

25 Years of Impactful Grant Making

Gun Violence Prevention
Research Supported by the
Joyce Foundation

AUGUST 2019

The
Joyce
Foundation

This document reviews the Joyce Foundation's 25-year history of grant making to advance gun violence prevention research. Since 1993, the Joyce Foundation has provided support to researchers who have produced hundreds of scientific publications and innumerable insights about gun violence in the United States, and its solutions. This is necessarily an incomplete accounting, but provides an approximate measure of the unique impact of the Joyce Foundation's grant making during a critical time period when few other private or public funders supported the field.

CONTENTS

4	EXECUTIVE SUMMARY	25	GUN CRIME
6	BY THE NUMBERS	25	ILLEGAL GUNS AND TRAFFICKING
10	METHODOLOGY	26	ILLEGAL GUN CARRYING BY YOUTH
11	REFRAMING GUN VIOLENCE	27	ALCOHOL, DRUGS, AND FIREARMS
11	A PUBLIC HEALTH APPROACH	29	SOLUTIONS
11	SOCIAL AND ECONOMIC COSTS OF GUN VIOLENCE	29	POINT-OF-SALE INTERVENTIONS
13	GUN AVAILABILITY AS A RISK FACTOR FOR GUN VIOLENCE	31	PREVENTION IN HEALTH CARE SETTINGS
13	GUN HOMICIDE	32	OTHER REGULATORY AND LEGISLATIVE SOLUTIONS
15	GUN SUICIDE	36	RESEARCH
17	INTIMATE PARTNER VIOLENCE AND FIREARMS	36	THE NATIONAL VIOLENT DEATH REPORTING SYSTEM
18	UNINTENTIONAL FIREARM INJURIES	37	RESEARCH AGENDAS
20	GUN-RELATED BEHAVIORS	38	WHAT'S AHEAD?
20	GUN OWNERSHIP AND STORAGE	39	CONCLUSION
22	LEGAL PUBLIC CARRY OF FIREARMS		
23	SELF-DEFENSE GUN USE		

EXECUTIVE SUMMARY

In 1993, under the leadership of then-president Deborah Leff, the Joyce Foundation launched its Gun Violence Program. Gun violence previously had been considered primarily as a medical concern addressed through the clinical treatment of victims, or a criminal justice issue addressed through the arrest, prosecution, and incarceration of offenders. The Joyce Foundation helped define gun violence as a public health issue, focused on policies and strategies to prevent violence before it occurs.

The first step in defining gun violence as a public health issue was better understanding the nature of the problem, including the risk factors, trends, and causes of gun violence. Over the past 25 years, the Foundation has invested in research and data collection to inform the development of solutions.

The following report summarizes the output of \$32 million in the Joyce Foundation's research grant making over the last quarter century, which yielded over 240 peer-reviewed research publications. (The Foundation has also supported a great deal of non-academic research, which is not reflected here.) The impact of this research cannot be overstated. This report shows that, at a time when few other private donors or public agencies invested in gun violence prevention, the Joyce Foundation helped build and sustain the field.

The Joyce Foundation supported many early studies that described the scope of gun violence and its impact on different populations. Because of a scarcity of even basic data on gun deaths in the United States, the Foundation joined with other funders to create the pilot for the National Violent Death Reporting System (NVDRS). NVDRS links data from multiple sources on each violent death in the United States to provide a complete picture of the circumstances surrounding each incident. Housed at the CDC since 2002, NVDRS is now collecting data nationwide, and is used by public health agencies, researchers, law enforcement, and policy makers to develop prevention strategies.

More recently, the Foundation's research grants have focused on solutions to gun violence, supporting projects to identify, evaluate, and improve execution of policies and practices to reduce gun deaths and injuries. With support from the Joyce Foundation, researchers have studied policies to curb unregulated firearm transfers, keep guns away from domestic abusers and children, and reduce gun trafficking. Foundation grants have also supported evaluations of community-based, clinical, and law enforcement interventions to prevent firearm violence.

Today, the Joyce Foundation's program is known as the Gun Violence Prevention & Justice Reform Program, and supports research and policy solutions both to address gun violence and to minimize harmful impacts of the criminal justice system's response to gun violence. With gun violence claiming the lives of nearly 40,000 Americans annually, the Joyce Foundation is heartened to see new interest from policy makers and philanthropy in supporting research on gun violence. The experience of the Joyce Foundation should provide a valuable roadmap for how to invest in this issue in a way that builds on existing knowledge and enhances our shared commitment to public health and safety.

Ten of the most seminal research findings on gun violence produced with Joyce Foundation support are:

1. **The United States has 25 times the gun homicide rate of comparable countries.** This is largely attributable to the availability of firearms in the United States, which has a higher rate of household firearm ownership than any other developed country.
2. **Gun availability is correlated to higher rates of gun violence.** In the United States, states with a higher prevalence of firearm ownership have higher rates of suicide and homicide among women, men, and children. States with higher rates of firearm ownership have three times the rate of homicides of law enforcement officers, as well as higher rates of fatal shootings by police. States with the highest prevalence of guns had nine times the rate of unintentional firearm deaths as states with the lowest gun prevalence.
3. **The impacts of gun violence are very different in rural and urban areas.** Rural counties experience higher rates of gun suicide compared to the most urban counties; in contrast, the most urban counties have higher rates of gun homicide. Rural counties had more than double the rate of unintentional firearm death among children compared to urban counties.
4. **Firearms are the most lethal means of suicide, with a fatality rate over 90%.** People who attempt suicide by other means are likely to survive the attempt, and are unlikely to go on to die by suicide. Limiting a suicidal person's access to firearms is an evidence-based measure for reducing their risk of suicide.
5. **Self-defense gun use is rare,** and survey respondents are three times more likely to indicate they were recently victimized with a gun than used one in self-defense.
6. **Of gun owners with children, only 30% store all guns in the safest manner (locked and unloaded).** Unsafe storage practices also contribute to an estimated 380,000 guns stolen annually in the United States.
7. **The unregulated secondary market for firearms is a significant source of illegal guns used in crime.** Today, 22% of gun sales occur without a background check.
8. **Strong gun laws reduce deaths.** Comprehensive background checks implemented through a permit-to-purchase regime have been shown to reduce rates of gun trafficking, homicide, and suicide.
9. **A number of measures have proven effective for reducing intimate partner homicide,** including state laws that prohibit people convicted of any violent misdemeanors from owning firearms, those that apply the prohibitions to dating partners and require prohibited abusers to surrender their firearms, and those that include emergency domestic violence restraining orders as a basis for prohibiting gun possession.
10. **State and local law enforcement oversight of gun dealers,** including licensing, inspections, and stings, are effective at reducing illegal gun trafficking.

The Joyce Foundation is grateful to Ted Alcorn for researching and authoring this report, with research assistance from Amy Rooker.

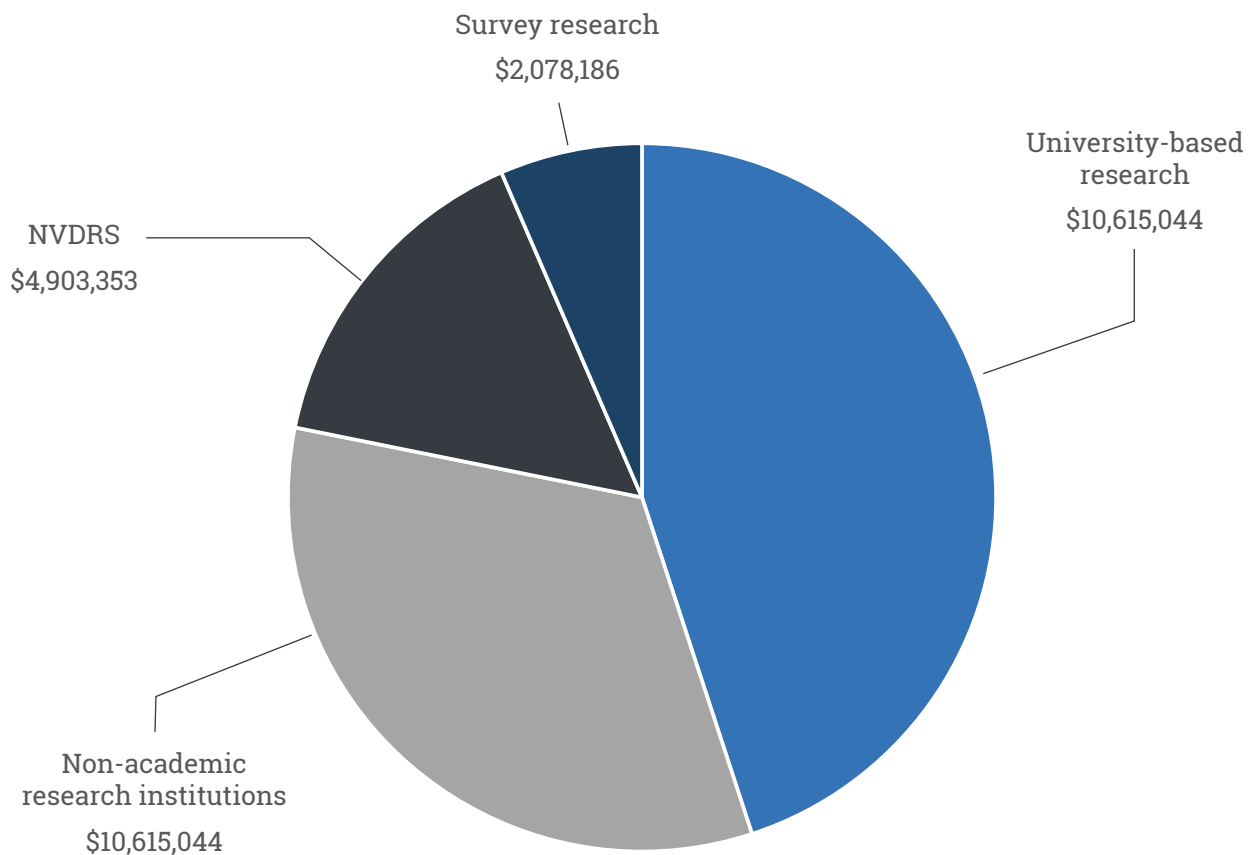
By the Numbers

Over the last 25 years, the Joyce Foundation has been among the most significant and sustained funders of research on how to prevent gun violence.

