

## Gun violence is an epidemic and “we solve epidemics with medicine, not politics”

Brian Owens

CMAJ January 14, 2019 191 (2) E59-E60; DOI: <https://doi.org/10.1503/cmaj.109-5700>

Canada has the fifth-highest rate of gun deaths in the world among populous high-income countries. Between 2008 and 2012, more young men aged 18–24 died from firearms than from cancer, falls, drowning and fires combined.

Canadian doctors are showing support for American physicians and for the medical profession’s place in developing policies on gun safety. “Just because there is a political border, that doesn’t mean we shouldn’t be concerned with other citizens of the world,” says Dr. Natalie Yanchar, past-president of the Trauma Association of Canada. “It’s almost a humanitarian crisis, and from a global perspective, our voice needs to be heard.”

### Firearm possession and violent death: A critical review

Wolfgang Stroebe, W., 2013, Aggression and violent behavior. 18, 6, p. 709-721 13

It is widely believed that possession of firearms is associated with the rate of gun-related suicides and homicides in the USA as well as worldwide

Since both suicide and homicide require the intention to kill, guns are unlikely to be the primary cause of such acts. People are unlikely to commit murder or suicide in order to try out their new gun. However, it is important to note that the possession of firearms is likely to be an important contributing factor. Both suicide and homicide are defined by the success of injurious behavior. Use of a gun considerably increases the likelihood of reaching the goal of killing oneself or another person: People who use guns to commit suicide are over 250 times more likely to die than those who overdose (Sachs, 2007). And gun assaults are seven times as likely to kill as all other assaults (Zimring, 2004).

With regard to suicide, there is evidence that one third to four fifths of suicide attempts are impulsive. Among people who made near lethal suicide attempts, 24% took less than 5 min between the decision to kill themselves and the actual attempt and 70% took less than 1 h (Miller & Hemenway, 2008). Many suicidal crises are temporary. Most people, who attempt suicide never repeat it (Sachs, 2007). More than 90% of people who survive a suicide attempt do not go on to die by suicide (Miller & Hemenway, 2008). It is, therefore, important that suicide attempts by guns are usually successful, whereas attempts by other means (e.g., drugs, cutting) are much less so (Sachs, 2007).

In reviewing studies that relate gun possession to suicide or homicide rates, it is useful to distinguish between individual-level and macro-level studies. Most of the studies of both types are cross-sectional and, therefore, do not allow causal inferences. However, information from the limited number of longitudinal studies does allow us to argue that certain causal interpretations are more consistent with the evidence than others

Individual-level studies relate possession of a personal or a household gun to the frequency of suicide or homicide of the owner of the firearm or of persons living in that household

Macro-level studies relate the rate of household gun ownership at the international or national level to suicide or homicide rates at the same level. The association is typically reported as correlations between these rates across different counties, states or countries. For example, national studies conducted in the USA assess the association between the rates of gun possession in different States and the rates of suicide or homicide.

The studies on gun ownership and suicide provide strong evidence that these two variables are associated (Tables 1 and 2). All seven case-control studies found gun ownership significantly associated with substantial increases in overall suicide rates. The six studies that also reported on gun-related suicides found even more substantial increases. The picture is somewhat more mixed for macro-level studies, particularly those relying on international comparisons

The great majority of findings about the association of firearm availability and suicide or homicide reviewed in this article is consistent with the assumption that easy access to firearms increases the risk of dying from violent causes. With few exceptions, studies found gun ownership positively associated with gun-related suicides and homicides. Since there are hardly any studies finding a negative relationship between gun availability and homicide, one can reject the self-defense and deterrence hypothesis. Thus, one can clearly conclude that more guns are associated with more rather than fewer violent deaths. Furthermore, there is also evidence that guns do not merely serve as substitutes for other means of killing, but increase the overall rates of suicide and homicide.

It is, ironic that this belief in the protection offered by owning a gun is an illusion. Because this need for self-protection is likely to be one of the roots of people's resistance to stricter gun laws, it would be important to gain a better understanding of the bases of this belief that is difficult to understand from a European perspective. Most Europeans would not think of needing a gun for protection. So why do Americans feel in need of guns? One obvious reason would be the relatively high rate of homicides. To reduce this need one would, therefore, need to further decrease homicide rates. Another strategy, however, would be to persuade people that owning a gun is more likely to kill them than to protect them against crime.

## **Guns and Suicide in the United States**

Matthew Miller, M.D., Sc.D.,

and David Hemenway, Ph.D.

September 4, 2008

N Engl J Med 2008; 359:989-991

In 2005, the most recent year for which mortality data are available, suicide was the second-leading cause of death among Americans 40 years of age or younger. Among Americans of all ages, more than half of all suicides are gun suicides. In 2005, an average of 46 Americans per day committed suicide with a firearm, accounting for 53% of all completed suicides. Gun suicide during this period accounted for 40% more deaths than gun homicide.

Why might the availability of firearms increase the risk of suicide in the United States? First, many suicidal acts — one third to four fifths of all suicide attempts, according to studies — are impulsive. Among people who made near-lethal suicide attempts, for example, 24% took less than 5 minutes between the decision to kill themselves and the actual attempt, and 70% took less than 1 hour.

