated, ERPOs appeared to play a role in preventing mass shootings in the instances they studied [22].

Stand-Your-Ground Laws

Historically, the "castle doctrine" was a common law establishing the right to defend oneself against perceived threats in the home, with lethal force if necessary, without having to try to retreat to a safer place first. In recent years, Stand-Your-Ground (SYG) or No-Duty-to-Retreat Laws have entered the public consciousness due to their role in high-profile cases such as the death of Trayvon Martin, an unarmed Black teenager who was shot and killed by a shooter whose lawyers had considered using SYG as defense in 2012. SYG laws establish the right of a person to defend one's self or others, including with lethal force, against perceived threats without having to retreat from the situation. In contrast to a "castle doctrine," SYG laws signify the right to use lethal force in areas outside the home, including public spaces.

Much of the available literature evaluating SYG laws, while still relatively small in volume, has been published in the last few years due to heavy media attention. Many studies also have a regional focus, such as Florida, where high-profile cases have occurred, questioning their generalizability. Humphreys et al. found that since its implementation in Florida in 2005, the SYG law was associated with a 24.4% increase in all homicide and a 31.6% increase in firearm-related homicide over a period of 9 years [23]. With regard to nonlethal injury, the National Bureau of Economic Research found that the laws are associated with a significant increase in emergency room visits and hospital discharges related to firearm injuries nationwide [24].

The data on the employment of SYG as a legal defense for shooters are even more troublesome. Civil rights proponents have argued that the perception of a threat is easily influenced by a person's biases—most notably, their racial biases. It has been well documented that young Black males, including adolescents, are more likely to be seen as threatening and often older than their Caucasian peers [25, 26]. Using the language of SYG, adolescent Black males may be more likely to be "perceived as a threat" than most other demographics. A well-publicized example of this was the murder of Jordan Davis, a 17-year-old boy who was killed in 2012 by a man with a concealed carry permit in Florida who was upset that Jordan was playing loud music from his car in a gas station. His legal defense was ultimately unsuccessful, and he was convicted of murder, but used the language of SYG to defend his actions [27].

A study out of the Urban Institute which analyzed FBI Supplementary Homicide Report data from 2005 to 2010 found that, in states with SYG laws in effect, white-on-Black homicides were more likely to be deemed justified in court using this defense (11.4%) than Black-on-white homicides (1.2%) [28]. These data raise serious doubts about SYG laws' effect on public safety, particularly with regard to the lives of Black adolescents and young adults.

Campus Carry

Campus Carry laws refer to state laws that either allow or restrict possession of firearms on college and university campuses. The Gun-free School Zones Act of 1990 made it illegal for unauthorized individuals to carry a loaded or unsecured firearm within 1000 feet of a kindergarten, elementary, or high school but did not apply to institutions of higher learning. Since then, campus carry has been the subject of much debate, particularly when the first states legalized campus carry in 2003–2004, and again following the Virginia Tech shooting of 2007, in which 32 people were killed and 17 injured on campus by a student with two semi-automatic firearms.

The scope of these laws varies widely from state to state, but generally falls into three categories. States with "Mandatory" campus carry laws compel colleges and universities to allow guns on campuses, although there may be exceptions in accordance with school policies (such as at sporting events or in secure areas). Some states require firearms to be concealed on campus while others allow open carry as well. States with "Institutional" campus carry laws allow the individual institutions to determine their policy on campus carry. With very few exceptions, the majority of institutions in these states have chosen to ban firearms from their campuses. States that have enacted "nonpermissive" campus carry laws do not permit the possession of any firearms on institutional campuses.

There is very little empirical evidence on the effect of campus carry laws to date. However, a study by Miller et al. in 2002 surveyed 10,000 students at 119 4-year US universities and found that students who had a firearm at college were more likely to binge drink and engage in risky or aggressive behavior after binge drinking. Also, instead of serving as a deterrent to victimization, students in possession of firearms for protection were also more likely to have been threatened by a gun themselves, even after the firearm was in their possession [29]. Furthermore, large studies of both students and faculty at 15 Midwestern universities show that both groups overwhelmingly do not want concealed firearms on campus, with 78% of students and 94% of faculty opposing campus carry [30, 31]. While more research is needed to show any causal link between gun possession, risk behaviors, and victimization, the limited data that are available would suggest that campus carry would make students less safe.