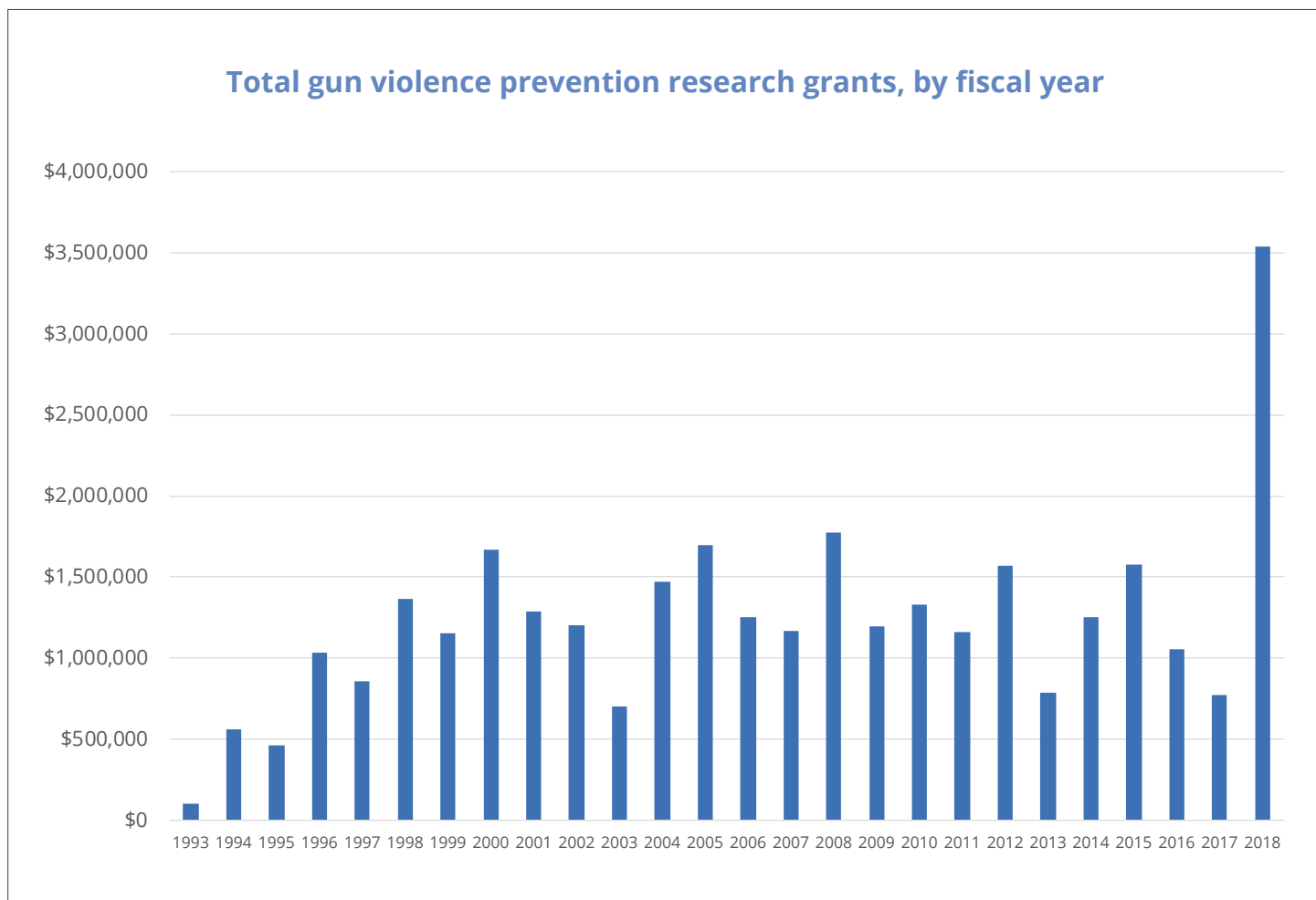
Between December 1993 and December 2018, the Foundation made **141 grants** to support gun violence research, capacity building, or dissemination, totaling **\$32 million dollars**.

That includes 58 grants to university-based researchers totaling \$14.4 million; 31 grants to non-academic research institutions, including think tanks and hospitals, totaling \$10.6 million; 28 grants totaling \$4.9 million to support the establishment and expansion of the National Violent Death Reporting System; and 24 grants totaling \$2.1 million specifically focused on survey research to better understand gun ownership, beliefs, and behaviors. In total, the grants supported work at **47 separate institutions**.

Gun violence prevention research grants from 1993–2018, by category



Grant making fluctuated only slightly year to year. Fiscal year 2018 saw the Foundation's largest grant making to date, with a total of \$3.5 million in grants to 14 distinct recipients.



Researchers who received early funding from the Joyce Foundation such as Steve Teret (first grant received in 1994), Phil Cook (1996), Garen Wintemute (1999), David Hemenway (2000), Susan Sorenson (2000), and Daniel Webster (2001) have gone on to become among the most prolific and respected scientists studying gun violence.

“Joyce stands alone as the vital through line for gun violence research since the mid-1990s. Without exaggeration and in an utterly practical sense, Joyce’s support is a chief reason firearm violence prevention research has advanced as much as it has.”

Drs. Matthew Miller and Deborah Azrael

Northeastern University
and Harvard Injury Control
Research Center

The Joyce Foundation also played a pivotal role in establishing the CDC’s National Violent Death Reporting System, which generates the country’s most detailed surveillance data on firearm-related deaths. Grantees have helped establish and strengthen data collection systems in the Great Lakes region, educated the public and policy makers about the importance of injury surveillance data, and helped extend the system nationwide.

“The Joyce Foundation was instrumental in getting a number of other foundations to support research to advance the prevention of gun violence. It is highly doubtful that I would have focused my career on gun violence prevention if the Joyce Foundation had not invested in the topic and in our Johns Hopkins University Center. Their support has allowed us to understand the power of licensing handgun purchasers to reduce gun violence.”

Dr. Daniel Webster

Professor, Johns
Hopkins Bloomberg
School of Public Health

Grants made by the Joyce Foundation during the reviewed time period resulted in at least 244 original, peer-reviewed studies — with many forthcoming studies based on those grants still in the works. These publications often touch on several dimensions of gun violence, but for sake of clarity this document groups them by primary focus:



Reframing gun violence

A public health approach
Social and economic costs of
gun violence



Gun availability as a risk factor for gun violence

Gun homicide
Gun suicide
Intimate partner violence and guns
Unintentional firearm injuries



Gun-related behaviors

Gun ownership and storage
Legal public carry of firearms
Self-defense gun use



Gun crime

Illegal guns and trafficking
Gun carrying by youth
Alcohol, drugs, and firearms



Solutions

Point-of-sale interventions
Prevention in health care settings
Other regulatory and
legislative solutions



Research

The National Violent Death
Reporting System (NVDRS)
Research agendas

“The Joyce Foundation played a pivotal role in the creation of the NVDRS, ensuring that the careful work of police, coroners, and medical examiners in documenting firearm-related deaths is accurately captured in a national data system. While other foundations have assisted with portions of the process, the Joyce Foundation alone helped bring about every part: piloting, federal funding, expansion, system improvements, and research. It is hard to overstate how much the NVDRS advances the nation’s data infrastructure for suicide, legal intervention homicides, and unintentional firearm deaths.”

