

Firearm Injuries in Children

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In order to understand the nature and magnitude of the problem of firearm injury in children, one must consider all circumstances under which firearm injuries occur, regardless of relationship of the victim to the perpetrator or intent to injure. As such, this article will consider accidental and intentional self-inflicted injury as well as injuries resulting from criminal activity. While each circumstance will invite unique approaches for prevention, the accessibility of firearms in the United States contributes to the extremely high rate of injury in the United States as compared to other prosperous countries. Whereas other countries may have similar rates of violence, the rates of serious injury and death are much higher in the United States because firearms are often used. Firearms are especially effective at causing injury and death when compared to other methods that one might use to commit violence.

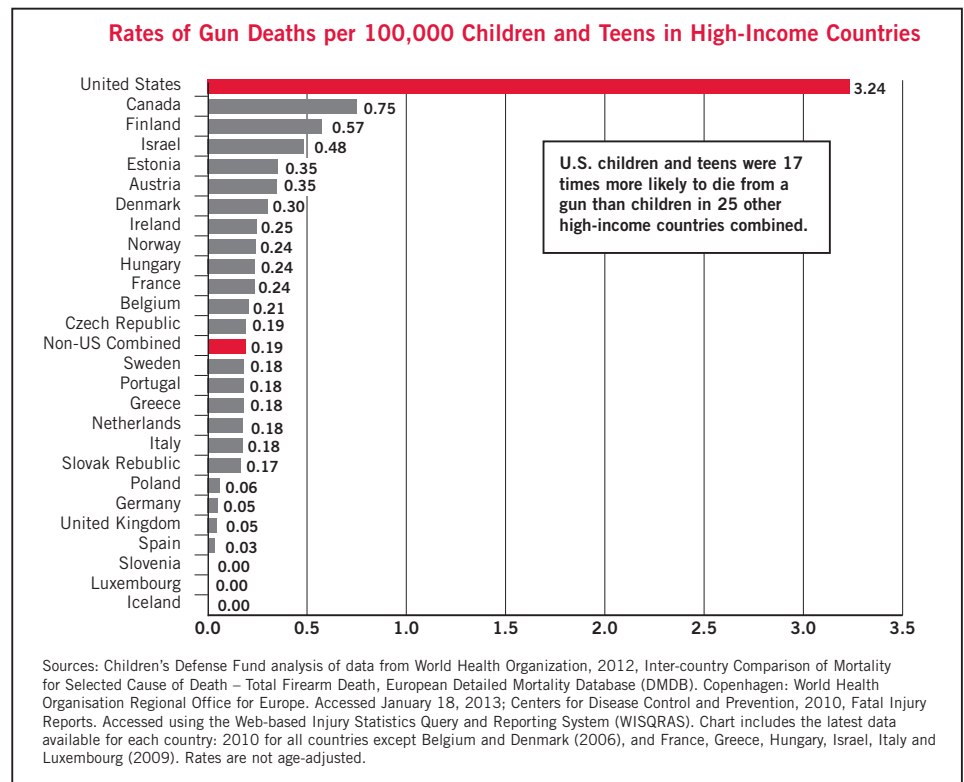
Magnitude of the Problem

National Statistics on the Number Injured

The magnitude of the problem of firearm injury in the US can be appreciated by examining data accessible through the Center for Disease Control's Web-based Injury Statistics Query and Reporting System (WISQARS).¹ National estimates of nonfatal injuries are obtained from reporting to the Consumer Product Safety Commission's (CPSC) National Electronic Injury Surveillance System (NEISS). NEISS coordinators working for the hospital or under contract by the CPSC at approximately 100 representative hospitals throughout the US report every product-related injury evaluated at the hospital's emergency department. Fatal

injury data are derived from reporting to the National Vital Statistics System by states and counties.

