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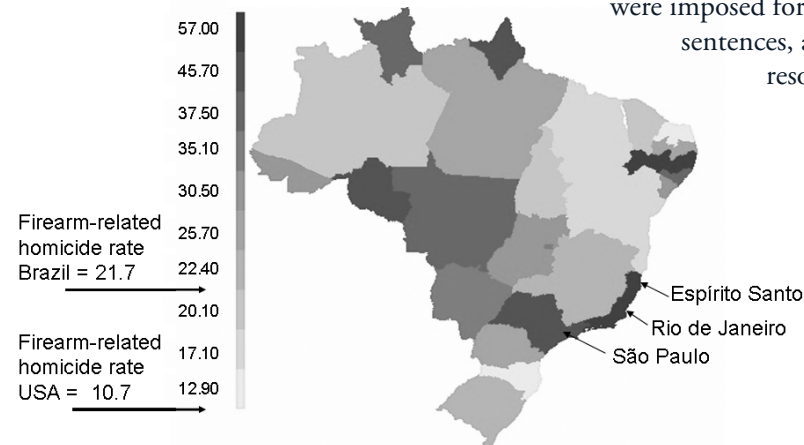
Reducing Firearm Injury: Lessons from Brazil

Editor's note: For the second straight year, large cities in the U.S. are experiencing an alarming increase in homicides, mostly committed with firearms. Philadelphia reported 406 homicides in 2006, giving it the highest rate of homicides among the ten largest cities (27.8 per 100,000 people). This trend has renewed interest in policies to limit the availability of firearms. However, the effectiveness of such policies at reducing injury remains controversial, often creating political deadlock. To inform this debate, we look at evidence from Brazil, a country with even greater levels of violence than the U.S. This Issue Brief analyzes recent gun legislation and other violence reduction policies in Brazil and their effects on firearm violence.

Brazil has twice the rate of firearm-related homicides as the U.S.

Brazil has one of the world's highest homicide rates. Homicide is the leading cause of death for men ages 15-44; more than 70% of these deaths involve a firearm.

- In 2002, Brazil had a homicide rate from firearms of 21.7 per 100,000 people, compared to 10.7 per 100,000 in the U.S. As the map below shows, this rate varies considerably among Brazil's 26 states, including high-crime spots such as São Paulo (2003 population: 39 million; male firearm mortality rate: 50/100,000), Rio de Janeiro (15 million; male firearm mortality rate: 82.9/100,000), and Espírito Santo (3 million; male firearm mortality rate: 70.4/100,000).
- In 2003, Brazil had 39,325 firearm-related deaths, more than 90% of which were homicides. In October 2003 the Brazilian government passed a set of laws aiming to reduce gun violence. These measures sought to control the flow of firearms into the country, made it illegal to own guns that are not registered or to carry guns outside of one's home or business, instituted background checks for gun purchases, and raised the minimum age for gun purchase to 25. New penalties were imposed for violating these laws, including fines and tougher prison sentences, and the federal government provided significant resources to help municipalities enforce these laws.



Source: Brazilian Ministry of Health, 2002

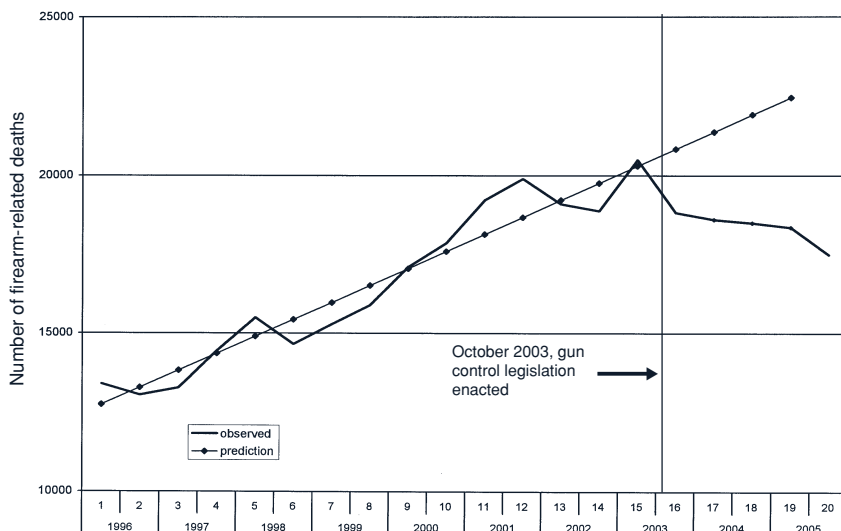
New study analyzes gun legislation's effect on deaths and hospitalizations

Macinko and colleagues studied whether these measures reduced firearm-related deaths and hospitalizations in Brazil. The study takes advantage of a natural experiment, since the two national interventions were implemented at two different time periods after nearly a decade of increasing firearm-related deaths and hospitalizations.

- The investigators used vital statistics data for each six-month period between 1996 and 2004 to analyze time trends in firearm-related mortality. They modeled predicted death rates based on historical trends, and compared them with observed death rates in 2004 and 2005 after the interventions were implemented.
- Similarly, they modeled firearm-related hospitalizations using hospital information system data from 2002 on, and compared the expected hospitalizations with the observed ones in 2004-2005.
- To understand differences by region, they also modeled firearm-related mortality and hospitalizations by state, and by capital cities of states.
- The investigators interpreted the difference between the predicted and observed rates to be the impact of the intervention, since no other sudden nationwide changes in mortality or hospitalizations were reported over this time period.