Raising the Minimum Age

The minimum age to purchase a firearm varies by state, status of the dealer, and kind of firearm. Federally licensed dealers cannot sell or deliver handguns to individuals under 21 or long guns to those under 18. Unlicensed dealers, however, can sell,

transfer, or deliver handguns to consumers over 18. Federal law places no minimum on the age of possession of long guns. In certain states, persons as young as 14 years old may legally be in possession of a long gun and long gun ammunition.

There is a large body of evidence that the areas of the brain responsible for impulse control, judgment, and long-range planning are among the last areas of the brain to mature, and may continue to develop into the mid-20s [32, 33]. Similar to the rationale behind CAP laws, quick and easy access to a lethal weapon puts adolescents in possession of firearms at a higher risk of mortality than those without access. A review of the literature found that the association between firearm access and suicide is strongest among the adolescent and young adult population [9]. It is reasonable to conclude that any attempt to limit access to firearms in this population could decrease adolescent firearm-related mortality.

A study in *JAMA* found that state laws raising the minimum legal age to purchase firearms from 18 to 21 years were associated with a 9% decline in rates of firearm suicides among 18- to 20-year-olds [15]. Another analysis by Gius et al. found that, while no significant overall association could be found with state-enacted minimum age laws, unintentional firearm deaths and firearm suicides among children and teens 19 years or younger declined significantly after the federal minimum age law was enacted [34]. The limited data available would then suggest that a federally mandated minimum age of possession and purchase would be far more effective in reducing adolescent firearm-related morbidity and mortality than state-level regulation.

Mandatory Waiting Periods

With respect to gun purchases, mandatory waiting periods refer to a certain number of days that must elapse between when a consumer purchases a firearm and when the consumer actually takes possession of the firearm. There is no federally mandated waiting period, although a de facto waiting period may be imposed while a licensed gun dealer performs a background check on a prospective buyer. Some states have implemented an instant check system that allows for nearly immediate background checks. (If the FBI is unable to complete the background check by the third business day, the purchaser may take possession of the gun—a systematic shortcoming known as the "Charleston loophole"—because it allowed the shooter at the Mother Emmanuel Church in Charleston, South Carolina to purchase a gun after his background check took too long.) [35] Private sellers are not federally mandated to perform background checks, and therefore their consumers may take immediate possession at the time of purchase. As of January 2020, nine states and DC had enacted mandatory waiting periods on all firearm purchases, ranging from 1 to 14 days and varying by type of firearm.

Waiting periods provide time for a completed background check as described above and provide a "cooling off" period for a buyer who may have impulsive intent to harm him/herself or others. Gun rights proponents argue that mandatory waiting

periods delay possession and therefore delay self-protection, particularly in the case of domestic violence. However, per the aforementioned Rand 2018 meta-analysis, there is little empirical evidence to conclude how often this may occur [18]. In fact, available studies provide far more data showing that waiting periods prevent firearm-related injury and death. In 2004, the CDC found that evidence indicated waiting periods were associated with a declining suicide rate [36]. More recently, a widely cited study by Luca et al. analyzed data from the CDC between 1970 and 2014 and found a causal inverse relationship between waiting period laws and gun homicides. They estimated that states with waiting periods averted roughly 750 gun homicides per year as a result of the policy [37]. In response to such evidence, and with concern for older adolescents who are of legal purchasing age, but whose impulsivity could benefit from a "cooling off" period, the American Academy of Pediatrics has expressed its support for mandatory waiting periods [6].

Universal Background Checks

Federal law mandates that licensed firearm dealers run background checks through the National Instant Criminal Background Check System (NICS) on all consumers purchasing a firearm. However, private sellers are not required to run background checks, nor are they required to keep records of all sales. This exemption has been referred to as the "private sale loophole" or previously, the "gun show loophole," referencing the many private sales that occur at gun shows. Several states have implemented laws requiring background checks on some or all private sales. However, a study out of the Harvard T.H. Chan School of Public Health in 2017 estimated that 22% of gun sales in the United States had been completed without background checks during the previous 2 years [38].

