

Chapter 6

Firearm Violence in the Pediatric Population: An International Perspective



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Mexico's child vigilantes: The indigenous people of Ayahualtempa are arming their children. Is it for self-defense, or to get attention?

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Firearm injuries and deaths are a public health issue not only among the pediatric population in the United States (US) but also in other areas of the world. US rates of firearm homicide, firearm suicide, and unintentional firearm death are much higher than those of other high-income countries. Some countries in the developing world, particularly some in Central and South America, have even higher rates of firearm death than the US. Internationally, relatively little is known about the circumstances of child and adolescent firearm injuries. While there are good data on the number of pediatric firearm deaths in high-income countries, the data are not as good for lower- and middle-income countries. For most countries, the data on the number and circumstances of nonfatal firearm injuries are unavailable or of questionable validity. Mass shootings are also disproportionately high in the US [1, 2]; however, there are no known cross-national studies focusing on school shootings or mass shootings of children and adolescents.

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6.1 High-Income Countries

Though few studies have examined firearm violence in the pediatric population cross-nationally, three studies by the same authors provide fatal firearm victimization data comparing children and adolescents in the US to other high-income countries in 2003, 2010, and 2015 [3–5]. The high-income countries for comparison were chosen based on those countries identified by the Organisation for Economic Co-operation and Development (OECD) as high-income countries for the year of each study. Data are from the World Health Organization (WHO). In each year, the US was an outlier, with much higher rates of pediatric firearm death (Table 6.1).

Total Firearm Deaths. The US has about half the population as the other high-income countries combined. In 2015, 7241 American youth 0–24 years old were killed with firearms. By contrast, 685 youth in the other high-income countries combined were killed by firearms. The ratio of US death rates from firearms to death rates from firearms in the other high-income countries was 54 times higher for the 0–4-year-old age group, 21 times higher for the 5–14-year-old age group, and 23 times higher for the 15–24-year-old age group (Table 6.1). It is this last ratio that is most important. In 2015, both in the US and in the combination of other high-income countries, 94% of all firearm deaths in the 0–24-year-old age range occurred to youth 15–24 years old. For young children 0–4 years old, 87 American children were killed by firearms compared to 3 children in all other high-income countries combined. For children 5–14 years old, 356 American children were killed by firearms compared to 31 in the other high-income nations. For youth 5–24 years old, the total firearm deaths were 6798 Americans versus 552 youth in the other high-income countries.

This large difference in firearm fatalities between the US and other high-income countries has been present throughout the twenty-first century. In 2003, there were 7132 American youth (0–24 years old) deaths from firearms, and in 2010, there were 6534. By contrast, in 2003, there were 712 youth in other high-income countries killed by firearms and 515 in 2010.

Table 6.1 Rates of firearm victimization in the United States compared to the other high-income countries [3–5]

Ratio of US death rates to rates of other high-income countries									
	0–4 years old			5–14 years old			15–24 years old		
	2003	2010	2015	2003	2010	2015	2003	2010	2015
Firearm homicide	7.8	22.3	54.5	13.4	18.5	29.1	42.7	49.0	31.1
Non-firearm homicide	4.3	5.2	6.1	1.8	1.4	1.5	3.4	3.1	2.6
Overall homicide	4.4	5.6	6.6	3.6	3.4	3.7	14.2	11.4	13.0
Firearm suicide				8.0	11.2	9.4	8.8	12.5	10.6
Non-firearm suicide				1.2	1.1	1.5	0.6	0.7	0.9
Overall suicide				1.6	1.5	2.2	1.2	1.2	1.6
Unintentional firearm death				10.6	12.2	20.2	11.6	12.6	8.2
Firearm deaths	6.8	33.8	54.5	10.6	14.2	21.1	17.3	22.5	23.3

More American youth aged 0–24 years old are killed in firearm homicides than are killed in firearm suicides. The opposite is true for youth in other high-income countries. In 2015, the relative rates of American youth (15–24 years old) firearm homicide victimization was 31 times higher in the US compared to the high-income nations. Even for firearm suicide, the US rate for those 15–24 years old was more than ten times higher in the US (Table 6.1). In both the US and other high-income countries, the overwhelming majority of youth 0–24 years old killed with firearms were male. In the US, 88% of the victims were male in 2015; for the other high-income countries, the percentage was 91%. We did not find any international studies that compared pediatric gun suicides or gun homicides by their circumstances (e.g., gang-related, intimate partner violence-related, rurality).