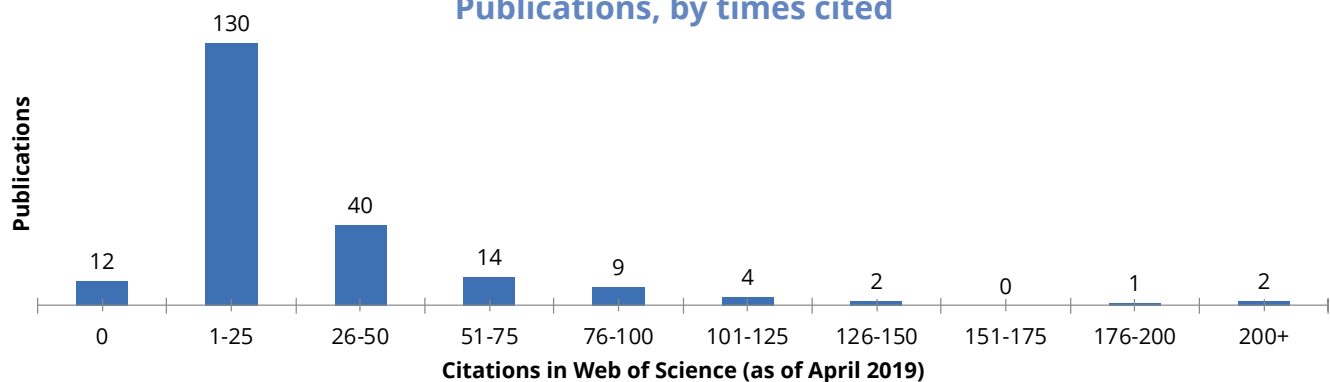
Dr. David Hemenway and Catherine Barber

Co-Director and Senior Researcher,
Harvard Injury Control Research Center

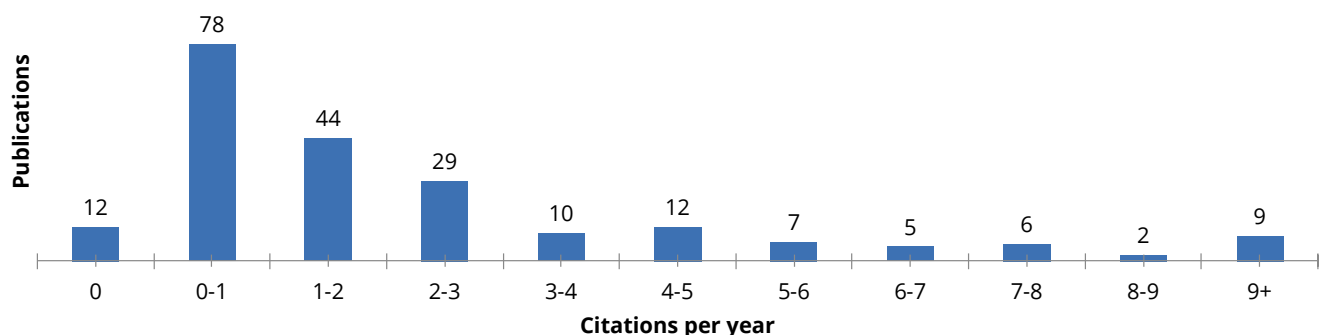
While the papers ranged in impact, among the most frequently cited (according to the citation index Web of Science) were such canonical studies as:

- Grinshteyn E, Hemenway D. Violent Death Rates: The United States Compared with Other High-income OECD Countries, 2010. *The American Journal of Medicine*. 2016;129(3):266-273. doi:10.1016/j.amjmed.2015.10.025
- Fleegler EW, Lee LK, Monuteaux MC, Hemenway D, Mannix R. Firearm Legislation and Firearm-Related Fatalities in the United States. *JAMA Internal Medicine*. 2013;173(9):732. doi:10.1001/jamainternmed.2013.1286
- Ludwig J, Cook PJ. Homicide and Suicide Rates Associated with Implementation of the Brady Handgun Violence Prevention Act. *JAMA*. 2000;284(5):585-591. doi:10.1001/jama.284.5.585

Publications, by times cited



Publications, by average annual rate of citations since publication



“In many ways, my career as a gun violence researcher was made possible by the Joyce Foundation.”

Dr. Charles Branas

Chair of the Epidemiology
Department at the Mailman School of
Public Health at Columbia University

Today, the Joyce Foundation’s portfolio of grants exemplifies its broad vision for reducing gun violence in all its aspects, from suicide to community violence to police-involved shootings. At the same time, the grants show the Joyce Foundation remains at the vanguard of the gun violence prevention movement, advancing cutting-edge policies like firearm licensing and providing thought leadership, as through wedding gun violence prevention with criminal justice reform.

METHODOLOGY

To comprehensively review Joyce Foundation-funded research on gun violence prevention, publications attributable to the grants were identified by word searches for “Joyce Foundation” in major citation databases (including Proquest, Science Direct, and Springer) and by reviewing the curriculum vitae of grantees for their publications during periods of grant support. When a publication did not explicitly indicate it was supported in part by the Joyce Foundation and there was some question about its origin, the researcher was contacted to verify. All told, 301 publications were identified that were supported at least in part by funding from the Joyce Foundation, of which 244 were original research and 57 were commentary or correspondence. This document is a summary of those deemed original, peer-reviewed research, and published up to April 2019 — even as additional publications originating from these grants continue to appear.





Reframing gun violence

A PUBLIC HEALTH APPROACH

For much of the twentieth century, gun violence was viewed as a problem of crime, inviting only law-and-order solutions. Joyce-funded researchers were among the first to call for a public-health approach to gun violence. They drew a comparison to other successful injury-prevention efforts, including changes in road and automobile design that drove down accident mortality, and education and behavior-change campaigns that informed the public about the risks of smoking and shifted social norms. This successful reframing of gun violence as a topic of public health concern opened the door to ever more research on ways to prevent gun violence.

Publications

- Hemenway D. The Public Health Approach to Motor Vehicles, Tobacco, and Alcohol, with Applications to Firearms Policy. *Journal of Public Health Policy*. 2001;22(4):381-402. doi:10.2307/3343157
- Hemenway D. Reducing Firearm Violence. *Crime and Justice*. 2017a;46(1):201-230. doi:10.1086/688460
- Prothrow-Stith D. Strengthening the Collaboration between Public Health and Criminal Justice to Prevent Violence. *The Journal of Law, Medicine & Ethics*. 2004;32(1):82-88. doi:10.1111/j.1748-720x.2004.tb00451.x
- Prothrow-Stith D. Interpersonal violence prevention: A recent public health mandate. In: *Oxford Textbook of Public Health*. 5th ed. Oxford University Press; 2009.

SOCIAL AND ECONOMIC COSTS OF GUN VIOLENCE

Joyce-funded research has yielded at least 12 publications measuring the costs of gun violence, including medical and insurance costs, and its overall social and economic costs. These studies show that policies and programs aimed at reducing gun violence stand to save United States taxpayers billions of dollars. Joyce-funded research has also shown that estimates of the costs of gun violence that focus on medical costs and productivity losses underestimate the total societal costs of gun violence. Other studies have shown how on-campus shootings contribute to anxiety with symptoms similar to post-traumatic stress disorder.

KEY FINDINGS:

- The mean medical cost per gunshot injury in the United States in 1994 was approximately \$17,000, for a nationwide annual total of \$2.3 billion in lifetime medical costs (in 1994 dollars). Almost half (\$1.1 billion) was paid by government insurers and borne by United States taxpayers (Cook, 1999).

- A retrospective review of 139 pediatric patients who were admitted to the Children's Hospital of Philadelphia between 1988 and 1992 with a gunshot wound (68% of whom had public or no insurance) found that the hospital provided them an estimated \$1.63 million in uncompensated care (Nance, 1994).
- In 2000, among all fatal injuries, only motor vehicle crashes have a larger effect of reductions in life expectancy in the United States than firearm injuries (motor vehicle crashes shorten life expectancy by an average of 160.5 days vs 103.6 for firearm violence) (Lemarie, 2005).
- The American public is willing to pay \$24.5 billion (approximately \$1.2 million per gun assault) in increased taxes to reduce gun assaults by 30% (Ludwig, 2001).

Publications

- Buka SL, Stichick TL, Birdthistle I, Earls FJ. Youth exposure to violence: Prevalence, risks, and consequences. *American Journal of Orthopsychiatry*. 2001;71(3):298-310. doi:10.1037/0002-9432.71.3.298
- Cook PJ. The Medical Costs of Gunshot Injuries in the United States. *Jama*. 1999;282(5):447. doi:10.1001/jama.282.5.447
- Cook PJ, Ludwig J. The Costs of Gun Violence against Children. *The Future of Children*. 2002;12(2):86. doi:10.2307/1602740
- Cook P, Ludwig J. The Social Costs of Gun Ownership. 2004. doi:10.3386/w10736
- Fergus TA, Rabenhorst MM, Orcutt HK, Valentiner DP. Reactions to trauma research among women recently exposed to a campus shooting. *Journal of Traumatic Stress*. 2011;24(5):596-600. doi:10.1002/jts.20682
- Hemenway D. (2012). Costs of firearm violence: How you measure things matters. In D. M. Patel, R. M. Taylor (Eds.) & Institute of Medicine, National Research Council of the National Academies, Social and economic costs of violence: Workshop summary (pp. 60-63). Washington, DC, US: National Academies Press.
- Lemaire J. The Cost of Firearm Deaths in the United States: Reduced Life Expectancies and Increased Insurance Costs. *Journal of Risk Insurance*. 2005;72(3):359-374. doi:10.1111/j.1539-6975.2005.00128.x
- Ludwig J, Cook P. The Benefits of Reducing Gun Violence: Evidence from Contingent-Valuation Survey Data. 1999. doi:10.3386/w7166
- Morgan ER, Rowhani-Rahbar A, Azrael D, Miller M. Public Perceptions of Firearm- and Non-Firearm-Related Violent Death in the United States: A National Study. *Annals of Internal Medicine*. 2018;169(10):734. doi:10.7326/m18-1533
- Nance ML, Templeton JM, Oneill JA. Socioeconomic impact of gunshot wounds in an urban pediatric population. *Journal of Pediatric Surgery*. 1994;29(1):39-43. doi:10.1016/0022-3468(94)90519-3
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Gun availability as a risk factor for gun violence

GUN HOMICIDE

Research supported by the Joyce Foundation has yielded at least 25 publications about gun homicides and assaults. The research has consistently shown a positive relationship between rates of gun ownership and homicide deaths, and in both respects, the United States is an outlier compared to other high-income countries.

