

Firearm-Related Mortality

A Global Public Health Problem

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Injuries and deaths from firearms are increasingly part of modern consciousness, particularly in some countries. In the United States, gun-related massacres at schools, places of worship, workplaces, night clubs, and recreational venues have seared images of innocent victims in the minds of the populace.



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In the United States and elsewhere, acts of terrorism committed with firearms and other lethal means have changed the way people live, work, travel, and play. For example, in the United States, armed guards patrol some schools, and some politicians have advocated allowing teachers to carry guns. Although mass shootings and terrorist attacks are the most visible form of gun violence, they account for only a small fraction of the public health burden of firearm-related morbidity and mortality.

In this issue of *JAMA*,¹ the Global Burden of Disease 2016 Injury Collaborators and the Institute for Health Metrics and Evaluation used considerable expertise and resources to provide a sweeping view of the magnitude of firearm deaths in 195 countries and territories across the globe. The study estimated that 251 000 firearm-related deaths occurred outside of state-conflict settings in 2016, an increase from an estimated 209 000 firearm-related deaths in 1990. This constitutes a major public health problem for humanity.

Several aspects of how these deaths were distributed are noteworthy. First, 64% of firearm-related deaths were homicides, 27% were suicides, and 9% were unintentional deaths.

Second, in all but 1 year of the 27-year study period (1994; genocide in Rwanda), firearm deaths were more common outside war settings than within them.

Third, the global burden of firearm mortality was highly concentrated. In 2016, six countries in the Americas—Brazil, the United States, Mexico, Columbia, Venezuela, and Guatemala—accounted for 50.5% of all deaths. An estimated 32.0% of the deaths occurred in just 2 countries—Brazil and the United States—with Brazil accounting for one-fourth of all firearm homicides and the United States accounting for 35% of all firearm suicides.

Fourth, there was tremendous variation in rates of firearm-related deaths across countries. The lowest firearm suicide rate was 0.1 per 100 000 persons in Singapore, and the rate was 6.4 per 100 000 persons in the United States; whereas firearm homicides varied from close to zero in Singapore to 38.9 per 100 000 persons in El Salvador. In some countries (eg, Brazil, Columbia, Mexico, the Philippines, and South Africa), the vast majority of firearm-related deaths were homicides, and suicides were a small minority. In other mostly rich countries

(eg, Australia, Canada, France, Germany, and Sweden), the opposite was true—suicides dwarfed homicides. For example, the firearm-related suicide rate was 6.6-fold higher than the firearm-related homicide rate in France and 7.5-fold higher in Germany. In a few countries, such as China and Saudi Arabia, unintentional deaths reportedly predominated.

Fifth, although aggregate rates of firearm deaths decreased over the study period at an annualized rate of 0.9%, these rates were either constant or increased in 18 countries, 14 of which are in Latin America and the Caribbean.

The study raises many important questions, not least of which is what explains the multiple dimensions of variation in the rates of firearm-related deaths. One obvious candidate, given evidence that access to firearms is a recognized risk factor for firearm-related mortality,² is the prevalence of guns in civilian hands. The investigators explored this possibility using 2 measures to approximate the prevalence of firearms in civilian hands: estimates from the global Small Arms Survey³ and the proportion of suicides due to firearms.⁴ These are questionable proxies. The Small Arms Survey relies on extrapolations in many countries where registry data do not exist, and its estimates are more than a decade old. Firearm suicide has not been validated as a proxy measure of gun density outside a small number of non-Western countries, and even in these countries, the validity of this proxy measure may be restricted to comparisons between jurisdictions with large differences in the proportion of gun density.⁴

Another explanation the authors offer for the variation they detect is sociocultural. For example, large differences in incidence and the proportion of gun deaths due to suicide may partly reflect religious and cultural differences in the acceptability of suicide or of suicide by this method. Other research has highlighted the influential nature of such factors on risks of firearm suicide.^{5,6}

The broad view of the global burden of deaths due to firearms provided by this study may offer insights to individual countries. What can countries in the Americas learn from Japan and Singapore that might help reduce gun deaths? To what extent have particular national laws contributed to prevention, and how transferrable are those laws to other countries with different cultures, political structures, and histories? What lessons are offered by countries such as the Philippines and Australia, where the annual incidence of firearm suicides has decreased by more than 5%, or Estonia and Taiwan, where the annual incidence of firearm homicides has decreased by 6%?

For individuals living in the United States, where the national policy debate has focused largely on interpersonal violence, the study provides a reminder of the importance of firearm suicide. In 2016, there were 2 firearm suicides for every firearm homicide, a margin that has widened over the past decade as suicide rates have increased and homicide rates have been relatively flat.⁷ Older white non-Hispanic men are at greatest risk of firearm suicide.⁷ Research and prevention efforts in the United States should proceed from a more inclusive definition of firearm violence.

The authors also highlight the need for further research on the causes of firearm violence and strategies for prevention. More robust methods for estimating the number and distribution of firearms in the population—at both the national and international levels—are critically important. In addition to knowing how many people own guns, reliable estimates of how many people have easy access to guns would be valuable because this may be the strongest risk fac-

tor for firearm injury and death. A better understanding of access is likely also critical in determining which policies and prevention strategies are most effective and how best to implement them. In addition, much more knowledge is needed about why people keep firearms. Efforts to prevent firearm violence that do not proceed from a clear understanding of both why people own firearms and the perceived barriers to change will have limited success, as the experience to date demonstrates.^{8,9}

In the United States, research on firearm violence has been impeded by the Dickey amendment, which has largely prevented the Centers for Disease Control and Prevention and other federal agencies from funding such research since 1996.¹⁰ In the absence of this funding, several private foundations have stepped in to fill the void. However, real progress in addressing the vast public health problem that the Global Burden of Injury Collaborators document will depend on sustained action from governments in both research and policy.

ARTICLE INFORMATION

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