6.2 Low- and Middle-Income Countries

There are few cross-national studies examining firearm deaths including low- and middle-income nations. This may be because the mortality data systems are not well developed so the data are not as reliable in these countries [6]. However, some limited information is available. Similar to the high-income countries, among those 0–24 years old, the number of firearm deaths increases rapidly with age and is much higher for males than females [7].

Globally in 2016, there were more firearm homicides than firearm suicides among those 0–24 years old [7]. In 2016, a handful of countries—Honduras, El Salvador, Guatemala, Jamaica, Columbia, Venezuela, Brazil, and occasionally South Africa—were among the leaders in disaggregate pediatric firearm homicide death rates, in all age groups, and among both females and males [7]. The highest rates of firearm homicide victimization occurred in low- and middle-income countries in the Americas. Among the youngest age group of children in 2016, firearm homicide rates per 100,000 male children 0–4 years old were highest in Honduras (1.9), El Salvador (1.6), Guatemala (1.6), Jamaica (1.5), and Columbia (1.4). In contrast, the US firearm homicide rate was 0.5 per 100,000 male children 0–4 years old in 2016.

One study found firearm suicide rates among children were higher in the developing world than among high-income countries—with the exception of the US and Canada [7]. For example, among males aged 10–14 years old, firearm suicide rates per 100,000 were highest in Greenland (9.6), the US (0.78), Albania (0.37), Canada (0.29), and Croatia (0.27). Among males age 15–19 years, firearm suicide rates per 100,000 were highest in Greenland (54.7), Venezuela (10.0), the US (6.4), Argentina (4.88), and Uruguay (3.7). We must note that for countries with a relatively small population like Greenland, where the total population was less than 57,000 in 2019, these rates are unstable and thus must be interpreted with caution though Greenland has historically had one of the highest rates of suicide in the world.

An older study of adolescents and young adults (15–24 years old) in 34 high- and middle-income countries in the early 1990s reported that the US was second to

Finland in firearm suicide and twelfth in overall suicide rates [14]. A more recent study found among 35 high- and middle-income countries, the US had the highest pediatric (10–19 years old) firearm suicide rate and the seventh highest overall suicide rate, following Estonia, New Zealand, Uzbekistan, Kyrgyzstan, Moldova, and Lithuania [8].

6.3 Why Are US Youth at Such High Risk for Firearm Deaths?

The United States has clearly been an outlier in firearm deaths compared to most high-income nations. However, the reasons for this are not well understood, and there have been few international studies comparing risk factors among youth specifically for firearm violence. Here we examine the narrow issue of some risk factors potentially associated with the large differences between the US and the other high-income countries in terms of youth firearm death.

Guns: Not surprisingly, a major risk factor for firearm death is the availability of firearms. It is not possible to have a firearm death if there is no firearm. The US has the most firearms per capita of any high-income country [4]. In 2017, the Small Arms Survey crudely estimated there were over one billion small arms throughout the world globally, of which about 85% were in civilian hands. US civilians accounted for over 45% of the world's civilian-held firearms, which equals approximately 350–400 million firearms. This equates to roughly 120 firearms for every 100 people (man, woman, and child) in the US [9]. Among other high-income countries, there were about 11.5 firearms for every 100 people [9]. The country estimates ranged from a low of 0.16 firearms per 100 people in the Republic of Korea to a second high of 34.7 firearms per 100 people in Canada.

