Firearm Violence Research
Improving Availability, Accessibility, and Content of Firearm-Related Data Systems

Firearm violence continues to exert its devastating toll as a public health crisis in the United States—more than 35,000 individuals in the United States die from firearm-related injuries each year. The medical and public health community as well as the public have become increasingly vocal in advocating for policies that could reduce the burden of firearm-related injury and death. While there has been little legislative activity regarding firearms at the federal level, states have been active in implementing several laws through both legislative and initiative mechanisms in recent years. The result is a series of “natural experiments,” in which some states have specific laws that have been or are being implemented or repealed over time. Even among states with laws in specific domains, there is substantial heterogeneity in components of these laws. Examples include universal background checks (requiring background checks for firearm transfers whether they are purchased from a licensed dealer or an unlicensed seller), permit to purchase (requiring firearm purchasers to apply to law enforcement agencies to obtain a permit before approaching sellers), extreme risk protection orders (allowing families or law enforcement officers to petition a court to temporarily restrict access to firearms for a person at high risk of harming themselves or others), and firearm storage laws (requiring some form of storage, such as use of a locking device, in certain situations when firearms are not in use). A thorough assessment of the effectiveness of these policies requires data on firearm ownership and storage comparisons between states and over time. However, in most states, such data currently do not exist or are not available to researchers.

Although much has been written about limitations in funding for firearm violence research, especially at the federal level, relatively less attention has been devoted to barriers in obtaining and accessing data needed to address important policy and practice questions. The availability of funds to collect data by researchers is imperative; nonetheless, there are circumstances in which the lack of access to pertinent information that is not readily collectible by investigators, regardless of research funding, can adversely affect specific areas of inquiry in firearm violence.

In this Viewpoint, we use the categories of firearm ownership and storage, firearm purchase, and firearm tracing to highlight the importance of data systems in firearm violence research. For each category, some examples of scholarly publications in medical and health sciences journals are listed that were made possible in prior years by the use of data that do not currently exist or are no longer accessible by researchers. Suggestions are provided to address these barriers and facilitate research on firearm violence toward reducing the morbidity and mortality associated with it.

Firearm Ownership and Storage
In contrast to motor vehicles, US states do not collect and make available licensure system data on firearm ownership. One of the largest annual surveys of US residents is the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS included questions about household firearm ownership and storage in some states in the 1990s through 2004. Firearm ownership questions were part of the core survey section in 2001, 2002, and 2004, and firearm storage questions were part of the core survey section in 2002 and 2004. These data allowed determination of household firearm ownership and storage nationally by state and facilitated research on a variety of questions related to risk and occurrence of firearm-related injuries. No questions about firearms have been included in the BRFSS core survey section after 2004. Since then, a few states have used the BRFSS state-added question mechanism to collect information about firearm ownership and storage in those specific states.

Lack of state-level representative data on firearm ownership and storage continues to negatively affect studies that seek to examine the effectiveness of various policies on firearm violence. Investigators have used creative analytic approaches to develop proxies for state-level firearm ownership; however, those methods have their limitations and are not a replacement for direct assessment of firearm ownership. Others have conducted their own nationally representative surveys to quantify individual and household firearm ownership and storage. However, the sample size of such surveys and their relative infrequency make them an inadequate substitute for annual national data, especially data that can be representative at the state level, as was the case for the BRFSS.

Firearm Purchase
To our knowledge, California is currently the only state that makes data on firearm purchase available to investigators. In some other states, this information used to be available to researchers. For example, a database of surveys to quantify individual and household firearm ownership and storage.

Corresponding Author: Ali Rowhani-Rahbar, MD, MPH, PhD, Department of Epidemiology, University of Washington, PO Box 357236, Seattle, WA 98195 (rowhani@uw.edu).

© 2019 American Medical Association. All rights reserved.
handgun purchases was established in the early 1930s in Washington as a way to trace handguns confiscated during crimes. The data were originally collected by law enforcement agencies and sent to the state for entry into a registry. After 1975, purchase information was sent by licensed firearm dealers directly to the Department of Licensing, where it was entered into a computer database and could be used by researchers. Information collected at the time of purchase included purchaser name; date of birth; sex; address; date of purchase; and handgun make, model, and caliber. The handgun purchase data in Washington have not been accessible to researchers since 1995.

Data on firearm purchase led to important scientific publications. In 1999, investigators in California identified that handgun purchases were associated with substantially elevated risks of suicide in the subsequent week. In 1997, investigators in Washington found legal purchase of a handgun to be associated with long-lasting elevated risks of violent death. If firearm purchase data were available, the ability to link data to records, such as vital statistics, hospital admissions, and criminal arrests, would allow for an enhanced understanding of the relationship between recent firearm purchase and those outcomes as well as the potential modifying effect of laws on that relationship.

Firearm Tracing
Investigators used firearm tracing data from the 1980s to the 1990s to address questions of policy importance, such as the temporal associations between federal firearm laws and the diversion of firearms to those who commit crimes and restriction of handgun purchases as a means of disrupting the illegal interstate transfer of firearms. In 2003, the Tiahrt Amendment was signed into the law as a provision of the US Department of Justice appropriations bill prohibiting the National Tracing Center of the Bureau of Alcohol, Tobacco, Firearms and Explosives from releasing information related to its firearms trace database to anyone other than a law enforcement agency or prosecutor in connection with a criminal investigation.10 As such, this law precluded data on individual-level firearm tracing from being used in academic research. If firearm tracing data were available, that information could enhance understanding of firearm trafficking, practices of specific retailers, and the influence of policies on reducing the circulation of illegal firearms as well as their effects on firearm injury and death.

Future Path
Firearm violence research is currently limited by major barriers to both data availability and accessibility. Some steps to overcome these challenges may include adding firearm ownership and storage questions back to the BRFSS core survey section; conducting statewide surveys by researchers and public health practitioners to quantify firearm ownership and storage; retaining data on firearm sales by state licensing agencies that can be used through a trusted third party for linkage with other administrative records and providing de-identified linked data to approved qualified investigators; requiring data on recovered firearms to be deposited with the state Department of Justice and made available to researchers; and repealing or modifying the Tiahrt Amendment to allow researchers access to firearm tracing data.

In addition to providing sufficient research funding, a serious commitment to enhancing current firearm data systems, infrastructures, and regulations, as well as improving the availability and accessibility of firearm-related data for research, is required to reduce the burden of firearm violence.

ARTICLE INFORMATION
Published Online: October 11, 2019. doi:10.1001/jama.2019.16286

Conflict of Interest Disclosures: Dr Rowhani-Rahbar reported receiving grants from the National Institutes of Health, the US Department of Justice, and Arnold Ventures and contracts from City of Seattle and State of Washington. Dr Rivara reported receiving grants from the National Institutes of Health, the US Department of Justice, Arnold Ventures, and the City of Seattle and contracts from the State of Washington. No other disclosures were reported.

Additional Contributions: The authors wish to thank David Hemenway, PhD (Harvard University), and Garen Wintemute, MD, MPH (University of California), for their insightful comments on an earlier draft of this article.

REFERENCES