Queries of the 2010 CDC data generated the following statistics: There were 105,197 injuries from firearms in the US; 73,505 patients were treated for nonfatal gunshot wounds, and 31,672 deaths resulted from firearm injury. Of the deaths, 19,392 (61%) were suicides, 11,078 (35%) were homicides and 606 (2%) were classified as unintentional. In children and youth under the age of 19, there were 15,576 nonfatal injuries and 2,711 deaths from firearm injury. Of the deaths in this group, 1,173 (65%) were homicides, 749 (28%) were suicides and 134 (5%) were classified as unintentional. Firearm injury is second only to motor vehicle accidents (4,442 deaths) as a cause of death in this age group. Older teens are at the greatest risk of being victims of firearm injury. Of the firearm injuries occurring in the under 19 year old group, 86 percent of firearm deaths and 89 percent of gun injuries occurred in 15-19 year-olds. In comparison to other high income countries the death rate from firearm injury in the US is very high (Figure 1).²



* Data were not available for Australia, Japan, South Korea, New Zealand and Switzerland.

Figure 1 - Rates of Gun Deaths per 100,000 Children and Teens in High-Income Countries

Continued on page 16

Firearm Injuries in Children

Continued from page 15

Because firearm injury so frequently involves younger individuals (Figure 2), the years of potential life lost are very high.

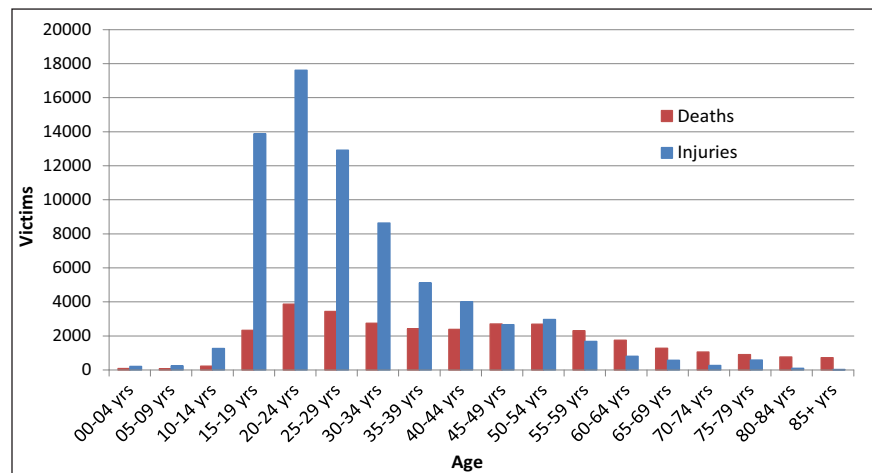


Figure 2 - Numbers of fatal and nonfatal firearm injury by age group (Source, CDC).

When compared to other causes of injury, firearms are the third leading cause of years of potential life lost (Figure 3).

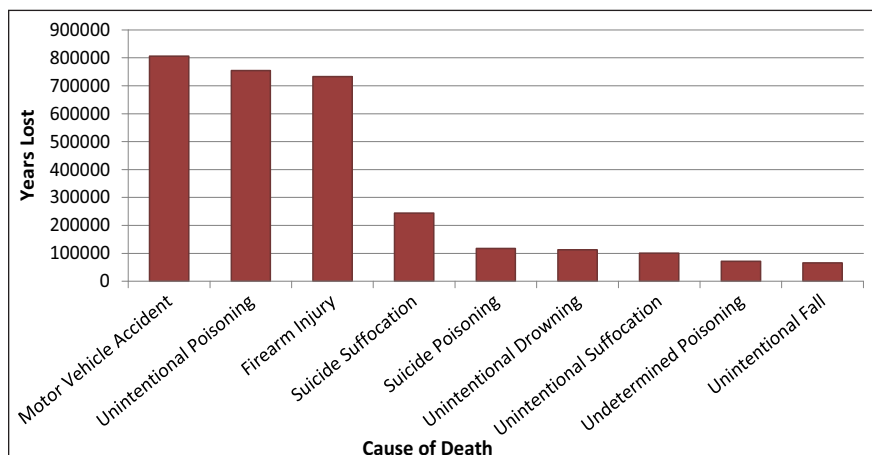


Figure 3 - Years of potential life lost due to injury (Source, CDC).