Cross-nationally, many studies have found a strong relationship between levels of household gun ownership (or guns per population) and both firearm homicide and firearm suicide. For example, a recent analysis of 195 countries found estimates of the number of firearms per country were significantly associated with higher rates of firearm homicide and firearm suicide [10]. A study of 26 high-income countries found an association between firearm availability and firearm homicide rates [11], as well as firearm homicide specifically among women [12]. A study including middle-income countries [13] also found a significant relationship between firearms and firearm homicide, even controlling for the possibility of reverse causation—that homicide could lead to increased firearm ownership. Other international studies have found firearm availability is also associated with firearm suicide [14, 15], including one study focusing on adolescents [14].

Many case-control studies of the US population have found having a gun in the home increases the risk of firearm homicide and firearm suicide, with some studies focusing specifically on adolescents [16]. An ecological study in the US focusing on children found firearm availability was associated with homicide, suicide, and unintentional deaths [17]. That study found that firearm availability was associated not

only with firearm deaths but also with both overall homicide and overall suicide and was not associated with non-firearm homicide or non-firearm suicide.

Gun Laws: The US has among the weakest gun laws among the high-income countries. Most other high-income countries have national firearm licensing systems and strict laws regulating the acquisition of handguns. Some countries require training courses, character references, verified safe storage practices, lengthy reviews of criminal and health histories, and waiting periods. The US requires none of these practices at the federal level, only requiring that purchasers pass an instant background check when purchasing a firearm through a federally licensed dealer [18].

In recent years, at least four literature reviews have tried to determine the effects of US state gun laws on aspects of firearm-related injuries and deaths [19–22]. The main takeaways are, overall, that stronger gun laws are better than weaker ones for reducing firearm deaths, but it is usually difficult to determine the effect of individual laws on firearm deaths and injuries. The literature does suggest that among the most relevant individual laws for reducing firearm fatalities may be universal background checks, waiting periods, and laws restricting firearm ownership for those with a history of violent misdemeanors and intimate partner violence offenses [23, 24]. While few evaluations focus on the effects on child/youth outcomes, there appears to be solid evidence that child access prevention (CAP) laws in the US reduce self-inflicted shootings of children [25].

Evidence of US Adolescent Violence and Suicidality: Comparing US rates of non-firearm homicide or non-firearm suicide with rates in other countries has sometimes been used to try to determine if Americans are potentially more violent or more suicidal. Contrariwise, it has been argued that if American non-firearm homicide or non-firearm suicide is lower than other countries, it means other countries are just substituting other means of killing for guns. Gun advocates tend to use this as a heads-I-win, tails-you-lose proposition. Either way, it's not the guns. It was only if the non-firearm rates were similar that gun advocates could not readily claim guns were not a risk factor for suicide. For non-firearm suicide, American youth have similar rates compared to youth in other high-income countries (see Table 6.1). In 2015, for example, the 15–24-year-old non-firearm US suicide rate was 90% of the overall rate for the other high-income countries.

In contrast, for non-firearm homicide, US youth have much higher rates than similarly aged youth in other high-income countries. This is even in our youngest children where the non-firearm homicide rates for children 0–4 years old was over six times higher in the US compared to other countries in 2015. If these data are accurate, they indicate a major problem for American children and their caregivers since the perpetrators of infant and toddler homicides are commonly the child's father or the mother's boyfriend [26].

American youth 15–24 years old also have substantially higher rates of non-firearm homicide victimization rates than youth in other high-income countries. While the difference seems large (2.6. times the non-firearm homicide rate of youth in other high-income countries in 2015), they are an order of magnitude less than the difference in firearm homicide (31.1 times the rate). The perpetrators of

homicide in this 15–24-year-old age group are typically other youth of similar age. Of course, for those 15–24 years old, there are various reasons why more guns could causally increase not only gun homicides but also non-gun homicides [18]. These reasons include (1) retaliation (guns increase serious violence, leading to retaliation by guns and other methods), (2) lower clearance rates (where there is more gun homicide per criminal justice resources, perpetrators are more likely to get away with murder, and residents grow not to trust the police), (3) reduction in social capital (e.g., more people stay inside and longtime residents move out), (4) a growing tolerance of serious violence, and (5) a more traumatized community with individuals more likely to react violently to signs of disrespect and to perceive innocent actions as signs of disrespect (“hurt people hurt people”).

