

UPDATE ON FIREARM VIOLENCE

The Scourge is Still with Us

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INTRODUCTION

Four years ago I authored an article about firearm violence, defined as injury and death related to firearms, which showed that it remained a substantial public health problem due to the lethal nature of firearm injuries, and the increasing firepower of the weapons used.¹ Injuries and deaths caused by firearms remain a major American scourge that causes tremendous suffering and is a major public health expense. Costs run as high as \$280 billion annually when lost work and quality of life are factored in.² A small but highly visible and upsetting aspect of the firearm injury burden are the mass shootings that happen periodically in this country, often with highly lethal assault rifles in crowded public places. The United States may be particularly susceptible to this type of event.³

The website www.gunviolence.org publishes yearly statistics from a variety of sources about the annual deaths from gun violence. Recently published figures show that in 2020 there were 43,549 gun deaths, with 19,393 the result of homicides or unintentional acts, and 24,156 due to suicides.⁴ In a recent phenomenon that seems persistent, the number of firearm deaths now exceeds motor vehicle deaths. The National Safety Council estimates there were 42,060 deaths from motor vehicle accidents in 2020, which itself represents an increase for as yet unknown reasons.⁵

FIREARM VIOLENCE RESEARCH

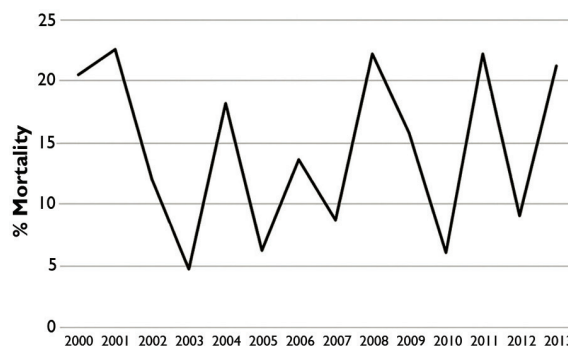
There have been positive developments in the last few years regarding research into gun violence, with efforts made to establish national databases, assess the burden and national cost of injuries, and measure the effectiveness of gun violence interventions. Historically, one of the barriers to effective research was the so-called Dickey amendment, named after the congressman who proposed it in 1996, which specifically directed the Centers for Disease Control not to do research advocating or promoting gun control; the new Republican Congress extended it to other government health care agencies in 2011.⁶ Although this latest legislation did not specifically ban research on prevention of firearm injuries, it did have the effect of drying up funding for such research. However,

in 2018, partially in response to the recent mass shooting at a Florida high school and considerable political agitation,⁷ the language was clarified to specify that research would be permitted.

In December 2019 Congress approved \$25 million for firearm injury research, the first funding approved in two decades.⁸ Though the number of papers devoted to this topic has increased, the next step is to provide research funds commensurate with the scope of the problem. An analysis published in 2017 showed that in relation to mortality rates, gun research was the least-researched and the second-least funded cause of death (after falls).⁹

GUNFIRE VIOLENCE IN LANCASTER

Lancaster County, despite its semi-rural status and below average crime incidence, is not immune to gunfire violence and injury. In 2017 our group in the LGH Trauma Department showed that Lancaster General Health, the county trauma center where presumably the vast majority of gunshot victims are brought for care, averages 30-40 patients per year for the entire population, with a mortality rate of 15% (71 deaths per 478 GSW victims).¹⁰ There was no significant change in the mortality rate over the study period from January 2000 to December 2013 (21% in 2000 to 21% in 2013; $p=0.973$) (Fig. 1). Since 2013 the firearm death rate for Lancaster County has increased from 5.6 to 9.48 per 100,000.¹¹



Source: Morrison, *J Surg Res.* 2015 Nov; 199 (1): 190-6

Fig. 1. Mortality Rate for People with Gunshot Wounds Brought to Lancaster General Hospital (including those pronounced dead on arrival).