Firearm-related mortality declines after implementation of gun laws

Brazil experienced a decline in firearm-related deaths from 2003 to 2005, reversing the historical trend toward increasing levels of firearm-related violence. These improvements were not offset by homicides committed using other weapons.



- Beginning in the first months of 2004, the historical increase in firearm deaths halted, and the number of deaths decreased. From 2003 to 2005, the number of firearm deaths decreased by 8.8%.
- Observed rates were 15.8% lower than predicted ones in the same time period (see graph below). These results suggest that the gun interventions implemented in 2003 and 2004 might have averted as many as 4,746 deaths in 2004, and 7,938 deaths in 2005.

Gun-related hospitalizations decline as well

The investigators found a parallel drop in hospitalizations for firearm-related injuries from 2003 to 2004. This decline took place in the context of a trend in overall hospitalization rates to increase or remain stable in most states.

- In 2003, there were 21,329 hospitalizations for firearm-related injuries in Brazil. In 2004, firearm-related hospitalizations declined by 4.6%.
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- In absolute terms this decline was primarily a result of decreased hospitalizations for firearm-related intentional injuries; the greatest proportional decreases were for unintentional injuries (13% decline) and attempted suicides (18% decline).

Impact of federal gun policies varies by how well they are implemented at local level

Although the overall levels of firearm-related deaths and hospitalizations for the country decreased greatly in 2004 and 2005, there were important regional differences. The investigators examined how implementation of federal policies varied in three high-crime states and the associated patterns of hospitalization rates. They also examined how municipal actions taken to implement gun laws affected firearm-related death rates.

- São Paulo has one of the country's highest rates of gun violence. It has strictly enforced gun laws (the rate of arrests for firearm possession was 50 per 100,000, higher than the national average of 40 per 100,000). It also had one of the highest rates of gun buyback in the country (188 per 100,000). Hospitalization rates for firearm-related injuries dropped about 15% in 2004, with the timing of the declines coincident with implementation of the new gun laws.
- Rio de Janeiro has some of the most pervasive levels of drug trafficking and violent crime, and is known to have a weak law enforcement infrastructure. Arrests for gun possession were below the national average (30 per 100,000) and did not increase in 2004-2005. However, federal and local authorities heavily supported the voluntary disarmament program, resulting in buyback rates of 193 per 100,000. Hospitalization for firearm-related injuries did not decrease from 2003 to 2004, but fell about 12% after the buyback programs were implemented.
- Espírito Santo also has high rates of violent deaths, and like Rio, has limited law enforcement infrastructure. In 2004, rates of arrests for firearm possession were 20 per 100,000—half the national average. It also had low levels of arms buyback, collecting only 86 per 100,000. Hospitalizations for firearm-related injuries increased dramatically after the gun laws took effect, and continued to vary up to three times higher than the previous year.
- Municipalities across the country could apply for federal funds to implement the gun laws and improve their public safety infrastructure. Those that received federal funds and implemented public security plans were significantly more likely to experience declines in firearm-related mortality than municipalities that took neither action. For example, in the city of São Paulo where all interventions were implemented, firearm-related mortality declined by 41%; in the city of Rio de Janeiro, where only some interventions were implemented, rates declined by 17.5%, and in Victoria, the capital city of Espírito Santo, few interventions were implemented and death rates actually increased by 14.6%.

POLICY IMPLICATIONS

This study suggests that a good portion of recent declines in firearm-related deaths and hospitalizations in Brazil can reasonably be attributed to new government measures aimed at reducing the availability of firearms, the strengthening of local capacity to enforce gun measures, and the mobilization of civil society to support these actions. These findings should stimulate further debate over whether regulation of firearms can be an effective strategy in reducing gun-related violence in the U.S.

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POLICY IMPLICATIONS

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- In Brazil, policymakers created a coherent, national set of gun control laws. This, in combination with improved law enforcement strategies, civic engagement (church-led buyback programs), and investment in municipal infrastructure resulted in sustained reductions in firearm violence.
- The variation in effectiveness of the new measures regionally and in different metropolitan areas shows the important synergistic effects of these actions and demonstrates that expected policy impacts are likely to differ depending on geography, demographics, and the political commitment within the locality.
- Federal leadership in passing the gun control measures also stimulated the mobilization of civil society which, in turn, helped foster popular support for local level violence prevention strategies.
- In October 2005, Brazilians voted to reject a complete ban on firearms. Thus, Brazil may serve as an important example of how a country can address pervasive gun violence even while maintaining private ownership of firearms.

This Issue Brief is based on the following article: M.D.M. de Souza, J. Macinko, A.P. Alencar, D.C. Malta, O.L.D. Neto. Reductions in firearm-related mortality and hospitalizations in Brazil after gun control. Health Affairs, March/April 2007, vol. 26, pp. 575-584; and updated 2005 statistics from the Brazilian Ministry of Health, Secretariat for Epidemiologic Surveillance.

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