The fact that the US has a larger percentage of its population incarcerated than any other country, high-, middle-, and low-income, might indicate that we are a highly criminal and violent society. It may also suggest that we are a more punitive society than most. Probably a better measure of underlying crime and violence come from cross-national victimization data using comparable questions, such as the International Crime Victim Surveys (ICVS). Such surveys indicate that at least compared to the other high-income countries, the US is an average high-income country in terms of violent (and nonviolent) crimes [27–29]—except for gun crime. Americans do not have especially higher rates of assaults, sexual assaults, robberies, car theft, burglary, or any non-gun crime compared to other high-income countries. It is thus argued that our high incarceration rates may be attributable to other features of our society such as our moralism, punitive attitudes, and structural characteristics of our government. They do not reflect our underlying rates of crime and violence [30].

6.4 Adolescent Risk Factors

The cross-national studies on rates of violent and nonviolent crimes do not provide data by age of the perpetrator or victim, so they do not directly provide comparable data on youth violence. Some studies have compared American youth to youth in other countries about issues, which are often considered risk factors for self-inflicted or non-self-inflicted violence. Data for these studies typically come from the World Health Organization (WHO) collaborative cross-national studies such as the Health Behavior in School-Aged Children (HBSC) and the Global School-based Health Survey (GSHS).

Alcohol Use: Alcohol consumption is a risk factor for violence. The few studies comparing alcohol use among US adolescents to adolescents in other high-income countries have found US adolescents seem consume at the lower end of the spectrum. For example, from HBSC surveys of weekly alcohol use among adolescents aged 11, 13, and 15 years in 28 countries in North America and Europe, American adolescents ranked 24th in 2010 in terms of the percentage consuming alcohol [31]. A study of tenth graders using HBSC data for three countries (the United States,

Canada, the Netherlands) for 2005–2006 found that for most measures of alcoholic drinking, rates were the lowest in the US [32]. Given the findings of these studies, alcohol use is likely not one of the primary risk factors accounting for the increased rates of firearm homicides and firearm suicides in American youth compared to youth in other countries.

Fighting and Bullying: US adolescents also do not appear to be more likely than youth in other countries to engage in either fighting or bullying. One study of those aged 11–16 years in 79 countries from 2003 to 2011 using both HBSC and GSHS data examined rates of four or more episodes of fighting in the past year, as well as bullying victimization. American youth were on the lower end of the distribution among these countries. For example, US youth experienced lower rates of both frequent fighting and bullying victimization compared to youth in Canada and France [33]. A cross-national study of adolescents aged 11, 13, and 15 years old examined fighting using HBSC data for 2001–2002 across 35 countries and also found US adolescents at the relatively low end of the spectrum for fighting [34]. A cross-national comparison of bullying across 40 countries using HBSC data found adolescents in the US were in the middle of the range of involvement in bullying among both males and females [35]. An earlier cross-national study of those aged 11, 13, and 15 years old in Israel, Ireland, Portugal, Sweden, and the US for 1997–1998 using HBSC data found US adolescents were pretty average in terms of physical fighting, having sustained an injury from fighting, and having bullied others [36]. Based on these findings, it appears that rates of fighting and bullying are not higher in the US compared to other advanced countries. So increased aggressiveness is also likely not a causative factor in the increased rates of firearm deaths in US youth.

Weapon Carrying: This same five-country study found the United States had similar percentages of adolescents who carried a weapon as four other countries (Israel, Ireland, Portugal, and Sweden) [36]. However, another study of seven countries (Belgium–French, Estonia, Israel, Latvia, Macedonia, Portugal, and the United States) using HBSC data for 2001–2002 found the US had the highest percentage of boys and girls who had carried a weapon in the past 30 days (e.g., 22% of boys carried in the US compared to the second high of 19% for Israeli boys). Moreover, among the carriers, the US had the highest percentage of carriers who were carrying firearms (22%) [34].