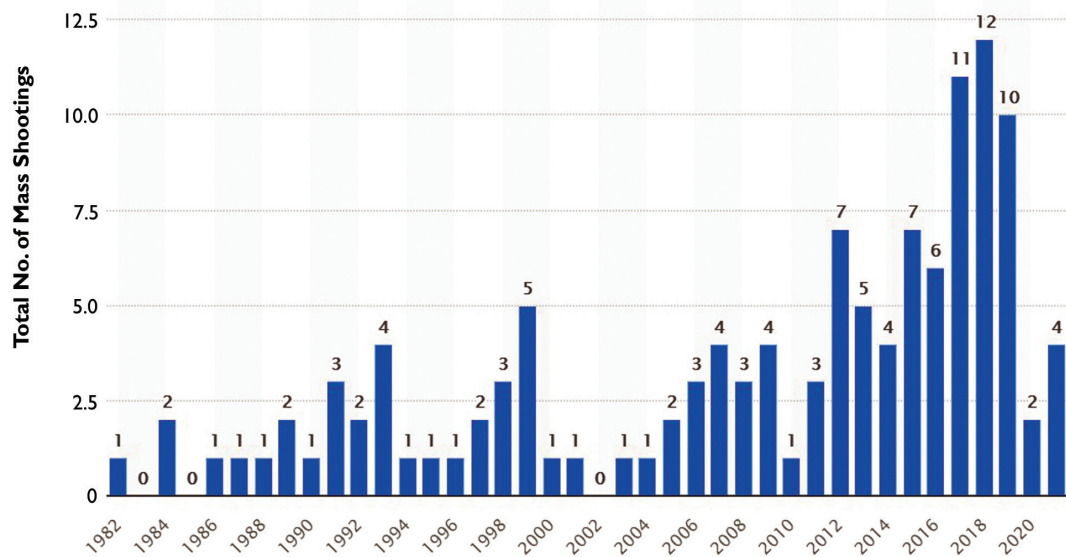


Fig. 2. Incidence of Mass Shootings Per Year

GUNFIRE VIOLENCE IN PENNSYLVANIA

Gunfire remains a significant problem in Pennsylvania, with the CDC reporting a firearm injury rate of 11.7 per 100,000 and a homicide rate of 6.1 per 100,000.¹² When our group analyzed data statewide, we found that 19,342 patients were admitted to the hospital with gunshot injuries from 2003 to 2015, averaging 1,488 per year, with little variation from year to year.¹³ The total number was 1,278 in 2003, for example, and 1,672 in 2006. Dishearteningly, adjusted mortality from these injuries did not change over time, despite advances in resuscitation and critical care.

Of all homicides in Pennsylvania in 2018, firearms accounted for 78%, and a handgun was used in 59%.¹⁴ Data from the same source show that this is an increase from an age-adjusted death rate from firearms of 10.5 per 10,000 residents in 2015 and 2016, but a decrease from 2017. These rates place Pennsylvania in the midpoint of states for firearm deaths. In 2019, 1,541 people were killed by firearms, which is an increase since the previously published article.¹

Pennsylvania, a state with a mixed urban and rural population, at the time of this writing still has relatively few legal restrictions on gun ownership, with “Stand your ground legislation” passed in 2011,¹⁵ still in force, as well as a bill designed to expose municipalities to lawsuits over restricting rights of gun ownership and gun carrying.¹⁶

GUNFIRE VIOLENCE AT THE NATIONAL LEVEL

As mentioned in the introduction, the rates of death and serious injury as a result of firearm violence have not decreased, and in fact they increased in the last year. In

2019, the CDC recorded 39,531 deaths.⁴ There is also regional evidence that gunfire violence went up during the time of the pandemic caused by SARS-CoV-2.¹⁷ The burden of injury from firearms in the pediatric age group has shown some reduction but still remains a substantial burden.¹⁸

It is also important to note that several studies have documented increased rates of firearm injury and death when access to guns was liberalized and concealed carry was permitted.^{19,20} Conversely, however, there is evidence that state and local gun control laws can meaningfully impact firearm injury rates.^{21,22}

There remain strong regional differences in the per capita rate of gunfire injury and deaths. While it is often difficult to disentangle regional socioeconomic factors from legal efforts to control access to firearms, there is a correlation between efforts to regulate firearms and firearm injury rate.²³ Data show that in the aggregate, stronger gun policies are associated with decreased rates of firearm homicide, even after adjusting for demographic and sociologic factors. Specifically, laws that strengthen background checks and permits-to-purchase seem to decrease firearm homicide rates.²⁴

Mass shootings also continue to occur and have been slightly increasing over the past few years (Fig. 2).⁴ There were an estimated 578 mass shootings in 2020, a substantial increase over the previous year. Depressingly enough, gun sales seem to increase after mass shooting episodes.²⁵

GUNFIRE VIOLENCE: A WAY FORWARD

In February 2019, the American College of Surgeons hosted a historic meeting of 44 major medical and injury

prevention organizations. The goal was to build consensus on the part of the nation's leading experts on trauma and injury to work together and go forward in the new, more encouraging climate for research and prevention of firearm injuries.²⁶ Recognizing how politicized this topic had become, the stated goals were to "address firearm injury as a medical health problem, not a political problem...and commit to a professional and civil dialogue centered on how best to reduce and prevent firearm injury, death, and disability. This mirrors the public health model that has been so effective in improving outcomes in traffic-related injury."