Second, many suicidal crises are self-limiting. Such crises are often caused by an immediate stressor, such as the breakup of a romantic relationship, the loss of a job, or a run-in with police. As the acute phase of the crisis passes, so does the urge to attempt suicide. The temporary nature and fleeting sway of many suicidal crises is evident in the fact that more

than 90% of people who survive a suicide attempt, including attempts that were expected to be lethal (such as shooting oneself in the head or jumping in front of a train), do not go on to die by suicide.

Third, guns are common in the United States (more than one third of U.S. households contain a firearm) and are lethal. A suicide attempt with a firearm rarely affords a second chance. Attempts involving drugs or cutting, which account for more than 90% of all suicidal acts, prove fatal far less often.

The empirical evidence linking suicide risk in the United States to the presence of firearms in the home is compelling.<sup>3</sup> There are at least a dozen U.S. case-control studies in the peer-reviewed literature, all of which have found that a gun in the home is associated with an increased risk of suicide. The increase in risk is large, typically 2 to 10 times that in homes without guns, depending on the sample population (e.g., adolescents vs. older adults) and on the way in which the firearms were stored. The association between guns in the home and the risk of suicide is due entirely to a large increase in the risk of suicide by firearm that is not counterbalanced by a reduced risk of nonfirearm suicide. Moreover, the increased risk of suicide is not explained by increased psychopathologic characteristics, suicidal ideation, or suicide attempts among members of gun-owning households.

Three additional findings from the case-control studies are worth noting. The higher risk of suicide in homes with firearms applies not only to the gun owner but also to the gun owner's spouse and children. The presence of a gun in the home, no matter how the gun is stored, is a risk factor for completed suicide. And there is a hierarchy of suicide risk consistent with a dose-response relationship. How household guns are stored matters especially for young people — for example, one study found that adolescent suicide was four times as likely in homes with a loaded, unlocked firearm as in homes where guns were stored unloaded and locked.

Data on Suicides in States with the Highest and Lowest Rates of Gun Ownership, 2001–2005.

Many ecologic studies covering multiple regions, states, or cities in the United States have also shown a strong association between rates of household gun ownership and rates of completed suicide — attributable, as found in the case-control studies, to the strong association between gun prevalence and gun suicide, without a counterbalancing association between gun-ownership levels and rates of nongun suicide.

Physicians and other health care providers who care for suicidal patients should be able to assess whether people at risk for suicide have access to a firearm or other lethal means and to work with patients and their families to limit access to those means until suicidal feelings have passed. A Web site of the Harvard Injury Control Research Center can help physicians and others in this effort ([www.hsph.harvard.edu/means-matter](http://www.hsph.harvard.edu/means-matter)). Effective suicide prevention should focus not only on a patient's psychological condition but also on the availability of lethal means — which can make the difference between life and death.

### **The association between changes in household firearm ownership and rates of suicide in the United States, 1981–2002**

Matthew Miller, Injury Prevention, 2006 Jun; 12(3): 178–182)

"Changes in household firearm ownership over time are associated with significant changes in rates of suicide "

"These findings suggest that reducing availability to firearms in the home may save lives, especially among youth."

### **Protection or Peril?**

Arthur Kellermann N Engl J Med 1986; 314:1557-1560

DOI: 10.1056/NEJM198606123142406

To study the epidemiology of deaths involving firearms kept in the home, we reviewed all the gunshot deaths that occurred in King County, Washington (population 1,270,000), from 1978 through 1983. The medical examiner's case files were supplemented by police records or interviews with investigating officers or both, to obtain specific information about the circumstances, the scene of the incident, the type of firearm involved, and the relationship of the suspect to the victim. A total of 743 firearm-related deaths occurred during this six-year period, 398 of which (54 percent) occurred

in the residence where the firearm was kept. Only 2 of these 398 deaths (0.5 percent) involved an intruder shot during attempted entry. Seven persons (1.8 percent) were killed in self-defense.

For every case of self-protection homicide involving a firearm kept in the home, there were 1.3 accidental deaths, 4.6 criminal homicides, and 37 suicides involving firearms. Handguns were used in 70.5 percent of these deaths.

The advisability of keeping firearms in the home for protection must be questioned.

**Suicide in the Home in Relation to Gun Ownership**

Arthur L. Kellermann,

August 13, 1992

N Engl J Med 1992; 327:467-472

DOI: 10.1056/NEJM199208133270705

It has been suggested that limiting access to firearms could prevent many suicides, but this belief is controversial. To assess the strength of the association between the availability of firearms and suicide, we studied all suicides that took place in the homes of victims in Shelby County, Tennessee, and King County, Washington, over a 32-month period.

During the study period, 803 suicides occurred in the two counties, 565 of which (70 percent) took place in the home of the victim. Fifty-eight percent (326) of these suicides were committed with a firearm. After excluding 11 case subjects for various reasons, we were able to interview 80 percent (442) of the proxies for the case subjects. Matching controls were identified for 99 percent of these subjects, producing 438 matched pairs. Univariate analyses revealed that the case subjects were more likely than the controls to have lived alone, taken prescribed psychotropic medication, been arrested, abused drugs or alcohol, or not graduated from high school. After we controlled for these characteristics through conditional logistic regression, the presence of one or more guns in the home was found to be associated with an increased risk of suicide (adjusted odds ratio, 4.8; 95 percent confidence interval, 2.7 to 8.5).

