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State Firearm Laws and Interstate Firearm Deaths From Homicide and Suicide in the United States: A Cross-Sectional Analysis of Data by County

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State Firearm Laws and Interstate Firearm Deaths From Homicide and Suicide in the United States: A Cross-Sectional Analysis of Data by County

Abstract

In a cross-sectional analysis of deaths from 2010 through 2014, states with strong gun laws had lower rates of firearm-related homicide and suicide than states with less regulation. Counties in states with less restrictive firearms laws had relatively lower rates of firearm-related homicide when they bordered states with strict gun laws. In contrast, rates of gun violence in areas with strong gun laws were unaffected by lenient laws in neighboring states. Restrictions on the sale and ownership of firearms may have measurable effects on rates of firearm deaths, with potential spillover across state lines.

Keywords

firearms, firearm violence, gun violence, homicide, suicide, firearm policy

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Research BRIEF

Research to Improve the Nation's Health System

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STATE FIREARM LAWS AND INTERSTATE FIREARM DEATHS FROM HOMICIDE AND SUICIDE IN THE UNITED STATES: A CROSS-SECTIONAL ANALYSIS OF DATA BY COUNTY

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KEY FINDINGS

In a cross-sectional analysis of deaths from 2010 through 2014, states with strong gun laws had lower rates of firearm-related homicide and suicide than states with less regulation. Counties in states with less restrictive firearms laws had relatively lower rates of firearm-related homicide when they bordered states with strict gun laws. In contrast, rates of gun violence in areas with strong gun laws were unaffected by lenient laws in neighboring states. Restrictions on the sale and ownership of firearms may have measurable effects on rates of firearm deaths, with potential spillover across state lines.

THE QUESTION

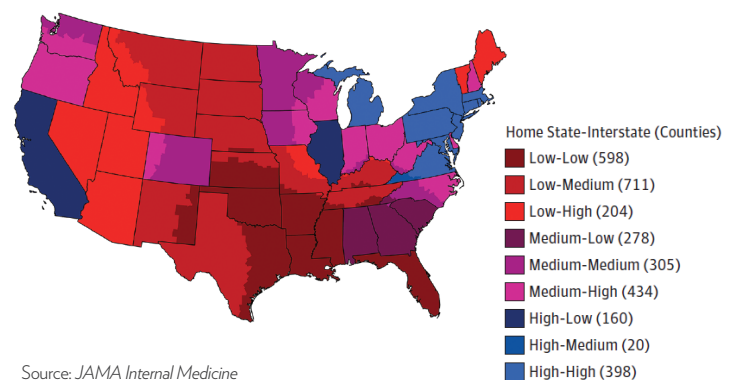
Firearms were linked to more than 36,000 deaths in the United States in 2015, including 22,000 suicides. Firearms are involved in half of all suicides and two-thirds of all homicides. Regulations regarding the sale, movement, and exchange of firearms are primarily drafted and enforced at the state level. However, firearms can easily move across state lines, which generates challenges for law enforcement. Previous research has identified an association between strengthening gun policies and decreasing firearm-related deaths, but there are no rigorous studies of the interstate spillover effects of firearm restrictions.

Using a spatial statistical model, the authors assessed the relationship between state firearm laws and interstate rates of firearm-related death. The authors assigned “policy scores” to individual counties based on the strength of their state’s gun restrictions and their neighboring states’ gun restrictions. They assessed whether counties located closer to states with low policy scores (that is, lenient gun laws) have higher firearm death rates.

THE FINDINGS

The map below shows the distribution of state and interstate policy scores by county. California had the strongest gun restrictions, although many of its counties are adjacent to states with more lenient regulations.

GEOGRAPHIC DISTRIBUTIONS OF COMBINED HOME STATE AND INTERSTATE POLICY SCORES

Source: *JAMA Internal Medicine*

Suicide. Counties in states with high levels of gun restrictions had the lowest rates of firearm suicide and overall suicide, regardless of the strength of policies in neighboring states. Adjusting for demographics, counties with the lowest home state/interstate policy scores had 1.35 times the risk of firearm suicides than counties with the highest home state/interstate policy scores. Non-firearm suicides were unaffected by the strength of firearm policy.

Homicide. Counties in states with high levels of gun restrictions had the lowest rates of firearm homicide, and lowest rates of homicide overall. Adjusting for demographics, counties with the lowest home state/interstate policy scores had 1.38 times the risk of firearm homicides than counties with the highest home state/interstate policy scores. Non-firearm homicides were unaffected by the strength of firearm policy.

Counties in states with low levels of firearm regulation had higher rates of firearm homicide, but homicide rates were lower in counties closer to states with stronger regulation. There was no corollary effect for firearm-related suicides: firearm suicide rates are higher in states with lenient gun laws, and proximity to states with stronger gun laws had no effect on those death rates.

THE IMPLICATIONS

This study enriches the literature regarding the effects of gun legislation on rates of death, and the potential spillover of policies across state lines. First, states with strong gun laws had lower rates of all types of gun-related deaths. Second, states with more lenient gun laws had higher rates of firearm suicide and homicide. But these states might have benefited from proximity to a state with stricter laws, as firearm homicide rates were lower than expected in counties that bordered states with stronger gun laws.

This important finding suggests that stricter gun laws may have salutary effects across state lines. This effect does not extend to firearm suicide rates, which were unrelated to interstate policy scores. This finding is in line with earlier work that suggests that legally purchased weapons are the most significant facilitators of suicide, because suicidal intent is often transient and guns are the most effective method of suicide.

THE STUDY

The authors constructed a spatial statistical model of firearm death rates by county from January 2010 to December 2014. Firearm deaths were calculated using Centers for Disease Control and Prevention data. Data on the relative strength of state gun laws were gathered from the Law Center to Prevent Gun Violence. The authors selected six types of laws based on evidence regarding the laws with the largest impact on firearm deaths and trafficking, including: dealer regulation, background checks for private sales, license to purchase or own, junk gun regulations, reporting requirements for lost or stolen guns, and limitations on multiple purchases. For each category of regulation, states were assigned a score of 0 to 2 (low to high), and the scores were summed to obtain an index of all laws.

Each of 3,108 counties in the 48 contiguous states was assigned a home state policy score and an interstate policy score. Borrowing from other work in transport geography, the authors assumed that interstate policy effects would be greatest between places located close to one another, and that states with larger populations would have greater effects over larger distances than smaller states. Having assigned each county an interstate and home-state score, the authors grouped the counties into three groups based on state-level gun control measures (high, medium, and low) with three subgroups based on interstate gun policy scores (high, medium, and low).

For each of the nine groups, the authors calculated all-cause suicide and homicide rates, firearm-linked suicide and homicide rates, and non-firearm linked suicide and homicide rates. The authors used counties with the highest home state/interstate policy scores as the comparison group for other counties. The analyses controlled for crime rates at the county level to isolate the effect of gun policy.

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Elinore Kaufman, MD, MSHP is an alumna of Penn's Masters of Science in Health Policy Research Program. She is currently Chief Resident in general surgery at New York-Presbyterian Weill Cornell Medicine, and plans to pursue a fellowship in trauma surgery and surgical critical care after graduation.

She is dedicated to a comprehensive understanding of injury and violence as public health challenges. Her research focuses on trauma care and injury prevention, ranging from qualitative assessment of patient-centered care in the trauma bay to national analyses of drunk driving prevention policies and gun control laws.