Joyce-funded research has shown that contrary to arguments that firearm ownership protects against victimization, states with higher prevalence of firearm ownership have higher rates of suicide and homicide among women, men, and children, even after controlling for other factors. This body of research has also described geographic differences in the pattern of gun mortality within the United States — including starkly different patterns of gun violence in rural and urban areas — and has employed techniques to understand how individual- and area-level data can be used together to understand firearm violence. Researchers have focused in particular on patterns of gun victimization and use among children, and on the types of firearms used.

KEY FINDINGS:

- The epidemiology of gun violence is very different in rural and urban areas. Between 1989 and 1999, the most rural counties had 1.54 times the rate of gun suicide compared to the most urban counties; in contrast, the most urban counties had 1.90 times the rate of gun homicide compared to the most rural counties (Branas et al, 2004).
- An analysis of death certificates of children and youth in Wisconsin showed that suicides outnumber deaths by other causes, and that overall firearm mortality exceeded cancer and infectious disease combined (Shiffler et al, 2005).
- A cross-sectional study of the guns used in homicides in Milwaukee between 1990 and 1994 found that most youth homicides were committed with inexpensive handguns (Richmond, 2004).
- Data from 2003 showed that the United States had 20 times the gun homicide rate compared to other countries (Richardson et al, 2011). By 2010, that gap had widened to 25 times (Grinshteyn et al, 2017).
- Non-conflict firearm mortality is not limited to the United States: though subject to data-collection problems, estimates place the annual number of these deaths between 196,000 and 229,000 (Richmond, 2005).
- States with higher rates of firearm ownership have three times the rate of homicides of law enforcement officers (Swedler et al, 2015). Moreover, states with high gun ownership also had higher rates of fatal shootings by police (Hemenway et al, 2018).

- Contrary to popular belief, both Israel and Switzerland have lower gun ownership and stricter gun laws; furthermore, more restrictive policies towards firearm storage resulted in a 40% decrease in suicide among Israeli soldiers (Rosenbaum et al, 2011).

Publications

- Branas CC, Culhane D, Richmond TS, Wiebe DJ. Novel Linkage of Individual and Geographic Data to Study Firearm Violence. *Homicide Studies*. 2008;12(3):298-320. doi:10.1177/1088767908319756
- Branas CC, Nance ML, Elliott MR, Richmond TS, Schwab CW. Urban–Rural Shifts in Intentional Firearm Death: Different Causes, Same Results. *American Journal of Public Health*. 2004;94(10):1750-1755. doi:10.2105/ajph.94.10.1750
- Branas CC, Richmond TS, Schwab CW. Firearm Homicide and Firearm Suicide: Opposite but Equal. *Public Health Reports*. 2004a;119(2):114-124. doi:10.1177/003335490411900203
- Christoffel KK. Homicide in childhood: a public health problem in need of attention. *American Journal of Public Health*. 1984;74(1):68-70. doi:10.2105/ajph.74.1.68
- Cook P, Laub J. After the Epidemic: Recent Trends in Youth Violence in the United States. 2001. doi:10.3386/w8571
- Cook P. The Epidemic of Youth Gun Violence. 2 Persp. On Crim & Just. 1997-1998a;107-125.
- Cook PJ, Laub JH. The Unprecedented Epidemic in Youth Violence. *Crime and Justice*. 1998b;24:27-64. doi:10.1086/449277
- Fujiwara T, Barber C, Schaechter J, Hemenway D. Characteristics of Infant Homicides: Findings from a U.S. Multisite Reporting System. *Pediatrics*. 2009;124(2). doi:10.1542/peds.2008-3675
- Grassel KM. Association between handgun purchase and mortality from firearm injury. *Injury Prevention*. 2003;9(1):48-52. doi:10.1136/ip.9.1.48
- Grinshteyn E, Hemenway D. Violent Death Rates: The United States Compared with Other High-income OECD Countries, 2010. *The American Journal of Medicine*. 2016;129(3):266-273. doi:10.1016/j.amjmed.2015.10.025
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- Hemenway D, Solnick SJ. The epidemiology of homicide perpetration by children. *Injury Epidemiology*. 2017;4(1). doi:10.1186/s40621-017-0102-2
- Hepburn LM, Hemenway D. Firearm availability and homicide: A review of the literature. *Aggression and Violent Behavior*. 2004;9(4):417-440. doi:10.1016/s1359-1789(03)00044-2
- Miller M, Azrael D, Hemenway D. Rates of Household Firearm Ownership and Homicide Across US Regions and States, 1988–1997. *American Journal of Public Health*. 2002b;92(12):1988-1993. doi:10.2105/ajph.92.12.1988
- Miller M, Hemenway D, Azrael D. State-level homicide victimization rates in the United States in relation to survey measures of household firearm ownership, 2001–2003. *Social Science & Medicine*. 2007;64(3):656-664. doi:10.1016/j.socscimed.2006.09.024
- Monuteaux MC, Lee LK, Hemenway D, Mannix R, Fleegler EW. Firearm Ownership and Violent Crime in the U.S. *American Journal of Preventive Medicine*. 2015;49(2):207-214. doi:10.1016/j.amepre.2015.02.008
- Nance ML, Carr BG, Kallan MJ, Branas CC, Wiebe DJ. Variation in Pediatric and Adolescent Firearm Mortality Rates in Rural and Urban US Counties. *Pediatrics*. 2010;125(6):1112-1118. doi:10.1542/peds.2009-3219
- Nance ML, Denysenko L, Durbin DR, Branas CC, Stafford PW, Schwab CW. The Rural-Urban Continuum: Variability in Statewide Serious Firearm Injuries in Children and Adolescents. *Archives of Pediatrics & Adolescent Medicine*. 2002;156(8):781. doi:10.1001/archpedi.156.8.781
- Richardson EG, Hemenway D. Homicide, Suicide, and Unintentional Firearm Fatality: Comparing the United States with Other High-Income Countries, 2003. *The Journal of Trauma: Injury, Infection, and Critical Care*. 2011;70(1):238-243. doi:10.1097/TA.0b013e3181dbaddf
- Richmond TS, Branas CC, Cheney RA, Schwab CW. The Case for Enhanced Data Collection of Gun Type. *The Journal of Trauma: Injury, Infection, and Critical Care*. 2004;57(6):1356-1360. doi:10.1097/01.ta.0000141886.22472.f5
- Richmond TS, Cheney R, Schwab CW. The global burden of non-conflict related firearm mortality. *Injury Prevention*. 2005;11(6):348-352. doi:10.1136/ip.2005.008896
- Rosenbaum JE. Gun utopias? Firearm access and ownership in Israel and Switzerland. *Journal of Public Health Policy*. 2011;33(1):46-58. doi:10.1057/jphp.2011.56
- Shiffler T, Hargarten SW, Withers RL. The Burden of Suicide and Homicide of Wisconsin's Children and Youth. *Wisconsin Medical Journal*. 2005;104(1):62-67.
- Swedler DI, Simmons MM, Dominici F, Hemenway D. Firearm Prevalence and Homicides of Law Enforcement Officers in the United States. *American Journal of Public Health*. 2015;105(10):2042-2048. doi:10.2105/ajph.2015.302749

GUN SUICIDE

The Joyce Foundation has supported research yielding at least 36 publications relating to firearm suicide. These publications have provided strong evidence that firearm ownership has an independent and direct effect on firearm suicide, controlling for mental illness and other demographic factors. Studies funded by the Joyce Foundation have established the elevated risk of suicide after purchasing a handgun, particularly for women. Death is not an inevitable outcome of suicidality, this research has also shown, but the presence of lethal means, including guns, increases the likelihood that a suicide attempt will result in death. Two groups, children and veterans, have been of particular focus, who under certain circumstances are at higher risk of suicide.