Ready availability of firearms is associated with an increased risk of suicide in the home. Owners of firearms should weigh their reasons for keeping a gun in the home against the possibility that it might someday be used in a suicide.

**Gun Ownership as a Risk Factor for Homicide in the Home**

Arthur Kellerman

The New England Journal

October 7, 1993

N Engl J Med 1993; 329:1084-1091

DOI: 10.1056/NEJM199310073291506

It is unknown whether keeping a firearm in the home confers protection against crime or, instead, increases the risk of violent crime in the home. To study risk factors for homicide in the home, we identified homicides occurring in the homes of victims in three metropolitan counties.

After each homicide, we obtained data from the police or medical examiner and interviewed a proxy for the victim. The proxies' answers were compared with those of control subjects who were matched to the victims according to neighborhood, sex, race, and age range. Crude and adjusted odds ratios were calculated with matched-pairs methods.

During the study period, 1860 homicides occurred in the three counties, 444 of them (23.9 percent) in the home of the victim. After excluding 24 cases for various reasons, we interviewed proxy respondents for 93 percent of the victims. Controls were identified for 99 percent of these, yielding 388 matched pairs. As compared with the controls, the victims more often lived alone or rented their residence. Also, case households more commonly contained an illicit-drug user, a person with prior arrests, or someone who had been hit or hurt in a fight in the home. After controlling for these characteristics, we found that keeping a gun in the home was strongly and independently associated with an increased risk of homicide (adjusted odds ratio, 2.7; 95 percent confidence interval, 1.6 to 4.4). Virtually all of this risk involved homicide by a family member or intimate acquaintance.

The use of illicit drugs and a history of physical fights in the home are important risk factors for homicide in the home. Rather than confer protection, guns kept in the home are associated with an increase in the risk of homicide by a family member or intimate acquaintance.

### **Firearms and Suicide in US Cities**

Matthew Miller, Injury Prevention, 2015 Apr;21  
(e1):e116-9. doi: 10.1136/injuryprev-2013-040969)

On an average day in the USA more than 100 Americans die by suicide-half use firearms. Suicide rates overall and by firearms are higher, on average, in states where household firearm ownership is more common. In general this means in states where a greater proportion of the population lives in rural areas.

"This study provides evidence consistent with previous ecological studies that firearms in the home impose suicide risk above and beyond baseline.

### **Household Gun Ownership and Youth Suicide Rates at the State Level, 2005–2015**

American Journal of Preventive Medicine  
Anita Knopov,  
March 2019 Volume 56, Issue 3,

Home gun ownership was positively associated with the overall youth suicide rate. For each 10 % increase in household gun ownership, the youth suicide rate increased by 26.9%

### **Homicide and suicide risks associated with firearms in the home:**

Wiebe, Ann Emergency Med. 2003 Jun;41(6):771-82)

"Having a gun at home is a risk factor for adults to be shot fatally (gun homicide) or commit suicide with a firearm"

### **Firearms and suicide in the United States: is risk independent of underlying suicidal behavior?**

Matthew Miller, Am J Epidemiol. 2013 Sep 15;178(6):946-55)

"After controlling for state-level suicide attempt rates (2008-2009), higher rates of firearm ownership (assessed in 2004) were strongly associated with higher rates of overall suicide and firearm suicide, but not with nonfirearm suicide (2008-2009)."

Our findings suggest that firearm ownership rates, independent of underlying rates of suicidal behavior, largely determine variations in suicide mortality across the 50 states.

Our results support the hypothesis that firearms in the home impose suicide risk above and beyond the baseline risk

It helps explain why several thousand more Americans die by suicide in states with higher than average household firearm ownership compared with states with lower than average firearm ownership."

### **Access to firearms and risk for suicide in middle-aged and older adults**

Conwell, Am J Geriatric Psychiatry. 2002 Jul-Aug;10(4):407-16.

"Elderly white men are at the highest risk for suicide."

Firearms are the most common method of suicide used by both men and women in later life, and a greater proportion of older than younger suicide victims use a gun

Presence of a firearm in the home was associated with increased risk for suicide, even after controlling for psychiatric illness."

Findings support the potential benefit for suicide prevention of restricting access to handguns."

**Suicide Prevention and Intervention: Summary of a Workshop.**

David Hemenway Harvard School of Public Health [https://www.ncbi.nlm.nih.gov/books/NBK223849/ ...](https://www.ncbi.nlm.nih.gov/books/NBK223849/))

"Reducing access to methods has proven successful in impacting overall suicide rates, as efforts in other nations including Japan and Great Britain have shown."

Easy accessibility of guns was found to be a risk factor for suicides in the U.S., compared to other countries .In homes with firearms, 86 percent of the suicides used the firearms. In the homes without firearms, only 6 percent of the suicides used a firearm. "

"The case-controlled studies on gun prevalence and suicide risk have revealed significant increases in suicide in homes with guns, even when other factors such as education, arrests, and drug abuse were controlled for.

"Virtually all ecological studies on suicide and gun prevalence have shown a positive association between the two"

"By state or region...for every age, for both genders, where there are more guns, there are more total suicides"

"Studies that have compared gun suicide rates between states with a high prevalence of guns and states with a low prevalence of guns, have consistently found that the high gun states have higher rates of suicides committed with firearms than low gun states".