Data support the association between universal background checks and decreased rates of homicide. Another 2019 study out of Harvard T.H. Chan School of Public Health and Boston University by Siegel et al. found that Universal Background Check laws were associated with a 14.9% decrease in overall homicides [39]. With regard to specific state laws, a 2015 study in the *American Journal of Public Health* found that a Connecticut law requiring all purchasers of firearms to undergo a background check (to obtain a permit) to purchase a handgun was associated with a 40% decrease in firearm homicides and a 15% decrease in suicides over the law's first 10 years in effect [40]. Conversely, in 2007, Missouri repealed a similar "permit-to-purchase" law that included a background check requirement, and this was associated with a 23% increase in firearm homicides from 2007 to 2014 [41].

Gun reform proponents have advocated for universal background checks, which would close the "private sale loophole," since the 1980s. In a 2017 survey published by the *New York Times*, 31 scholars of criminology, public health, and law rated universal background checks as the second most effective policy to prevent gun deaths (behind restricting purchase of firearms for those convicted of a violent crime and banning the sale of assault and semi-automatic weapons, which were tied for

first) [42]. The debate had drawn increased media attention after the Columbine School Massacre of 1999, again after the Sandy Hook Elementary School Massacre in 2012, and more recently after the Marjory Stoneman Douglas High School Shooting in 2018. After this most recent tragic event, in which 14 adolescents and 3 adults were killed, several polls from privately held data intelligence companies, news organizations, and academic polling centers have shown that the vast majority of registered voters (estimated between 88 and 94%) support federally mandating universal background checks [43, 44]. While more data are needed to bolster the association with reduction in firearm homicide, federally mandated universal background checks are supported by preliminary data, expert opinion, and overwhelming public support.

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Chapter 12
The Youth Voice: What Does Gun Violence Mean to Us?

Jack Kelly

Young people are disproportionately affected by gun violence, and so we must be centered in discussions of gun violence prevention. Those with the power to act must listen to our implorations.

I got my start in the gun violence prevention (GVP) movement when I recognized that the threat was coming to my own community. A gun shop was set to be fast-tracked and opened in 2016, in the heart of the town I live in. As a young person and a member of my community, I was both worried and disheartened. The gun shop eventually opened within 500 feet of a local church, 1000 feet of a local elementary school, and just down the road from where I went to school.

Being just 12 at the time, I expected my local elected officials to act to protect other young people like me. But as often happens, elected officials beholden to political interests took the passive approach and did nothing; the gun shop was permitted to open and conduct business.

This instance was a powerful wakeup call to me and the galvanizing event that brought me into the movement. In organizing and activism, people usually have an awakening in which the pressing issues they see in the media stop existing only in the abstract. They affect real people. This moment compelled me to join the GVP fight.

As I grew older, the peril did not recede—rather, with each new gun sale, the risk was heightened. The proliferation of guns is inexorably tied to a greater risk for gun violence and this was, and still is, regrettably happening in my own town—the place I have lived my whole life, where I go to school, where I have made friends.

With time, after having realized the threat of gun violence, I started becoming more cognizant of the many instances of gun violence my peers across our nation were facing. I started learning more about the tremendous magnitude of the problem: the issue I had seen in my community was by no means isolated.

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February 14, 2018 marked a day that is everlasting in my memory—the day of the Marjory Stoneman Douglas High School shooting in Parkland, Florida. I vividly remember sitting for hours watching the breaking news detailing the horrific loss of life because of an AR-15 semi-automatic rifle. A day meant to be filled with candies and cards was darkened by body count totals. This day was devastating for me, to see other young people unnecessarily die because of a weapon of war that someone bought legally as the result of a flawed legal system.

This event did more than rekindle my commitment to preventing gun violence. The March for Our Lives movement organized by Parkland survivors as a response to this tragedy helped me become organized. This movement empowered me, making me feel like a part of a robust youth force committed to changing a system where gun violence is found in ubiquity.