KEY FINDINGS:

- Firearms are the most lethal means of suicide: data from seven state health departments showed that 91% of suicide attempts by firearm between 1996 and 2000 resulted in death. In contrast, poisonings made up 74% of suicide attempts but only 14% of fatalities (Miller et al, 2004b).
- The association between firearm ownership and firearm suicide rates cannot be explained by mental illness. An ecologic study used data from 2001–2005 to assess the relationship between household firearm ownership, antidepressant prescription rates, and suicide rates. The authors found no association between suicide rates and antidepressant prescription rates, but did find that higher levels of household firearm ownership were associated with a higher prevalence of suicide (Opoliner et al, 2014).
- Data from a cross-sectional study from nine geographic regions in the United States between 1979 and 1994 suggest that a 10% decrease in regional firearm ownership would result in a 3% decrease in suicide rates (Birckmayer et al, 2001). This pattern is even more pronounced among children – a study comparing the change in suicide rates to changes in household firearm prevalence between 1981 and 2002 found that each 10% decline in the proportion of households with firearms and children had a corresponding 8.3% decline in firearm suicide, even after controlling for sociodemographic factors (Miller et al, 2006b).
- Ninety percent of firearm suicides occur among gun-owning households, according to Vital Statistics data (Hemenway, 2019).
- After controlling for differences in age, race, and survey year, researchers found that the risk of suicide is not significantly higher among veterans compared to non-veterans (Miller et al, 2012). However, examination of National Violent Death Reporting System data from 2002-2006 found that male veterans and female veterans were significantly more likely to use a firearm compared to non-veterans (1.3 times and 1.6 times, respectively) (Kaplan et al, 2009).
- In a case-control study of the more than 200,000 Californians who died in 1998, the 4,728 violent or firearm-related injury deaths were compared to all other deaths that year. The odds of having purchased a firearm during 1996–1998 were almost 12.5 times higher among people who died from firearm suicide; this rate rose to almost 110 times higher among women who died from a firearm suicide (Grassel et al, 2003).
- The relationship between firearm purchase and elevated risk of suicide persists for up to six years. A population-based cohort study of the nearly 240,000 California handgun purchasers in 1991 found that suicide was the leading cause of death in the first year following the handgun purchase and accounted for 52% of deaths among women 21 to 44 years old (Wintemute et al, 1999).
- A review of medical examiner records for all firearm suicides in Milwaukee between 1990 and 1994 found that handguns were used in close to 7 out of 10 firearm suicides (Hagarten, 1996). However, data from 13 states between 2005 and 2015 found that long guns were used in 51% of adolescent male suicides in rural areas (Hanlon et al, 2019).
- Despite being too young to legally own a gun, children are also at elevated risk of suicide when they live in a household with a gun. Between 2010 and 2015, 1.8 million children lived with adults who gave up gun ownership during that time period. In contrast, 3.6 million children lived with adults who became gun owners, suggesting a growing portion of children in the United States are living in homes with firearms (Wertz et al, 2019).

Publications

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INTIMATE PARTNER VIOLENCE AND FIREARMS

Joyce-funded research has yielded at least 11 publications about intimate partner violence (IPV) and firearms. These studies have measured the human toll of intimate partner violence with guns and helped identify those at highest risk of being victimized.

The research has helped quantify the scale of intimate partner violence with guns in the United States, where women are more likely to be killed with a firearm than women in any other high-income country. The research has also helped isolate the independent impact gun ownership has for amplifying abuse, described patterns of abuse with guns, and documented how intimate partner homicide is often followed by suicide. Some victims of abuse may consider obtaining firearms for the purposes of protection, but Joyce-funded research gives reason to think that handgun ownership does not lessen – and may increase – risk.

KEY FINDINGS:

- Among 25 high-income countries, the United States accounted for only 32% of the total female population, but 84% of all female firearm homicides. This result is largely attributable to the availability of firearms in the United States, which has a higher rate of household firearm ownership than any other country (Hemenway, 2002).
- Recent gun owners in Massachusetts' certified batterer intervention programs were 7.8 times more likely to have threatened their partners with a gun than were non-gun owners (Rothman, 2005).
- In Kentucky, coroner, medical examiner, vital statistics, and administrative judicial data from 1998–2000 were linked to show that when a male shot and killed his female partner, in two-thirds of cases he also shot himself (Walsh, 2005).
- A national random digit dial telephone survey of nearly two thousand American adults revealed that among all instances in which a gun was reportedly brandished in the home, the majority of brandishings were by men against female intimates, rather than intruders (Azrael, 2000).
- In a study of mortality among women who purchased handguns in California in 1991, women who purchased a gun had an increased risk for intimate partner homicide compared to all adult women in the state – though that study could not determine whether purchasing a handgun increased the risk, or if women who purchased handguns are already at high risk for intimate partner homicide for other reasons (Wintemute, 2003).
- Linked state data on restraining orders and homicides showed that approximately 11% of women who were killed by their male intimate partners had been issued a restraining order, and one-fifth of the women who had restraining orders were killed within two days of the order being issued (Vittes, 2008b).

- Of female victims of IPV in New York and Los Angeles who were identified through court and police records, only 26% reported that judges used their authority to order firearms be removed, and only 12% reported that all of their abusers' firearms had been seized or surrendered (Webster, 2010).
- Using administrative data from California, Vittes (2008a) linked nearly 800,000 domestic violence restraining orders (DVROs) with over one million handgun purchase applications, revealing that restrained persons who were serially abusive to intimate partners were most likely to purchase handguns after their restraining orders expired.

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UNINTENTIONAL FIREARM INJURIES

Over the last three decades, Joyce-funded research has yielded at least 13 publications about unintentional firearm injuries. This body of work captures the magnitude of unintentional firearm injury among adults, children, and adolescents, and describes who is most frequently injured unintentionally.

Joyce-supported research has documented the complexity of accurate data collection, resulting in underestimates of other-inflicted unintentional firearm injury deaths. Joyce-funded research has also shown there is an association between the availability of firearms and the risk of unintentional firearm injury, and yielded evidence that safe storage of firearms can help prevent injury.

KEY FINDINGS:

- A cross-sectional analysis of data from the World Health Organization Mortality Database showed that unintentional firearm deaths among children and adults were over five times more likely in the United States compared to 22 other high-income countries (Richardson, 2011).

- Rural counties had more than double the rate of unintentional firearm death among children compared to urban counties (Nance, 2010), a finding replicated by a retrospective study of national death certificate data from 1999 to 2006 (Carr, 2012).
- A review of 363 unintentional firearm deaths recorded in the National Violent Death Reporting System between 2003 and 2006 found that 49% were other-inflicted. Eighty-one percent of shooters in other-inflicted deaths were under age 25 (Hemenway, 2010). This is even more pronounced among children: a second analysis of unintentional gun deaths of children that occurred from 2005–2012 and were recorded in the NVDRS found that approximately two-thirds were other-inflicted (Hemenway, 2015).
- States with the highest prevalence of guns had nine times the rate of unintentional firearm deaths as states with the lowest gun prevalence (Miller, 2001).
- A disproportionately high number of women and children aged 5 to 14 years old die from unintentional firearm deaths in states with higher gun prevalence (Miller, 2002a; Miller, 2002b).
- Cross-sectional data on household firearm prevalence and storage practices from the 2002 Behavioral Risk Factor Surveillance System that were linked with population data from the National Center for Health Statistics revealed that unintentional firearm fatalities were more likely to occur in states where gun owners are more likely to store firearms loaded. The highest rates of unintentional firearm fatality occurred in states where loaded firearms were more likely to be stored unlocked (Miller, 2005).

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Gun-related behaviors

GUN OWNERSHIP AND STORAGE

Over the last two decades Joyce Foundation-supported research has yielded at least 28 publications about gun ownership and storage. This research includes some of the only existing nationally-representative surveys of firearm-related beliefs and behaviors, which have established the contours of gun ownership in the United States and how it varies regionally and over time. Among other findings, these surveys have shown that the face of gun ownership is changing, with new gun owners who differ from long-standing gun owners. The surveys have also helped establish how people store their guns and the beliefs that influence their behaviors, and misperceptions parents often have about their children's access to guns. Favorable attitudes towards safe gun storage do not necessarily translate into safe gun storage behaviors, the research has shown.

Joyce-funded research has also strengthened methodologies for measuring gun ownership and behaviors, and helped overcome missing data and response biases, particularly the differential rates at which men and women report gun ownership. For example, given that there is no national data on gun ownership, Joyce-funded research was critical in establishing that the share of suicides using a gun was a useful proxy, outperforming other measures including the share of homicides using a gun and NRA members per capita.

KEY FINDINGS:

- The lack of data on household firearm ownership has long hampered the field, but researchers validated a useful proxy measure: fatal gun suicides as a share of total suicide deaths. An analysis of data from 1979–1997 demonstrated the stability of the relationship (Azrael, 2004).
- A 2015 survey of 2,072 gun owners found that those who acquired their first gun within the past five years were more likely to be younger, liberal, own fewer guns, own handguns, own guns for protection, and store guns in a safer manner compared to their long-standing counterparts (Wertz et al, 2018).
- Among households with children and guns, only 3 in 10 gun owners store all guns in the safest manner (locked and unloaded). Between 2002 and 2015, the number of children in homes with unsafely stored guns doubled to 4.6 million (Azrael et al, 2018).
- A nationally-representative household survey of nearly 3,000 adults found that 38% of households and 26% of individuals had at least one gun. Men were more likely to report gun ownership (45%) than women (11%); long guns represented 60% of the gun stock; and 48% of gun owners had four or more guns (Hepburn et al, 2007).
- In surveys of gun ownership, men report household gun ownership at a rate 12 percentage points higher than women in otherwise comparable households, suggesting the gender of the respondent may bias the results. The difference in reporting between husbands and wives could be attributable to social desirability bias (i.e., women are less comfortable reporting gun ownership) or because women are unaware that there are guns in the home (Ludwig et al, 1998).

- In a nationally-representative survey of 434 households with children conducted in 1999, respondents from households with guns who didn't personally own them tended to be female and were also much more likely to report the guns were stored safely than were the actual owners – 21% of non-owners compared to 7% of owners (Azrael et al, 2000).
- Gun-owning parents substantially underestimated their children's knowledge about firearms stored in the home. In a 2006 study in rural Alabama, three quarters of children knew the location of their household gun and more than one third had handled a household gun. In turn, their parents incorrectly reported whether their child knew the location of the household firearm 39% of the time and whether their child had handled the gun 22% of the time (Baxley et al, 2006).
- Parents in two Midwestern cities who were subject to a year-long education campaign on gun safety were more concerned – though not measurably more likely to change their storage behaviors (Johnson et al, 2012).
- Research suggests that many adolescents have ready access to firearms: a survey of nearly 6,000 California teens found one-third had handled a firearm, of whom almost one-sixth had done so without adult knowledge – often outside the home. Half of these instances of unsupervised firearm handling involved shooting (Miller et al, 2004).
- Three times as many people report that they would feel less safe (49%) than more safe (15%) if more people in the community owned a gun (Miller et al, 2000)..