"Almost twice as many people in the states with high gun prevalence commit suicide. The evidence suggests that there is little substitution of means."

Dr. Hemenway emphasized the need to get at storage habits of gun owners through surveys and research. He stressed that maintaining a violent death registry would provide extremely valuable data on suicide, but also provide data on homicide and unintentional gun deaths"

**Risks and Benefits of a Gun in the Home**

David Hemenway, American Journal of Lifestyle Medicine, <https://doi.org/10.1177/1559827610396294 ...>

This article summarizes the scientific literature on the health risks and benefits of having a gun in the home for the gun owner and his/her family

For most contemporary Americans, scientific studies indicate that the health risk of a gun in the home is greater than the benefit

The evidence is overwhelming for the fact that a gun in the home is a risk factor for completed suicide and that gun accidents are most likely to occur in homes with guns

"There is compelling evidence that a gun in the home is a risk factor for intimidation and for killing women in their homes

**The Accessibility of Firearms and Risk for Suicide and Homicide Victimization Among Household Members: A Systematic Review and Meta-analysis**

Anglemyer, Annals of Internal Medicine 21 January 2014

Research suggests that access to firearms in the home increases the risk for violent death.

To understand current estimates of the association between firearm availability and suicide or homicide.

Access to firearms is associated with risk for completed suicide and being the victim of homicide"

### **Guns, Suicide, and Homicide: Individual-Level Versus Population-Level Studies**

David Hemenway, Annals of Internal Medicine January 2014

"The evidence that a gun in the home increases the risk for suicide is overwhelming, even stronger than Anglemyer and colleagues' robust findings"

"Across U.S. cities, states, and regions, higher levels of household gun ownership are associated with higher rates of firearm-related and overall suicide. There is no association between gun ownership levels and suicide by means other than guns."

"The few U.S. ecological studies that did not find a significant relationship between guns and suicide used poor proxies for gun ownership"

"Anglemyer and colleagues aptly summarize the evidence that, for most families, bringing a gun into the home substantially increases the risk for suicide for all family members and the risk for women being murdered in the home "

### **Firearms Availability and Suicide: Evidence, Interventions, and Future Directions**

D. Brent, American Behavioural Scientist

<http://doi.org/10.1177/0002764202250662>

"Case-control studies show an association between firearms in the home and completed suicide,"

Quasi-experimental studies also show a relationship between greater restrictiveness of gun control laws and lower suicide rates by firearms and overall, although some studies fail to show an effect or show method substitution"

A prospective study shows that handgun purchasers have an elevated risk for suicide for up to 6 years after the purchase. Relatively few studies have examined the impact of intervention to encourage families to store guns safely or remove firearms from the home on suicidal outcome.

### **Death by Gun Violence—A Public Health Crisis**

Howard Bauchner, JAMA. 2017;318(18):1763-1764. doi:10.1001/jama.2017.16446

"Guns do not make individuals, their families, or homes safer and they result in far more deaths to loved ones than to an intruder intending to cause harm".

Often forgotten is that 60.7% of the gun deaths in 2015 in the United States were suicides"

"Means used to attempt suicide matter; guns will result in suicidal deaths well over 90% of the time, whereas ingestion of pills or wrist cutting will be unsuccessful more than 90% of the time."

The majority of people who try to commit suicide but survive the attempt will not go on to die from suicide; if the attempt is with a gun, there will be no second chance at life."

### **Psychiatric Comorbidity, Suicidality, and In-Home Firearm Access Among a Nationally Representative Sample of Adolescents**

Simonetti, JAMA Psychiatry. 2015;72(2):152-159)

"The presence of a firearm in the home is an important risk factor for suicide"

"Individuals living in households with firearms are more likely to make suicide plans involving a firearm and in case-control studies the presence of a firearm in the home was consistently associated with suicide deaths, especially among adolescents

In areas where firearm ownership rates are high, suicide rates are also high"

#### **Global Mortality From Firearms, 1990-2016**

JAMA. 2018;320(8):792-814

"The presence of firearms in the home has been directly linked to their greater use as a means of suicide as well as to increases in unintentional firearm injury deaths."

"Readily available firearms facilitate unplanned suicide attempts and increase the probability of an injury being lethal.

"Self-directed attempts at harm are more frequently fatal than other firearm-involved violence, resulting in death for as much as 91% of attempts for suicide by firearm, 19% for physical violence by firearm, and 5% for unintentional firearm injuries"

"Efforts to reduce the number of firearms in homes and supporting secure storage of existing firearms can reduce unintentional death, particularly for children, while limiting immediate access to a means of harm that generally does not allow opportunity for second thoughts."

#### **Changing Times: A Longitudinal Analysis of International Firearm Suicide Data**

Vladeta Ajdacic-Gross, Am J Public Health. 2006 October; 96(10): 1752–1755.

"This longitudinal study with international data showed that the proportion of firearm suicides decreased simultaneously with the proportion of households owning firearms."

"This result is in line with the well-established association between availability of firearms at home and risk of firearm suicide"

"Firearm suicides depend on the availability of the method more than other suicide methods. Firearm suicides result more often from impulsive decisions than other suicide methods and tend to be associated more often with alcohol abuse"

"In most countries with declining proportions of firearm suicides, the firearm legislation and the licensing of firearm ownership have become more restrictive."