The entire consensus statement is worth reproducing given the magnitude of the issue:

1. Firearm injury in the U.S. is a public health crisis.
2. A comprehensive public health and medical approach is required to reduce death and disability from firearm injury.
3. Research is needed to better understand the root causes of violence, identify people at risk, and determine the most effective strategies for firearm injury prevention.
4. Federal and philanthropic research funding must be provided to match the burden of disease.
5. Engaging firearm owners and populations at risk is critical in developing programs and policies for firearm injury prevention.
6. Health care providers should be encouraged to counsel patients and families about firearm safety and safe storage. Educational and research efforts are needed to support appropriate, culturally competent messaging.
7. Screening for the risk of depression, suicide, intimate partner violence, and interpersonal violence should be conducted across all health care settings and in certain high-risk populations (such as those with dementia). Comprehensive resources and interventions are needed to support patients and families identified as high risk for firearm injury, and who have access to a firearm.
8. Hospitals and health care systems must genuinely engage the community in addressing the social determinants of disease, which contribute to structural violence in underserved communities.
9. Our professional organizations commit to working together and continuing to meet, to ensure these statements lead to constructive actions that improve the health and well-being of our fellow Americans.

THREE PROPOSALS TO ALLEVIATE GUN VIOLENCE

In 2017, I authored three proposals very much along the lines of the consensus statement above, to reduce the level of gunfire injury and fatalities in the United States:

First was a recommendation for legislation that would limit the lethality and firepower of weapons sold to the

general public, based on a package of gun law reforms that Australia introduced following a mass shooting in 1996 that killed 35 people (the Port Arthur Massacre). The Australian legislation included a ban on highly lethal weapons that are not used in hunting, such as semiautomatic rifles. Since then, mass shootings in which four or more people are killed remain rare. Furthermore, between 1997 and 2013, firearm deaths fell from 3.6/100,000 persons to 1.2/100,000, a decline that was more rapid than before 1997.²⁷

In the United States, recent research has shown that in a linear regression model controlling for yearly trend, the years in which a federal ban on assault weapons was in place were associated with significantly fewer mass shooting-related deaths per 10,000 firearm homicides, and mass-shooting fatalities were 70% less likely to occur.²⁸ A recent editorial in the *Journal of Trauma and Acute Care Surgery* by a prominent trauma surgeon also called for a ban on high capacity, high velocity weapons.²⁹ It is regrettable that although bills are introduced every year on the federal level, there has not been any substantial legislative action to regulate these weapons, and both Pennsylvania and Michigan still allow them to be sold.^{30,31}

Second, I and virtually every provider in the trauma field that I know, call for increased research on the causes, treatment, and prevention strategies for gunfire injuries, together with increased funding for this research, on par with funding for cancer, AIDS, Covid-19, etc.

Finally, there must be a vigorous effort to disseminate our findings to the general public in ways that can be readily understood – especially when they can correct misconceptions. It might surprise people to learn, for example, that owning a firearm does not make them less likely to be murdered. In fact, existing data suggest that it increases their risk of dying by gunfire.³² There is broad popular support for efforts to mitigate the effects of firearm injuries, similar to efforts that continue to make driving a motor vehicle safer.³³

Considering all the different aspects of this public scourge, it is easy to succumb to a kind of nihilistic fatalism, especially as little has changed since I wrote my previous overview. The horrifying events in Orlando and Las Vegas have been supplanted in the news by the horrifying events in Boulder and Pittsburgh; it is virtually a certainty that between the time this article is written and published there will be another mass shooting event, and scores of patients will sustain firearm injuries and die.

The climate of hyperpartisan politics certainly has not diminished, as the events of January 6th remind us. Yet similar scourges in the past have seemed just as – if not more – intractable, until eventually they were not. I believe that progress not only can be made, but will be made within our lifetimes.

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