Another way to look at the impact of firearm injury is to look at its effect on life expectancy. As compared to other causes of death to which the US devotes a lot of resources, death from firearm injury has a substantial effect on life expectancy in the US (Table 1).³ Reduction in life expectancy as a result of death by firearm is higher than that for both colon and prostate cancer. The life expectancies of males in general, and black males in particular, are affected very significantly by firearm injury.

Cause of Death	Reduction in Life Expectancy (days)
• Lung Cancer	197
• Motor vehicle accidents	161
• Firearm injury	104
• Colon Cancer	67
• Prostate Cancer	47
Firearm injury reduction in life expectancy for:	
• White males	151
• Black males	362

Table 1- Reduction in US life expectancy, in days, by cause and by population. Adapted from Firearm Injury in the US, 2011

Rochester Statistics on Number Injured

There are innovative efforts underway in Rochester to gather data on firearm injury. As one of the first of its kind, the Rochester Shooting Victims Database was developed by researchers at Rochester Institute of Technology's Center for Public Safety Initiatives (CPSI) in partnership with the Monroe Crime Analysis Center (MCAC). Because of the nature of the managing agency, shooting incidents are only included in this database if there was a criminal charge attributed to the shooting at any time. As it currently stands, full records of non-criminal accidental and self-inflicted injuries are not available to be included in the database. Although some self-inflicted events have made it into the MCAC database, an accurate reflection of these injuries is difficult to obtain. The importance of combining these two injury types is clear; without one it is impossible to fully understand the problem of firearm injury and develop effective interventions for preventing them.

For all criminal shootings in Rochester from 2010 through 2012, there were 532 individuals who suffered from gunshot wounds. Of these, 71 were fatal and 461 were nonfatal. Two suicides by firearm made it into the database along with two determined nonfatal self-inflicted gunshot wounds and seventeen suspected self-inflicted gunshot wounds. During this period, 90 shooting victims were

Continued on page 17

Firearm Injuries in Children

Continued from page 16

children ages 18 and younger. Nine of these were fatal including one that was a suicide in connection to a murder (the murder victim was over the age of 18). Rochester shooting statistics by age and race reflect the great disparity shown in national statistics. In the three-year study period, 90% of the children who were victims of firearm injury were black. Furthermore, black males under the age of 18 were almost nineteen times more likely to become a shooting victim than their white counterparts. Though the proportion of children 18 and younger was just under 17% of shooting victims, half of the total shooting victims were 23 years old or younger.

The Cost of Firearm Injury

The Pacific Institute for Research and Evaluation produced a comprehensive estimate of the cost of firearm injury based on 2010 CDC data.⁴ They estimated the cost of gun injury to be \$174 billion that year, taking into account the costs of medical care, work loss, mental health care, emergency transport, police, criminal justice, claims processing, employer cost and quality of life. At \$113 billion, quality of life cost (pain, suffering, and loss of enjoyment of life of people who were shot and their families) was the largest contributor to the total. The Pacific Institute estimate did not include the cost of lost property value or property tax revenue.³

We used the CDC's WISQARS to estimate the cost of gun injury in 0-19 year old children. Based on 2005 data, medical and lost work costs alone amounted to \$5.5 billion. When criminal activity is involved, as it is in 2/3 of the cases, the economic cost is much higher because of the criminal justice, quality of life and property value costs in the area in which these crimes occur. With tools available to us, we were not able to include these costs in our estimate.

A complete estimate cost must take into account economic and non-economic costs, including at least:

1. Healthcare costs associated with treatment of the acute injury and physical and psychological rehabilitation of the victims
2. Lost productivity of the injured individuals and the family members caring for them
3. Police costs for investigation, criminal justice costs for prosecution and incarceration costs for those found guilty of a crime
4. Cost of security in schools and other public places
5. Lost property value
6. Reduced property tax revenue making it more difficult to pay for programs and services that interrupt the cycles of poverty and violence
7. Pain and suffering of victims and their families
8. Loss of a sense of safety and security in the

community

9. Employer costs related to replacing lost worker productivity, recruitment, retraining
10. Limitations on where and when to travel or be outside to the extent that in some communities it limits opportunities for play and has been proposed as a contributor to obesity

Firearm Injury as a Public Health Problem

Organized medicine has long recognized firearm injuries as a public health issue with the American Medical Association calling for a public health approach to the problem since at least 1987.⁷ This approach involves (1) defining the problem, (2) identifying risk and protective factors, (3) developing and testing strategies, and (4) assuring widespread adoption. Despite the longstanding calls for action, we are still struggling to complete step 2.