"Suicide methods are a major target in suicide prevention. The method-based strategy in suicide prevention is a step-by-step investment. Legislative measures restricting firearms or ammunition availability in private homes are one step forward."

#### **Reducing a suicidal person's access to lethal means of suicide: a research agenda.**

Barber and Miller, Am J Prev Med. 2014 Sep;47(3 Suppl 2):S264-72

"Reducing the availability of highly lethal and commonly used suicide methods has been associated with declines in suicide rates of as much as 30%-50% in other countries."

" Means restriction is one of the few empirically based strategies to substantially reduce the number of suicide deaths

**"Firearms and Suicide in the United States: Is Risk Independent of Underlying Suicidal Behavior?"** Miller, M., C.

Barber, R. A. White, and D. Azrael\American Journal of Epidemiology, Vol. 178, No. 6, 2013, pp. 946–955.

"After controlling for state-level suicide attempt rates (2008-2009), higher rates of firearm ownership (assessed in 2004) were strongly associated with higher rates of overall suicide and firearm suicide,"

These findings suggest that firearm ownership rates, independent of underlying rates of suicidal behavior, largely determine variations in suicide mortality across the 50 states. "

"Our results support the hypothesis that firearms in the home impose suicide risk above and beyond the baseline risk"

**"Suicidal Behavior and Firearm Access: Results from the Second Injury Control and Risk Survey,"**

Betz, M. E., C. Barber, and M. Miller Suicide and Life-Threatening Behavior, Vol. 41, No. 4, 2011, pp. 384–391.

"Among respondents with suicidal plans, the odds of reporting a plan involving a firearm were over seven times greater among those with firearms at home, compared with those without firearms at home.

"The results suggest people with home firearms may not be more likely to be suicidal, but when suicidal they may be more likely to plan suicide by firearm."

**Lethal Means Access and Assessment Among Suicidal Emergency Department Patients,"**

Betz, M. E., M. Miller, C. Barber, B. Beaty, I. Miller, C. A. Camargo, Jr., and E. D. Boudreaux,

"Depression and Anxiety, Vol. 33, No. 6, 2016, pp. 502–511.

"In this large, retrospective study of ED patients with positive screens for suicide risk, only 18% had documentation that any ED provider had spoken with them about their access to firearms or other lethal means of suicide."

Although we recognize that counseling may occur without documentation, our findings still suggest a dramatic discrepancy from ideal care, where lethal means counseling – along with documentation – is a part of ED care for all patients with suicide risk"

"Firearms accounted for 61% of all suicide deaths in the United States in 2015 largely because of their high lethality and the often short deliberation time before an attempt"

Healthcare provider counseling about firearm access—with a focus on how to reduce that access during periods of crisis or elevated suicide risk—is supported by multiple medical, public health, and legal organizations"

**Loaded questions: Internet commenters' opinions on physician-patient firearm safety conversations.** Knoepke C, Allen A, Ranney M, Wintemute G, Matlock DD, Betz ME.

West J Emergency Med. 2017 Aug;18(5):903-912.

doi: 10.5811/westjem.2017.6.34849. Epub 2017 Jul 11.

"Medical and public health societies advocate that healthcare providers counsel at-risk patients to reduce firearm injury risk. Anonymous online media comments often contain extreme viewpoints and may therefore help in understanding challenges of firearm safety counseling.

"More than 30,000 people die each year in the United States from firearm-related injuries, leading organizations to call for increased attention to firearm injuries as a preventable public health problem."

Cultural competence" of providers has been suggested as a means of increasing acceptability and implementation of firearm safety conversations."

"Among this set of commenters with likely extreme viewpoints, opinions were generally negative toward firearm safety conversations, but with some support in specific situations."

"Providing education, counseling, or materials without asking about firearm ownership was encouraged. Engaging firearm advocates when developing materials may enhance the acceptability of prevention activities"

"This qualitative analysis of online comments about an article on HCP firearm safety discussions likely represents extreme views due to anonymity and the requisite motivation to engage in highly politicized conversation."

## **How to Reduce Risk of Suicide by Firearms**

Liza Gold

Psychiatry Online, American Psychiatric Association

15 Mar 2018

<https://doi.org/10.1176/appi.pn.2018.3b12>

"Only two interventions have been empirically demonstrated to be effective in decreasing suicide mortality: mental health treatment and restriction of lethal means"

"Despite the common belief that individuals intent on dying by suicide who lack access to their preferred means will find another means to end their lives, most studies have demonstrated that restriction of one method does not inevitably lead to substitution of another method."

" In addition, when method substitution occurs, particularly if the preferred method is firearms, chances of surviving the suicide attempt increase due to the fact that other methods are less lethal."

## **Effects of Legislation:**

### **Suicide Rates and State Laws Regulating Access and Exposure to Handguns**

Michael D. Anestis, Ph

Am J Public Health. 2015 October; 105(10): 2049–2058.

Using previous research, we examined the impact of 4 handgun laws (waiting periods, universal background checks, gun locks, and open carrying regulations) on suicide rates.

We used publicly available databases to collect information on statewide laws, suicide rates, and demographic characteristics for 2013.