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LEGAL PUBLIC CARRY OF FIREARMS

With support from the Joyce Foundation, researchers have produced at least seven publications about legal public carry of firearms. This research has quantified the number of people who carry firearms and with what regularity, and advanced our understanding of the beliefs and laws that underpin this behavior, including by documenting how state legislatures have been expanding where, how, and by whom guns can legally be carried in public, despite Americans' opinions and the evidence that these laws may make them less safe. And Joyce-funded research has shown that, despite the potential for gun carrying to thwart or deter crime, concealed carrying of weapons and right-to-carry laws are associated with increases in violent crime.

KEY FINDINGS:

- Nine million adult handgun owners in the United States carry a loaded handgun monthly, three million daily, and the majority cite protection as their reason for carrying (Rowhani-Rahbar, 2017).
- Ninety percent of Americans agree that "regular" citizens should not be allowed to carry guns into restaurants, college campuses, sport stadiums, bars, hospitals, or government buildings (Hemenway, 2001).
- Fewer than one in three Americans support gun carrying in places like schools, bars, and sports stadiums. Although support for gun carrying was significantly higher among gun owners than non-gun owners, the majority still opposed gun carrying in these venues (Wolfson, 2017).
- Shall-issue policies may result in higher rates of violent crime among permit holders (Romero, 2003).
- Having a gun in a vehicle is a strong marker for aggressive and illegal driving behaviors (Hemenway, 2006; Miller, 2002).

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SELF-DEFENSE GUN USE

With support from the Joyce Foundation, researchers have published at least eight studies about self-defense gun use (SDGU). Over nearly two decades, this research has provided a foundation of evidence that having a firearm for use in self-defense is unlikely to prevent injury or property loss, and instead may increase the risk of injury or death. Joyce-funded research has also illustrated some challenges inherent to measuring the frequency of SDGUs, including the ways traditional research methods yield overestimates, and developed methods for addressing them. This has advanced our knowledge about how the efficacy of self-defense gun use for thwarting crime and preventing injury and has illuminated methodological considerations when producing estimates of SDGU incidents, with implications for public policy. Joyce-funded research has also found that Florida's enactment of a "Stand Your Ground" (SYG) law, which relaxed restrictions on the use of lethal force in self-defense, increased firearm homicide rates.

KEY FINDINGS:

- A national random digit dial telephone survey of 1,906 adults showed that a gun is more likely to be used to threaten a family member at home than to protect a family member in a SDGU (Azrael, 2000).
- Respondents of two national random digit dial telephone surveys report being victimized by a gun at rates three times higher than they report using a gun in self-defense (Hemenway, 2000).
- Approximately 4% of California adolescents aged 12 to 17 reporting in a national random digit dial telephone survey report having been threatened with guns compared to only 0.3% who said they had used a gun in self-defense (Hemenway, 2004). People who possessed a firearm were 4.46 times more likely to be shot in an assault than people who did not possess a firearm (Branas, 2009).
- A Joyce-funded case-control study of individuals who had been shot in an assault in Philadelphia between 2003 and 2006 also showed that individuals who were in possession of a gun were 4.46 times more likely to be shot in an assault than people who were not in possession of a firearm (Branas, 2009).
- A review of crimes reported to the National Crime Victimization Survey from 2007–2011 in which the victim took self-protective action against an offender showed that SDGU was no more beneficial at preventing injury or property losses than other self-protective actions (e.g., used a weapon other than a gun, screamed, chased offender). After using a gun in self-defense, 4.1% of victims still suffer injury, and 38.5% still suffer property losses. After taking any self-protection action, 4.2% were injured and 55.9% lost property (Hemenway, 2015).

- Survey respondents may report as “self-defensive gun use” incidents that are aggressive in nature and not socially optimal: a review of SDGUs by a panel of judges found that 51% of such incidents were probably illegal (Hemenway, 2000).
- Following the passage of a “Stand Your Ground” law in Florida, where firearm homicide rates increased by 11.6% (2.41 deaths per 100,000 population vs. 2.69), researchers attributed a significant part of the increase to the law – about 240 additional homicides in 2006 alone (Ukert, 2018).

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Gun crime

ILLEGAL GUNS AND TRAFFICKING

Joyce-supported research has yielded at least 15 publications about illegal guns and trafficking. Much of this research has analyzed crime gun trace data that identifies the first retail seller and purchaser of guns recovered by law enforcement. Some of this research has shown that certain gun dealer characteristics are associated with a higher likelihood of selling guns involved in crime. It has also sparked some of the first scholarship on patterns of gun theft.

KEY FINDINGS:

- A 1999 cross-sectional study of handguns illegally possessed by people under 18 found that most had been purchased by a person 45 years or older, and 41% were small-caliber (Wintemute, 2004).
- An analysis of handguns first sold by federally-licensed firearm dealers in California in 1996 showed that guns acquired in multiple-gun, same-day transactions were more likely to be traced. Cheaper guns and guns purchased by a woman were also at elevated risk of being recovered and traced (Wright, 2010a).
- A cohort study of California handgun purchasers aged 21 to 49 found that those with one or more prior non-prohibiting conviction were five times more likely to have a new felony or violent misdemeanor conviction compared to those with no convictions (Wright, 2010b).
- A national survey of gun owners found that 2.4% had experienced having a gun stolen from them, and at highest risk were those who owned six or more guns, owned guns for protection, or stored guns unsafely. This same survey estimated 380,000 guns are stolen annually (Hemenway, 2017).
- A study examining denied and completed handgun sales in California between 1998 and 2000 found that guns used in crimes are similar to those that are denied purchase. Specifically, denied sales are more likely to involve semiautomatic guns, short-barrel guns, medium-caliber guns, and a low price (Wright, 2005).
- A small minority of firearm retailers sell firearms that are later involved in crimes. Less than one percent of federally-licensed firearm dealers in California (24 of 3,312) accounted for almost 54% of all handgun traces (Wintemute, 2000).
- A survey of 120 handgun dealers found that most were willing to sell a handgun regardless of the end user; more than half were willing even when the buyer presented as purchasing on someone else's behalf (Sorenson, 2003).
- In mock purchases, pawnbrokers proved more likely than other firearms dealers to participate in a straw purchase (Wintemute, 2010b). Guns recovered from a crime scene and traced after a violent or firearm-related crime were also more likely to have been sold by a pawnbroker (Wintemute, 2005).

Publications

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ILLEGAL GUN CARRYING BY YOUTH

The Joyce Foundation has supported research that resulted in at least 10 publications about youth firearm carrying. The researchers focused on how youth are able to acquire firearms, finding that most are obtained through social and family networks. As with adults, youth are more likely to carry firearms if they live in areas of higher gun ownership at the city, county, and state level. Youth who carry firearms differ from their peers who do not, though youth tend to overestimate the proportion of their peers who possess guns.

KEY FINDINGS:

- Semi-structured interviews with youth in a juvenile justice facility revealed that two-thirds of interviewees had possessed or carried guns outside the home. These youth reported fear of being arrested and incarcerated as the most common reason deterring them from carrying a firearm outside the home (Freed, 2001).
- In a latter study of the same population, participants reported finding guns or acquiring them as gifts, primarily from family or friends, but later from looser acquaintances. Few reported stealing guns, although they believed theft was a source for their suppliers (Webster, 2002).

- In a survey of adolescents, 75% of the sample reported they did not have immediate access to a handgun. Those that reported they could have access to a handgun within two days reported similar risk behaviors to those who owned a handgun (Vittes, 2006).
- A survey of students in grades 9 to 12 found that every ten-percentage point increase in gun ownership in a state was associated with a two-percentage point increase in adolescent gun carrying (Wintemute, 2003).
- A subsequent analysis of a 1995 survey of adolescent males found that youth carrying was strongly related to county-level gun ownership as well as frequency of youth violence (Cook, 2004).
- This pattern held at the city level as well: a study of Chicago youth found that although only 5% of males and 1% of females reported carrying a concealed weapon, youth in safer neighborhoods were significantly less likely to carry concealed firearms (Molnar, 2004).
- States with stricter gun laws are associated with a 9% decrease in the odds of a youth carrying a gun, a survey of students in grades 9 to 12 found (Xuan, 2015).
- A random sample of more than 1,700 high school students found that 40% of students who carried a firearm strongly believed their peers carried a gun compared to 32% of non-carrying students. This belief about their peers' firearm habits informed their likelihood to carry: almost three-quarters reported being less likely to carry if they believed fewer other students carried guns (Hemenway, 2011).
- Another study replicated this finding: data from a youth violence data-system initiated in Boston showed that 5% of students carried in the last year, but estimated 20% of their peers did (Azrael, 2009).

Publications

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ALCOHOL, DRUGS, AND FIREARMS

With support from the Joyce Foundation, researchers have published at least six papers about the association between alcohol or drug use and firearms. Joyce-funded research has also established there is a relationship between individual alcohol consumption, proximity to alcohol outlets, and gun assault and suicide. This has implications for city planners, who may utilize zoning ordinances to shape when and how alcohol is sold.