In comparison to other types of injury on which the US has made major public health efforts, those dedicated to firearm injury are relatively small. For example, prior to enactment of laws mandating bicycle helmet use, head injury caused approximately 600 deaths and 181,000 emergency department visits per year.⁵ While accounting for more injuries overall, the number of deaths due to bicycle injury at that time is 2% of the number of deaths due to firearm injury in 2010. With physicians as very important participants, our nation put into place robust public health efforts that by legislation, education and efforts directed at changing social norms resulted in a very high proportion of bicycle riders now wearing helmets. Similarly, we have made tremendous strides in reducing motor vehicle injuries. As was the case with bicycle helmets, the success involves education, legislation and changing social norms. Many physicians continue to play an important role by routinely asking patients about seatbelt use. Partly because we lack the evidence base to support them, few efforts have been made to prevent gun injury.

In Rochester, there is a public health effort underway to prevent firearm injury in children. The ASK campaign (Asking Saves Kids), developed by the Center for Prevention of Youth Violence in collaboration with the American Academy of Pediatrics, encourages physicians and their staff to educate parents about the risk of unsecured firearms in homes that their children may be visiting and encourages parents to ask whether the homes have unsecured firearms. Posters and brochures provide parents with suggestions for non-confrontational ways to initiate conversations regarding unsecured firearms with adults in the homes their children are visiting (Figure 4).

Continued on page 18

Firearm Injuries in Children

Continued from page 17



Figure 4 -

A portion of the ASK campaign trifold brochure. Adapted from AskingSavesKids.org, the Center for Prevention of Youth Violence, 2013.

A Call for More Research

Research into the circumstances surrounding firearm injury has been very limited since 1996 when Congress removed all funding for research on firearm injury from the National Center for Injury Prevention and Control. In the same year, Congress stipulated that "None of the funds made available for injury prevention and control at the Centers for Disease Control and Prevention may be used to advocate or promote gun control." These prohibitions were introduced two years after the *New England Journal of Medicine* published Kellerman's article demonstrating a 2.7 fold risk of homicide in homes with guns.⁶ This prohibition has effectively halted the development of the evidence base required to develop rational solutions to the problem of firearm injury. In the wake of the Sandy Hook shootings in 2012, President Obama requested that Congress approve \$10 million for research on the causes and prevention of gun violence. These efforts might well start with improving the collection of data that describe the circumstances surrounding firearm injuries.

A September 28, 2013 *New York Times* article highlights how imprecise data reporting can hamper the study of firearm injury. The article describes a lack of standardization around whether a death is classified as an accidental death or a homicide. The *Times* found many instances where children died from accidental gunshots that were ruled as homicides. In an instance that typifies the difficulty with current methods of classification, a three year old died after accidentally shooting himself with his father's unsafely stored gun. Because the child's father was deemed negligent in the storage of the firearm, the death was classified as a homicide. The *Times* report revealed that nearly half of unintentional injuries are reported as homicides rather than accidents. The proper classification of firearm injuries is critical to identifying the most effective means to prevent them.

If we hope to be able to understand the problem of gun injury and develop effective strategies to combat it, we must encourage researchers from all appropriate disciplines to perform the sound research necessary to form an evidence base on which to draw. This research should garner funding commensurate with the magnitude of the problem. There remains strong political opposition to research whose results might undermine positions in which their adherents have a stake, however, the performance of sound research and the application of its results must be embraced by all those whose goal is the health, safety and security of our children and communities.

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