Each law was associated with significantly lower firearm suicide rates and the proportion of suicides resulting from firearms. In addition, each law, except for that which required a waiting period, was associated with a lower overall suicide rate.

"Our results were supportive of a potentially vital role in suicide prevention for state legislation that limits access and exposure to handguns."

### **Suicide, Guns, and Public Policy**

E. Michael Lewiecki,

Am J Public Health. 2013 January; 103(1): 27–31.

Suicide is a serious public health concern that is responsible for almost 1 million deaths each year worldwide. It is commonly an impulsive act by a vulnerable individual. The impulsivity of suicide provides opportunities to reduce the risk of suicide by restricting access to lethal means.

In the United States, firearms, particularly handguns, are the most common means of suicide. Despite strong empirical evidence that restriction of access to firearms reduces suicides, access to firearms in the United States is generally subject to few restrictions.

Implementation and evaluation of measures such as waiting periods and permit requirements that restrict access to handguns should be a top priority for reducing deaths from impulsive suicide in the United States.

## **Change in suicide rates in Switzerland before and after firearm restriction resulting from the 2003 "Army XXI" reform.**

Reisch T

American Journal of Psychiatry 1 Sep 2013

Firearms are the most common method of suicide among young men in Switzerland. From March 2003 through February 2004, the number of Swiss soldiers was halved as a result of an army reform (Army XXI), leading to a decrease in the availability of guns nationwide.

The authors compared suicide rates before (1995–2003) and after the intervention (2004–2008) in the affected population (men ages 18–43) and in two comparison groups (women ages 18–44 and men ages 44–53)

The authors found a reduction in both the overall suicide rate and the firearm suicide rate after the Army XXI reform. No significant increases were found for other suicide methods overall.

"legislation enacted in 2003 in Switzerland that halved the size of the citizen army was associated with a substantial reduction in the rate of suicide by firearms"

" The overall suicide rate in this group also declined. Equally interesting was the minimal evidence for method substitution".

## **Firearm legislation reform in the European Union: impact on firearm availability, firearm suicide and homicide rates in Austria**

Nestor D. Kapusta

British Journal of Psychiatry, September 2007

"Our findings provide evidence that the introduction of restrictive firearm legislation effectively reduced the rates of firearm suicide and homicide. The decline in firearm-related deaths seems to have been mediated by the legal restriction of firearm availability."

The rate of firearm suicides among some age groups, percentage of firearm suicides, as well as the rate of firearm homicides and the rate of firearm licences, significantly decreased after a more stringent firearm law had been implemented.

"Our findings provide evidence that the introduction of restrictive firearm legislation effectively reduced the rates of firearm suicide and homicide. The decline in firearm-related deaths seems to have been mediated by the legal restriction of firearm availability."

"Restrictive firearm legislation should be an integral part of national suicide prevention programmes in countries with high firearm suicide rates."

## **State Firearm Laws and Interstate Firearm Deaths From Homicide and Suicide in the United States: A Cross-sectional Analysis of Data by County**

Kaufman, JAMA Intern Med. 2018;178(5):692-700

"In this cross-sectional study, strong firearm laws in a state were associated with lower firearm suicide rates and lower overall suicide rates in the state regardless of the strength of the laws in other states."

"Strong firearm laws in a state were associated with lower rates of firearm homicide. Counties in states with weak laws had lower rates of firearm homicide only when surrounding states had strong laws."

"Strengthening firearm policies at the state level could help to reduce the incidence of both firearm suicide and homicide, with benefits that extend across state lines."

### **Reducing Suicides by Firearms**

American Public Health Association. Nov 13 2018; **Policy Number:** 20184

"The most promising evidence-based strategies to reduce access to firearms during a period of high risk are (1) temporary relocation of household firearms away from home when a family member is at risk for suicide, (2) safe storage at home if relocation is not possible, (3) working with leaders in the gun community to develop and implement messaging about the preceding two strategies that will be acceptable to gun owners, and (4) increasing screening for and counseling about access to guns by health professionals and other gatekeepers.

Multiple risk factors for suicide exist, including a previous suicide attempt (the strongest predictor), a history of depression or other mental illness, alcohol or drug abuse, a family history of suicide or violence, physical illness, and a feeling of being alone. However, as evidenced by the far greater prevalence of these factors than of suicide deaths, most people with one or more such risk factors do not go on to die by suicide. While individuals with these risk factors are encouraged to obtain mental health treatment, many of those who die by suicide have no known record of such treatment, indicating a need for additional strategies to increase the safety of people at risk. Reducing access to lethal means is one such strategy.

There is ample evidence that suicidality is transitory. Should a person survive a suicidal impulse, his or her prognosis is quite good. The results of a meta-analysis of nearly 100 studies of suicide attempts showed that 90% of attempters who survive do not go on to die by suicide. In fact, many suicide attempts occur with little planning, often in response to a short-term crisis. However, if a person attempts suicide through a means that is highly lethal, such as a firearm, the odds of survival are quite low.

