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Geographic Disparities in Rising Rates of Firearm-Related Homicide

Rosanna Smart, Ph.D.,
RAND, Santa Monica, CA

Terry L. Schell, Ph.D.,
RAND, Santa Monica, CA

Andrew R. Morral, Ph.D.,
RAND, Arlington, VA

Nancy Nicosia, Ph.D.
RAND, Boston, MA

To THE EDITOR:

After two decades of decreasing rates, the rate of homicides in the United States began increasing in 2014.¹ The increase has been driven entirely by a rise in firearm-related homicides, which diverged from the trend in non-firearm-related homicide in the late 2000s, starkly separated from it in 2014, and reached a rate of 4.4 deaths per 100,000 population in 2019 (Fig. S1A in the Supplementary Appendix, available with the full text of this letter at [NEJM.org](https://www.nejm.org)).^{2,3} In 2019, firearm use accounted for three of every four homicides, the highest ratio since systematic data on homicide mechanisms became available (Fig. S1B).² Although increasing rates of firearm-related homicides have garnered attention from researchers and the media, limited research has evaluated the extent to which this increase is a national phenomenon or is concentrated among geographic areas or demographic groups.

We used mortality microdata from 2006 through 2019⁴ and mixed-effects negative binomial regression models that predicted annual firearm-related homicides within demographic groups to estimate changes in the rates of firearm-related homicides (see the Supplementary Appendix). On average, the rate of firearm-related homicides decreased by 1% annually from 2006 to 2014 (incidence rate ratio, 0.99; 95% confidence interval [CI], 0.99 to 0.99) and then increased by 6% annually from 2014 to 2019 (incidence rate ratio, 1.06; 95% CI, 1.04 to 1.07); during the latter period, trends across the 50 U.S. states and the District of Columbia varied substantially (Fig. 1).

Many of the states with the highest risk in 2014 (Fig. 1A) also had the largest relative increases in risk over the period from 2014 through 2019 (Fig. 1B), thereby compounding existing geographic disparities. Among the most notable divergences were the relatively

rsmart@rand.org .

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worsening conditions in some Midwest and South–Central states (e.g., increases of 75 to 115%). These state-specific results were adjusted for demographic characteristics and county urbanicity (an indicator for deaths occurring in a county that is part of a large metropolitan area). However, as with the widening geographic disparities, there was strong evidence of recent trends having diverged substantively across demographic groups in ways that similarly exacerbated preexisting disparities in the risk of firearm-related homicide (Fig. S2). Specifically, with controls for age, urbanicity, sex, and state, the annual increase in the rate of firearm-related homicide from 2014 to 2019 was 7% higher among American Indians and Alaska Natives than it was among non-Hispanic Whites (95% CI, 1.04 to 1.11) and 2% higher among non-Hispanic Blacks (95% CI, 1.01 to 1.03) than it was among non-Hispanic Whites.