March for Our Lives marked the first time young people organized in a substantial way in vehement opposition to the political and social structures that permit gun violence. We had a certain irreverence that we conveyed to special interests in Washington. We stood up to the National Rifle Association (NRA) with a conspicuous message: we've had enough.

March for Our Lives' messaging is something that I have always been very proud of. Even though March for Our Lives was created in the wake of a school mass shooting, we don't let our genesis define the entire GVP fight. We recognize that gun violence manifests itself in many ways, so we have broadened our message to combat all forms of gun violence. We address the intersections of youth, race, and socioeconomic status with gun violence.

We as young people feel the toll of gun violence on our mental health. My generation, Generation Z, is significantly more likely to grapple with adverse mental health outcomes than previous generations of youth. Coupling that knowledge with the fact that having a gun makes you three times as likely to die by suicide—something proven true by a veritable plethora of studies—it becomes clear that we need to talk about access to guns when we talk about mental health. Beyond that, young people who are Black, Indigenous, or People of Color (BIPOC) face systemic racism in the United States and face police violence which often escalates into gun violence. March for Our Lives recognizes that gun violence and police violence are certainly linked.

We understand that urban gun violence is another salient, daily form of gun violence that does not garner the media coverage attributed to mass shootings. Recognizing that gun violence affects different communities in unique ways is central to our plan to take on gun violence.

We, as young people, believe it is time to move beyond the language of the "gun control" movement, which has had a myopic approach to creating safer communities. The "gun control" movement also has a racist stain on it because of the NRA and its attempts to prevent Black Panthers from having guns; we young people do not accept this as part of our messaging.

Young people are not a monolith; we are diverse and come from different communities. With this in mind, our collective youth messaging of GVP is to treat the intersections of gun violence as paramount.

March for Our Lives' ability to actually make change to a system that has failed people for so long reflects where young people stand in the gun violence prevention movement. Gun violence is so crucial of an issue for us, we take it upon ourselves to make change happen, not just wait for it.

We have been successful in organizing national walkouts that have called attention to the issue of gun violence—mobilizing millions to raise awareness. We have put pressure on elected officials to pass legislation that meaningfully fixed many problems with our old gun laws. We have registered hundreds of thousands of young people to vote for pro-GVP candidates.

Young people have been at the forefront leading these actions. Young people leading this fight shows how significant it is for us.

The most vital takeaway about young people and our fight to end gun violence is that we are still here.

We are still organizing.

Holding elected officials accountable.

Bringing young people into the movement.

Often people buy into the fallacy that because we aren't being constantly featured in the media, our work is finished. Or similarly, people only ascribe importance to GVP in the wake of a high-profile mass shooting. Both of these beliefs are erroneous: GVP always matters and our work is not finished, until no one dies because of a gun again.

I am a proud member of March for Our Lives, with a role as an organizer and leader in the state of New York. We are composed of hundreds of volunteers making up many chapters in different geographic regions in our state. We still talk with members of our bicameral legislature to advance GVP legislation. We still host forums with people running for office to hold them accountable on issues that matter to us. We still hold days of action to act around specific issues, such as our launch of the "Our Courts, Our Voice" campaign or our work with local elected officials to obtain funding for our communities.

We, the young people and the future of our nation, are still working to end gun violence once and for all. And the process of doing that has left us energized! Reflecting on all of this, the most critical takeaway about young people and our dedication to ending gun violence is this: we are committed to the current and continuing fight against gun violence and all of its intersections. We need to eviscerate gun violence and establish safe communities in the United States. A fundamental part of achieving this is having a wide coalition of people working towards this, including medical professionals and scientists with a public health perspective, and young people organizing at the grassroots level on an issue that profoundly impacts us (Fig. 12.1).

Fig. 12.1 Jack Kelly, Organizing Director for March for Our Lives NY, speaking at a rally with then Congressman-elect Mondaire Jones on the issue of voting rights. (Photo credit: Alex Acaro)

Note The opinions expressed in this chapter are those of the author and do not express the official opinions or stance of the March for Our Lives organization.

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