One must not opt to make a suicide attempt using a highly lethal means such as a firearm if there is to be any opportunity to obtain mental health treatment or endure a painful short-term crisis

Access to firearms is a key risk factor for suicide. Several studies have shown that rates of suicide are higher in states with higher levels of gun ownership (but not higher rates of suicide attempts) and that these heightened rates are driven by increases in firearm suicides. Suicides by methods other than firearms are not significantly different in states with lower or higher overall suicide rates. Multiple reviews offer strong evidence that rises in gun ownership prevalence are associated with increases in firearm suicides, which in turn lead to increases in the overall suicide rate. Studies of gun prevalence and suicide rates typically control for multiple potential confounders such as psychological distress, substance use, poverty, education, and unemployment. They also typically reveal that the relationship between household gun ownership and suicide rates holds for men, women, children 5 to 14 years old, and those in nearly every other age group. Decreasing the number of firearm suicides would yield a significant reduction in the overall suicide rate in the United States.

### **Firearm Legislation and Firearm-Related Fatalities in the United States**

Fleegler, JAMA Intern Med. 2013;173(9):732-740

"A higher number of firearm laws in a state are associated with a lower rate of firearm fatalities in the state, overall and for suicides/ homicides "

**Australia's 1996 gun law reforms: faster falls in firearm deaths, firearm suicides, and a decade without mass shootings**  
(Chapman, Injury Prevention, British Medical Journal)

<http://dx.doi.org/10.1136/ip.2006.013714>

"After a 1996 firearm massacre in Tasmania in which 35 people died, Australian governments united to remove semi-automatic and pump-action shotguns and rifles from civilian possession, as a key component of gun law reforms".

Declines in firearm-related deaths before the law reforms accelerated after the reforms for total firearm deaths, firearm suicides and firearm homicides but not for the smallest category of unintentional firearm deaths, which increased.

"No evidence of substitution effect for suicides or homicides was observed."

"The rates per 100 000 of total firearm deaths, firearm homicides and firearm suicides all at least doubled their existing rates of decline after the revised gun laws".

### **Firearm related deaths: the impact of regulatory reform**

Ozanne-Smith, Injury Prevention 2004;10:280–286.

To examine trends in rates of firearm related deaths in Victoria, Australia, over 22 years in the context of legislative reform and describe and investigate impact measures to explain trends.

In Victoria, two periods of legislative reform related to firearms followed mass shooting events in 1988 and 1996. A national firearm amnesty and buyback scheme followed the latter. Victorian and Australian rates of firearm related deaths before reforms (1979–86) were steady. After initial Victorian reforms, a significant downward trend was seen for numbers of all firearm related deaths between 1988 and 1995 (17.3% in Victoria compared with the rest of Australia , p<0.0001). A further significant decline between 1997 and 2000 followed the later reforms. After the later all state legislation, similar strong declines occurred in the rest of Australia from 1997 (14.0% reduction compared with Victoria , p=0.0372). Victorian reductions were observed in frequencies of firearm related suicides, assaults, and unintentional deaths before and after the 1988 reforms, but statistical significance was reached only for suicide.

Dramatic reductions in overall firearm related deaths and particularly suicides by firearms were achieved in the context of the implementation of strong regulatory reform

### **Stronger US gun laws are linked to lower homicide and suicide rates**

Jacqui Wise BMJ 2018; 360

The study found that stronger firearm laws in a state were associated with lower firearm suicide rates and lower overall suicide rates regardless of the strength of the laws in neighbouring states.

And counties in states with low or medium strength laws had higher firearm suicide rates, also regardless of the strength of laws in neighbouring states."

"Firearm homicide rates were highest in counties in states with the weakest state laws and where neighbouring states also had laws of low or medium strength. Counties in states with weaker laws had lower rates of firearm homicide only when surrounding states had stronger laws

"The researchers concluded, "Strengthening firearm policies at the state level could help to reduce the incidence of both firearm suicide and homicide, with benefits that extend across state lines."

### **State gun laws, gun ownership, and mass shootings in the US: cross sectional time series**

Paul Reeping

British Medical Journal 6 March 2019

364 doi: <https://doi.org/10.1136/bmj.l542>

Fully adjusted regression analyses showed that a 10 unit increase in state gun law permissiveness was associated with a significant 11.5% (95% confidence interval 4.2% to 19.3%, P=0.002) higher rate of mass shootings. A 10% increase in state gun ownership was associated with a significant 35.1% (12.7% to 62.7%, P=0.001) higher rate of mass shootings. Partially adjusted regression analyses produced similar results, as did analyses restricted to domestic and non-domestic mass shootings.

States with more permissive gun laws and greater gun ownership had higher rates of mass shootings, and a growing divide appears to be emerging between restrictive and permissive states.

### **What You Can Do to Stop Firearm Violence**

Garen Wintemute

Annals of Internal Medicine December 19, 2017

But there is a critically important and beneficial action that we physicians can take, right now and on our own initiative. Fundamentally, it's quite simple. We need to ask our patients about firearms, counsel them on safe firearm behaviors, and take further action when an imminent hazard is present (2).

This can be a focused intervention, because violence is not distributed at random. People who commit firearm violence—whether against others or themselves—and people who sustain it often have well-recognized risk factors. As a result, firearm violence can to some extent be predicted. What's more, these factors often bring high-risk individuals into contact with physicians. They include abuse of alcohol (3) and controlled substances, acute injury (4), a history of violence (including a suicide attempt), poorly controlled severe mental illness (5), an abusive partner, and serious life stressors.