A review of state laws restricting firearm use by intoxicated people showed that lawmakers have generally chosen between three types: laws restricting sales or transfers, laws restricting concealed carrying, and laws restricting possession or discharging a firearm. This research has advanced our understanding of the relationship between alcohol outlets and alcohol consumption and firearm injury, and between drug sales and firearm carrying and victimization, with implications for public policy.

KEY FINDINGS:

- A case-control study in Philadelphia found that heavy drinkers were 2.67 times as likely to be shot in an assault as non-drinkers. Regardless of an individual's level of alcohol consumption, being in an area with a higher density of off-premise alcohol outlets (e.g., take-out establishments, delis) increased the risk of being shot in an assault by 2.00 times, a statistically significant result. (In contrast, being in an area with a high number of on-premise alcohol outlets (e.g., bars) did not significantly increase the risk of gun assault). Heavy drinkers in areas with a higher density of off-premise alcohol outlet were at highest risk of being shot in an assault, 9.34 times higher than non-drinkers in areas with low off-premise alcohol outlet availability (Branas, 2009).
- In another Joyce-funded case-control study conducted in Philadelphia, the risk of gun suicide to participants with high alcohol outlet availability was less than the risk of gun suicide caused by alcohol consumption. The results of this study provide evidence of a need to restrict intoxicated persons from using or handling firearms (Branas, 2011).
- Men who sold crack were 10.2 times more likely to have recently carried a gun, and those who reported having ever been shot at were 4.6 times more likely to have recently carried a gun (Kacenek, 2006).
- A Joyce-funded randomized controlled trial testing the effects of alcohol on firearm use demonstrated that, compared to sober controls, subjects who were intoxicated with alcohol fired less accurately, had slower reaction times, and were quicker to fire in scenarios that required judgement. Larger trials testing the hypothesis that alcohol consumption worsens firearm accuracy and judgement could inform policies restricting firearm use while intoxicated (Carr, 2009).

Publications

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Solutions

POINT-OF-SALE INTERVENTIONS

The Joyce Foundation has supported research relating to policies regulating firearm ownership and purchase at the point of sale, resulting in at least 18 publications. The policies of interest include the expansion of background checks to private sales and firearm license or permit-to-purchase (PTP) laws, which require would-be gun purchasers to obtain a license or permit to buy a firearm. This research has explored how these policies affect intentional and unintentional firearm deaths and found mixed results. A growing body of research shows that these interventions can reduce illegal gun trafficking, gun homicides, and suicides – but only in an environment where they are implemented effectively. In general, Americans support requiring background checks for all gun sales, including those by private sellers.

KEY FINDINGS:

- Strong state gun laws restrict gun access from a significant share of the people illegally using guns. Researchers found that 30% of offenders incarcerated for firearm-related crimes would have been prohibited from owning firearms if their states had firearm laws that matched those of the strongest states (Vittes et al, 2012).
- A cross-sectional study of 54 US cities found that areas of higher gun ownership were associated with higher levels of intrastate gun trafficking. Cities in states with permit-to-purchase requirements had lower levels of trafficking, though this may have been mediated through lower rates of gun ownership (Webster 2009).
- Researchers analyzed the firearm suicide rate in Connecticut after it implemented a PTP law and in Missouri after it repealed a PTP law, and found these laws were effective at reducing firearm suicides. There was a 15.4% reduction in firearm suicides in Connecticut and a 16.1% increase in firearm suicides in Missouri (Crifasi et al, 2015). This repeal also affected firearm homicides: a separate study found that homicides increased by 23% in Missouri in the three years following the repeal of its PTP law (Webster et al, 2014).
- A study examined all firearm-related deaths between 2007 and 2010 and found that states with more firearm laws had significantly fewer firearm-related deaths compared to states with fewer laws. Differences ranged from close to 6.3 deaths per 100,000 people for firearm suicide and 0.4 deaths per 100,000 people for firearm homicide. (Fleegler, 2013).
- According to a nationally-representative survey of almost 4,000 adults, 72% agree or strongly agree that – whether legal or not – it is unacceptable to sell a gun to a stranger without a background check (Hemenway et al, 2017).
- A 2011 survey of 1,601 licensed firearm dealers and pawnbrokers found that most (55%) respondents were in support of a comprehensive background check requirement (Wintemute, 2013).

- A study comparing California to 32 control states between 1981 and 2000 found that a 1991 California law requiring a background check for all firearm purchases and prohibition of firearm purchases for people convicted of certain violent misdemeanor crimes was not associated with a change in the firearm homicide rate (Castillo-Carniglia et al, 2019).
- New legislation extending background checks to private sales may be met with noncompliance: data from Delaware, Colorado, and Washington after stricter background check laws were implemented found that total background checks increased in Delaware, but not the other two states (Castillo-Carniglia et al, 2017).

Publications

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PREVENTION IN HEALTH CARE SETTINGS

Joyce-funded research has yielded at least 14 publications on the role of physicians and trauma centers in preventing and responding to firearm injury. This research provides insight into the beliefs of the public and of clinicians about counseling patients on firearm safety, and has informed how trauma centers can best address gun violence.

Joyce-funded research has found that clinicians generally believe they have a role to play in preventing gun violence, and that the public is also supportive of physicians' involvement in firearm injury prevention. Some research has also suggested that trauma centers and their staff can play a role as educators and advocates, helping educate the community and policy makers on firearm injury. Their credibility and focus on evidence-based practice may be able to cut through contentious and political debates about firearm injury.

KEY FINDINGS:

- Although trauma centers are essential for treating acute firearm injuries, a cross-sectional study using data from two national databases found that 46.7 million Americans (mostly in rural areas) are more than an hour away from a trauma center equipped to treat gunshot wounds. To improve firearm injury outcomes, trauma centers and medical helicopter bases should be located according to geographic need (Branas, 2005).
- A retrospective analysis of Pennsylvania trauma registry data showed that most children who arrive alive at trauma centers and die from non-intracranial fatal firearm injuries die very rapidly from major vascular and thoracic injury. Time is a precious resource, and access to trauma centers could mean the difference between life and death (Nance, 2003).
- Surveys of incarcerated people find that some had reported forgoing treatment in a hospital, consistent with underreporting of gunshot wounds. Jail detainees who had been shot previous to their new injury were more likely to be treated in a hospital (May 2002).
- Multiple gunshot wounds are associated with higher mortality rates and more intensive care than are single gunshot wounds. Changes in wound patterns may contribute to increases in morbidity and mortality (Carr, 2008).
- A telephone survey found that 84% of internists and 72% of surgeons think they have a role to play in firearm injury prevention, and 84% of internists and 64% of surgeons also support legislation restricting the sale and possession of handguns. But, less than 20% of respondents said that they regularly incorporated firearm injury prevention into their patient care (Cassel, 1998).
- A second survey found that physicians who owned guns or were members of a firearm organization were less likely than other physicians to believe that firearm injury is a public health issue and less likely to believe that physicians should be involved in firearm injury prevention, but were more likely than nonowners to report counseling their patients about gun safety (Becher, 2000).
- Two-thirds of American adults who do not own guns and over 50% of gun owners believe that it is sometimes appropriate for physicians to discuss guns with their patients (Betz, 2016).
- Researchers assessed emergency department health care providers' views on lethal means and found that more than half believed most or all firearm suicide decedents would have died by another method if a firearm had not been accessible. These beliefs inform their tendency to forgo a lethal means assessment: 55% of patients with suicidal ideation were not asked about their firearm ownership (Betz et al, 2013).
- In 2006, after bills were introduced in Virginia and West Virginia that would have prohibited physicians from asking patients about firearms for the purposes of counseling them about how to reduce their risk of injury, a Joyce-funded evaluation concluded that this legislation would interfere with physicians' ability to best protect patients, potentially raising medical malpractice and First Amendment legal issues (Vernick, 2006).

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OTHER REGULATORY AND LEGISLATIVE SOLUTIONS

The Joyce Foundation has supported research resulting in at least 36 publications about other strategies for firearm injury prevention. These include studies focused on gun access, on policies and their enforcement, and on harm reduction through voluntary behavior change, and have yielded interventions targeting irresponsible ownership and storage practices, gun trafficking, intimate partner violence with guns, and other risky behaviors.

Joyce-funded evaluations of child access prevention (CAP) laws, which allow prosecutors to hold adults criminally liable if they store firearms unsafely in the presence of children, have shown they can also reduce injuries. A review of evidence about firearm use in intimate partner violence, particularly against women, has also yielded recommendations about policies to prevent male intimates from accessing firearms. Other studies have shown that state laws may also affect the share of guns later diverted to criminals. Researchers have also studied how guns are advertised, including examining whether advertising leads to riskier firearm practices and whether programs like gun buybacks have any effect on injury.

KEY FINDINGS — SAFE OWNERSHIP AND STORAGE:

- A 1999 survey found strong support for making firearms childproof (88%) and personalizing handguns so only the owner could fire the weapon (72%) (Sorenson, 1999).
- While CAP laws are found to be associated with reduced rates of unintentional firearm injury, in one study the only statistically significant change occurred in Florida – at that time, one of three states with a CAP law that allowed felony prosecution of people who violated the law (Webster, 2000).