Violent Media and Violent Video Games: The evidence for a link between violent media use and aggression is remarkably consistent across different countries [37]. Unfortunately, there are no known cross-national studies that include the US on the amount of violent TV and movies watched by adolescents or the time spent playing violent video games. However, HBSC surveys show that US adolescents watch about the same amount of TV (violent and nonviolent combined) as adolescents in 29 other countries and that US adolescents spend relatively less time on the computer (including both gaming and nongaming activities) [38]. In addition, data from a gaming analytics company showed per capita video game revenue for ten countries was higher for Japan and Korea than for the US [39]. It is thus unclear what influence violent media and video games may have on explaining the higher rates of US youth firearm deaths.

Mental Health: We found few cross-national studies on the mental health of American children or youth compared to those in other countries. However, in a study of individuals 18 years and older, from a mix of 17 high- and lower-income countries using the World Health Organization's World Mental Health Surveys, the lifetime prevalence of DSM-IV disorders was highest in the US [40]. An updated version of this study reporting on 28 countries found that more than a third of respondents in the US and four other countries had a lifetime mental health diagnosis [41]. Some of the disorders, especially involving impulse control, often have early age of onset. By contrast, an earlier study of ten countries (Canada, France, Italy, Korea, Lebanon, New Zealand, Puerto Rico, Taiwan, West Germany, the United States) found the US was average in terms of prevalence of major depression and bipolar disorder [42]. A similar study found average US rates for suicide ideation and suicide attempts [43]. Based on these limited data on the mental health of US youth compared to youth in other countries, no conclusions can be made about the contribution of mental health as a risk factor of US youth firearm deaths compared to other countries.

6.5 Research Gaps

Data and research gaps on the issue of firearms and the pediatric populations internationally are enormous. While the quality of the data on the mortality from firearms is considered good in high-income countries, data quality is variable for middle- and low-income nations. Much less is known about morbidity from firearms, with almost nothing known about the circumstances of nonfatal firearm injuries. Cross-national data on household gun ownership is spotty at best, with even less known about adolescent firearm carrying. Comparable cross-national data on many potential adolescent risk factors for firearm injury—e.g., mental health, violent video game play, and firearm use—are largely lacking.

6.6 Conclusions

The Western Hemisphere is home to most of the countries with the worst pediatric firearm injury problems. The United States looks good in comparison to many low-income nations in the Americas but looks terrible when compared to the world's high-income countries. More research on US and international pediatric firearm violence is clearly needed. Compared with many other public health and medical topics, relatively little is known about firearm violence, and firearm studies focused on children and youth in countries other than the US are lacking. The importance of the WHO in organizing the collection of comparable international data is undeniable, as so many of the relevant empirical studies are analyses of WHO-sponsored data collection. But clearly more needs to be done to have accurate and available

data for all countries. Only then can robust cross-national studies be conducted to better understand pediatric firearm deaths and injuries in the United States and other countries.

The available evidence suggests that what explains the high US rates of pediatric firearm deaths compared to other high-income countries has little to do with the underlying aggressiveness or mental health of our children. Rather it appears due to the high prevalence of and easy access to highly lethal firearms in the US. The gun question we always get from our international students is why doesn't the US do more to protect its own children from these guns? Acknowledging that we have a serious problem is an important first step, but it is just one step toward a solution. We must work together to find and implement effective ways to protect our children and youth from firearm deaths and injuries.

Take Home Points

- Countries in Central and South America have the highest rates of pediatric firearm deaths.
- Among high-income countries, rates of pediatric firearm deaths are highest in the United States.
- Easy access to firearms appears to be largely responsible for the relatively high rates of firearm violence in the United States.
- More research is needed on pediatric firearm injuries especially from a cross-national perspective.

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