In sharp contrast to the decreasing disparities in firearm-related violence during the 1980s and 1990s,⁵ recent trends have exacerbated existing disparities such that geographic and demographic groups that were already heavily exposed to firearm-related violence have had some of the largest increases, as measured in both relative and absolute terms. These increases are specific to firearm-related homicide and are not mirrored in trends in non–firearm-related homicide (see the Supplementary Appendix). Research is urgently needed to understand the societal shifts that contribute to these large changes in firearm-related violence within particular groups and to identify ways to reverse those trends.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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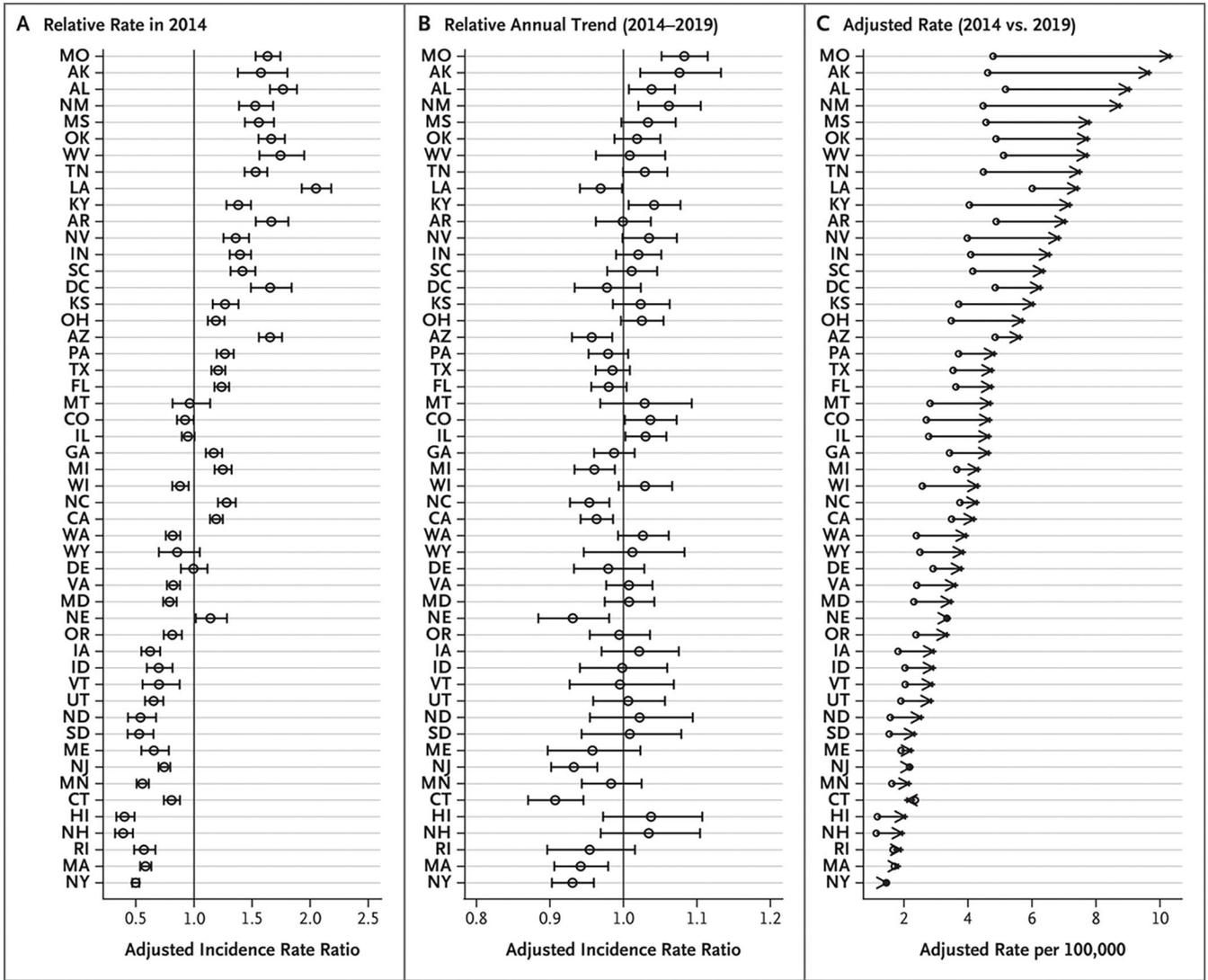


Figure 1. Adjusted Incidence Rate Ratios and Adjusted Rate Estimates of Firearm-Related Homicide, According to State.

Panel A shows adjusted incidence rate ratios that represent rates of firearm-related homicide according to state (including the District of Columbia [DC]) in 2014 relative to the average mean rate of firearm-related homicide for all states, with adjustment for demographic characteristics and whether a given county was urban (urbanicity). An incidence rate ratio of 1 represents an average mean rate of firearm-related homicide in the state in 2014 of 3.2 per 100,000 population. Error bars in Panels A and B indicate 95% confidence intervals. For example, the incidence rate ratio of 2.05 for Louisiana (LA) suggests that the rate of firearm-related homicide in that state in 2014, in an analysis controlled for demographic characteristics and urbanicity, was about twice the rate of the average state. State names are denoted by U.S. Postal Service state abbreviations. Panel B shows adjusted incidence rate ratios for the annual increase in the rate of firearm-related homicide from 2014 to 2019, representing state-specific trends relative to the average trend across states. An incidence rate ratio of 1 in Panel B represents the average annual trend in the rates of

firearm-related homicide for all states from 2014 through 2019, which was a 2% annual increase. For example, the incidence rate ratio of 1.08 for Missouri (MO) suggests that the rate of firearm-related homicide in that state increased 8% faster than the average annual rate increase for all states. Panel C shows model-estimated rates of firearm-related homicide for 2014 and 2019 for each state, with all other demographic characteristics and urbanicity held at the mean values but with allowance for national and state-specific trends. For example, the adjusted rates for Missouri indicate that if the mean values of demographic characteristics and urbanicity were held constant, Missouri had an approximate doubling of the rate of firearm-related homicide (from 4.8 per 100,000 population to 10.3 per 100,000 population). Arrows indicate the rate increase from 2014 (circle) to 2019 (plus sign). In all three panels, the states along the y axes are ordered top to bottom from largest to smallest rate according to the model-estimated rate of firearm-related homicide for 2019.

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