### **How to Stop Mass Shootings**

Garen Wintemute

September 27, 2018

N Engl J Med 2018; 379:1193-1196

Two policies exist today that if properly designed, widely enacted, and adequately implemented would likely have saved these lives and could potentially save many more in the future. Their benefits would extend far beyond reducing the incidence of mass shootings

The better known of these policies is the requirement that firearm sales involve background checks on purchasers. Background-check policies work at the population level to prevent firearm purchases by felons, people convicted of certain violent misdemeanors, and others who are at increased risk for violent behavior (specifics vary from state to state). Using background checks to prevent such persons from acquiring firearms is associated with a reduction of at least 25% in their incidence of arrest for a firearm-related or other violent crime.<sup>1</sup>

The second policy that could prevent firearm-related deaths is to allow courts to have firearms removed temporarily from people who pose an imminent hazard to others or themselves but are not members of a prohibited class. Again, provisions vary; in California, family members and law-enforcement officials can follow procedures based on those established for domestic violence to petition for a firearm to be removed. Physicians can play an important role in these cases by notifying eligible petitioners when intervention is warranted; disclosure of otherwise-confidential information is expressly permitted by Health Insurance Portability and Accountability Act regulations when an imminent hazard exists.

### **Guns, Fear, the Constitution, and the Public's Health**

Garen Wintemute

April 3, 2008

N Engl J Med 2008; 358:1421-1424

DOI: 10.1056/NEJMmp0800859

"In 2005, in this country, 30,694 people died from gunshot wounds; 17,002 cases were suicides, 12,352 were homicides, and 1340 were accidental, police-related, or of undetermined intent. Nearly 70,000 more people received treatment for nonfatal wounds in U.S. emergency departments. The disheartening 30% case fatality rate is 18 times that for injuries to motorcyclists. More than 80% of gun-related deaths are pronounced at the scene or in the emergency department; the wounds are simply not survivable. This reality is reflected in the fact that the \$2 billion annual costs of medical care for the victims of gun violence are dwarfed by an estimated overall economic burden, including both material and intangible

costs, of \$100 billion.<sup>1</sup> It's unlikely that health care professionals will soon prevent a greater proportion of shooting victims from dying; rather, we as a society must prevent shootings from occurring in the first place. Gun violence is often an unintended consequence of gun ownership. Americans have purchased millions of guns, predominantly handguns, believing that having a gun at home makes them safer. In fact, handgun purchasers substantially increase their risk of a violent death. This increase begins the moment the gun is acquired — suicide is the leading cause of death among handgun owners in the first year after purchase — and lasts for years.

The risks associated with household exposure to guns apply not only to the people who buy them; epidemiologically, there can be said to be "passive" gun owners who are analogous to passive smokers. Living in a home where there are guns increases the risk of homicide by 40 to 170% and the risk of suicide by 90 to 460%. Young people who commit suicide with a gun usually use a weapon kept at home, and among women in shelters for victims of domestic violence, two thirds of those who come from homes with guns have had those guns used against them.

Policies limiting gun ownership and use have positive effects, whether those limits affect high-risk guns such as assault weapons or Saturday night specials, high-risk persons such as those who have been convicted of violent misdemeanors, or high-risk venues such as gun shows. New York and Chicago, which have long restricted handgun ownership and use, had fewer homicides in 2007 than at any other time since the early 1960s.

Conversely, policies that encourage the use of guns have been ineffective in deterring violence. Permissive policies regarding carrying guns have not reduced crime rates, and permissive states generally have higher rates of gun-related deaths than others do ([see map](#)).

### **Prevention of Gun Violence (American Academy of Family Physicians)**

"Gun violence should be considered a public health issue, not a political one—an epidemic that needs to be addressed with research and evidence-based strategies that can reduce morbidity and mortality."

"These physicians, who witness the substantial impact firearm-related violence has on the health of their patients, families, and communities, have the power to help improve the safety and wellbeing of those groups."

"The complexity and frequency of firearm violence, combined with its impact on the health and safety of Americans, suggest that a public health approach should be a key strategy used to prevent future harm and injuries."

This approach focuses on three elements: scientific methodology to identify risk and patterns, preventive measures, and multidisciplinary collaboration"

The AAFP recommends that clinicians screen women of childbearing age for intimate partner violence. The presence of guns in the home increases the risk that a woman will die due to an IPV-related homicide eight-fold."

"Communicate with your local, state, and federal officials about gun violence as a public health concern.

"Firearms are the most lethal method of attempting suicide. Between 85 to 91% of firearm suicide attempts result in death, compared to 3% or less for other common ways of attempting suicide."

Suicide is often an impulsive decision

The majority of those who survived a suicide attempt reported that less than one hour had passed between the time they decided to commit suicide and when they took action"

The majority of those who survived a suicide attempt reported that less than one hour had passed between the time they decided to commit suicide and when they took action"

"The use of a firearm to commit suicide rarely allows for intervention or reconsideration, so increased access to firearms is associated with increased rates of completed suicide."

"The impulsive nature of suicide, in combination with often times easy access to guns, can result in a completed suicide—one that might have been preventable if another method had been attempted."

"Family physicians frequently find themselves on the frontlines on public health issues and discussions. This role provides them an opportunity to address and guide conversations about public health issues, such as gun violence, in both the exam room and their communities. "

"By advancing policies that promote safety and discourage violence, family physicians are instrumental in the gun violence debate."