- Surveys conducted between 1996 and 1998 found broad support for gun safety standards: nearly three-quarters of respondents supported general policies for handgun safety, and between 71-92% of respondents supported policies prohibiting certain people from owning handguns. This broad support held even among gun owners (Teret, 1999).

KEY FINDINGS — INTERDICTING GUN TRAFFICKING:

- Policies can affect criminals' access to guns: an analysis of diversion of guns from one of the country's top sources of guns used in crimes found a policy to forgo sales of "junk guns" decreased flow of new trafficked guns to local criminals by 44% (Webster, 2006a).
- A 2005 undercover sting targeting businesses who sold guns to minors reduced the number of such outlets by 46% (Lewin, 2005).
- An interrupted time series study found that stings of gun dealers believed to be facilitating illegal gun sales in Chicago were associated with an abrupt 46% reduction in the flow of new guns to criminals, and also had beneficial impacts in Detroit. In a third city, Gary, they had no measurable effect (Webster, 2006c).
- State laws can affect how effectively gun laws are enforced. A descriptive longitudinal study of changes in state law found that when Pennsylvania strengthened penalties for straw purchasing, prosecutions increased significantly, whereas when a court decision in Maryland made enforcement more difficult, prosecutions for violating a comprehensive background check declined (Crifasi, 2018).

KEY FINDINGS — INTIMATE PARTNER VIOLENCE:

- As of April 2004, 18 states had police gun removal laws (authorizing law enforcement to remove firearms when responding to a domestic violence call) and 16 states has court-ordered removal laws (giving courts authority to remove guns from batterers through protective orders). A review of these state laws concluded that they should be mandatory, apply to any and all guns and ammunition possessed by batterers, and include procedures to ensure proper implementation. Proper implementation is essential, because if laws like these are not implemented or enforced properly, evaluations of these laws may conclude that they are ineffective (Frattarolli, 2006).
- A systematic review by Zeoli (2016) suggests that DVROs that prohibit persons from purchasing or possessing firearms are associated with reductions in intimate partner homicide. Most recently, a full review of state DVRO policies, including their provisions and laws specifying implementation found 49 laws in 29 states and Washington, DC (Zeoli, 2017).

KEY FINDINGS — BEHAVIOR CHANGE:

- Researchers have examined a variety of behavior change strategies as a means of gun violence prevention. A 2015 randomized control trial found that a cognitive behavioral therapy-based approach to decision-making reduced offending up to 50% and increased high-school graduation rates by almost 20% (Heller, 2015).
- A review of 20 gun training courses found that most covered basic safety related to firearm use, but few covered suicide prevention (10%) or domestic violence prevention (10%) (Hemenway, 2017).
- However, a survey found that a training for firearm suicide prevention resulted in improvement in participants' knowledge of suicide and favorable attitudes towards the training (Stone, 2005).

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Research

THE NATIONAL VIOLENT DEATH REPORTING SYSTEM

The Joyce Foundation has funded the development, expansion, and improvement of the National Violent Death Reporting System (NVDRS) since its inception, including through grants to the Ann & Robert H. Lurie Children's Hospital of Chicago, the Indiana University Department of Pediatrics, and Harvard University. Between 2006–2018 the Joyce Foundation also provided over \$2.8 million in sustained support to the American College of Preventive Medicine for educating the public and policy makers about the system, building support for its expansion and improvement.

Developed and supported in part by grants from the Joyce Foundation, NVDRS was a major step forward in violent death surveillance. By augmenting death certificate data with victim and event characteristics from coroners and medical examiners, NVDRS provides more information about violent deaths than other contemporary surveillance systems. With NVDRS now operating in all fifty states, its data is shared with injury prevention specialists, public health officials, law enforcement, and policy makers to help them identify and respond to violent deaths affecting their communities. There have been over 150 peer-reviewed publications based on data from NVDRS, to date.

Joyce-funded research has also yielded at least five studies demonstrating the utility of NVDRS for firearm-related research. These publications have shown NVDRS has a high “sensitivity” (i.e., most cases are captured by the system) and “positive predictive value” (i.e., most cases reported as positive are true positives) for violent deaths including unintentional shootings and law enforcement involved shootings, which are poorly captured by other systems.

KEY FINDINGS:

- NVDRS captures more complete and more accurate data on unintentional firearm deaths than do the State Vital Statistics Registry or the National Vital Statistics System (Barber, 2011).
- NVDRS also captures more complete, more accurate data on homicides committed by law enforcement (90% sensitivity; 98% PPV) (Barber, 2016).
- A review of 1,552 homicides committed by law enforcement officers that occurred from 2005 to 2012 found that NVDRS correctly identified 1,421 cases (92% of cases in the study), far more than the National Vital Statistics System (58%) or the Federal Bureau of Investigation Supplementary Homicide Reports (48%). For homicides by police, NVDRS had relatively high sensitivity (90%) and a high positive predictive value (98%) (Barber, 2016).

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RESEARCH AGENDAS

The Joyce Foundation has helped the scientific community gather around a common set of priorities for reducing gun violence. Timely grants to the National Academy of Sciences, the Institute of Medicine, and private researchers have yielded at least six documents that gather a scientific consensus about what is known of firearm violence, and plot out an agenda for moving forward.

Publications

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What's Ahead?

In 2018 the Joyce Foundation made its largest-ever commitment to gun violence prevention research, granting over \$3.5 million to 14 projects, which will yield innumerable insights in the years to come.

They include evaluations of important and emerging areas of public policy, such as:

- A study to assess the impact “Stand Your Ground” laws have had on violence in the 28 states that have enacted them since 2005
- A study of state laws that set the age at which people with juvenile records can again buy and own firearms, and their impact on public safety
- Research and analyses of criminal justice system responses to gun offending in select municipalities in Illinois
- Research to study how changes in policies governing concealed gun carrying affect public safety
- A project to help hospitals develop best practices for implementing firearm suicide intervention programs

Some of them will provide crucial insights about how attitudes and behaviors towards guns are formed, among them:

- A mixed-methods study of how college students develop their awareness of and attitudes towards guns
- Dissemination of the findings of a survey of young adults in Chicago's most violent neighborhoods, which yielded sobering findings about their behaviors and attitudes toward guns and their perceptions of police
- Qualitative research – including focus groups and a national telephone survey – to assess young adults' attitudes, beliefs, and behaviors around guns and gun policy
- Analyses drawing on national surveys of firearm ownership and the National Violent Death Reporting System

Some of the grants focus on the critical role of the police and the criminal justice system:

- An evaluation of police-community engagement efforts and street outreach and violence interruption efforts in two police districts in Chicago
- Research to synthesize current knowledge about the effectiveness of police “Early Intervention Systems” that attempt to prevent negative outcomes both for officers and the people they police
- Support for efforts to promote democratic policing in Dane County, Wisconsin, and a report documenting national practices on police use of force

Conclusion

Historically, gun violence prevention research has been an impoverished field of study – and it still is.

In the 1990s, just as firearm injury prevention was emerging as an area of serious scientific inquiry, the National Rifle Association and its allies in Congress passed legislation curtailing public health spending on the topic at the US Centers for Disease Control and Prevention and elsewhere. The chilling effect ran all the way through to private and academic funders, and over the next twenty years, compared to other fields of study, the overall volume of publications on the topic fell 60%.¹ The Joyce Foundation is among a few funders that sustained the field during that period, and this report documents the significant leaps in knowledge that it made possible, even under those difficult circumstances.

In recent years, this freeze has begun to thaw. Other philanthropists have begun to support the field,² some states have allocated general revenues for the study of gun violence³, and in 2018 Congress clarified the budget rider it had imposed on gun violence researchers⁴ to affirm that it does not limit research on gun violence, and in 2019 the US House passed a budget that included \$50 million for gun violence prevention research⁵ – though its fate in the Senate is uncertain.

These actions are meaningful and should be applauded, but fall far short of creating a vibrant, sustainable field. The group of career gun violence researchers who are actively publishing is so small they can fit around a conference table.

Further support for gun violence research will be critical to identifying and implementing effective solutions, and driving down our nation's extraordinary rate of gun deaths. The Joyce Foundation's experience should be a hopeful signal to other foundations and public sector agencies for the kind of impact this research can have.

1. Ted Alcorn. "Trends in Research Publications About Gun Violence in the United States, 1960 to 2014." JAMA Internal Medicine. 2016 November 14; available at: <http://bit.ly/2eUxz28>.
2. Ruth McCambridge. "Arnold Foundation to Build \$50M Philanthropic Research Fund to Study Gun Violence." Nonprofit Quarterly. 2018 June 4; available at: <http://bit.ly/2YUmZQn>
3. Elizabeth Van Brocklin. "States Are Funding the Gun Violence Research the Feds Won't." The Trace. 2019 January 29; available at: <http://bit.ly/30yl9F5>
4. William Wan and Sean Sullivan. "House budget says CDC can study gun violence." Washington Post. 2018 March 22; available at: <https://wapo.st/2GdU6Y4>
5. Jessie Hellmann. "House Dems propose \$50 million to study gun violence prevention." The Hill. 2019 April 29; available at: <http://bit.ly/2O7vnea>

An aerial night photograph of a city grid, likely New York City, showing a dense pattern of illuminated streets and buildings. The sky is a mix of deep blue and purple, with a hint of orange from the setting or rising sun. The perspective is from a high altitude, looking down at the city.

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