Testimony

State Firearm Laws and Suicide Prevention

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Testimony of Andrew R. Morral[1]
The RAND Corporation[2]

Before the Committee on Health Care
Vermont House of Representatives

February 14, 2023

Thank you, Chair Houghton, Vice Chair McFaun, Ranking Member Black, and distinguished members of the House Committee on Health Care for the opportunity to testify today on what scientific research can tell us about the effects of state firearm laws on suicide. The views I will share are based on a series of peer-reviewed reports published by RAND as part of its Gun Policy in America initiative, a multiyear effort to better understand the effects of gun laws.[3] The goal of this initiative is to establish a shared set of facts that will improve public discussions and support the development of fair and effective gun policies.

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[1] The opinions and conclusions expressed in this testimony are the author's alone and should not be interpreted as representing those of the RAND Corporation or any of the sponsors of its research. Portions of this testimony are drawn from Andrew R. Morral, *Scientific Evidence on the Effects of State Gun Laws*, RAND Corporation, CT-518, 2019, https://www.rand.org/pubs/testimonies/CT518.html.

[2] The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. RAND's mission is enabled through its core values of quality and objectivity and its commitment to integrity and ethical behavior. RAND subjects its research publications to a robust and exacting quality-assurance process; avoids financial and other conflicts of interest through staff training, project screening, and a policy of mandatory disclosure; and pursues transparency through the open publication of research findings and recommendations, disclosure of the source of funding of published research, and policies to ensure intellectual independence. This testimony is not a research publication, but witnesses affiliated with RAND routinely draw on relevant research conducted in the organization.

[3] See Rosanna Smart, Andrew R. Morral, Rajeev Ramchand, Amanda Charbonneau, Jhacova Williams, Sierra Smucker, Samantha Cherney, and Lea Xenakis, *The Science of Gun Policy: A Critical Synthesis of Research Evidence on the Effects of Gun Policies in the United States*, 3rd ed., RAND Corporation, RR-A243-4, 2023, https://www.rand.org/pubs/research_reports/RRA243-4.html; Rosanna Smart, Andrew R. Morral, and Terry L. Schell, *The Magnitude and Sources of Disagreement Among Gun Policy Experts*, 2nd ed., RAND Corporation, RR-A243-3, 2021, https://www.rand.org/pubs/research_reports/RRA243-3.html; Terry L. Schell, Beth Ann Griffin, and Andrew R. Morral, *Evaluating Methods to Estimate the Effect of State Laws on Firearm Deaths: A Simulation Study*, RAND Corporation, RR-2685-RC, 2018, https://www.rand.org/pubs/research_reports/RR2685.html; and Terry L. Schell, Matthew Cefalu, Beth Ann Griffin, Rosanna Smart, Andrew R. Morral, "Changes in Firearm Mortality Following the Implementation of State Laws Regulating Firearm Access and Use," *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 117, No. 26, June 30, 2020.

This testimony is also informed by my own assessment of recently published studies as part of ongoing research funded by Arnold Ventures, as well as my experiences as director of the National Collaborative on Gun Violence Research (NCGVR), a private philanthropy that funds research on gun violence prevention. The collaborative was created with a $20 million seed grant from Arnold Ventures, which recognized the urgent need for greater investment in this arena. To date, NCGVR has provided $22 million in funding for research studies across the country.[4]

In this testimony, I will make three points:

1. Vermont has an unusually high rate of suicide. The high rate of suicide is associated with Vermont's high household firearm ownership rate.
2. There is credible scientific evidence to support the belief that safe firearm storage laws and waiting period laws like those implemented in other states may reduce state suicide rates among young people.
3. We do not have a comprehensive understanding of the full range of costs and benefits associated with any gun laws.

Firearms and Suicide in Vermont

In 2020, Vermont's suicide rate of 18.8 deaths per 100,000 population was 35 percent higher than the national average of 14 per 100,000. Of the 117 state residents who died by suicide in 2020, 69 (or almost 60 percent) died of a firearm injury. Almost all of these deaths (62 of the 69) were among men and boys, who had a firearm suicide rate more than 50 percent higher than the national average for men and boys in 2020. Over the past decade, Vermont's firearm suicide rate among youths 20 and younger has been 47 percent higher than the national average. In contrast, Vermont's suicide rate involving means other than firearms is only 16 percent higher than the national average.[5]

Hunting, sport shooting, and firearm ownership are long-standing traditions in Vermont, a state with one of the highest firearm ownership rates in the country. RAND research estimates that, in 2016, 47 percent of Vermont households owned a firearm, which was almost 50 percent higher than the national household firearm ownership rate of 32 percent.[6] There is good reason to believe that these ownership rates have risen since 2016, as they have in most states.

There is a common belief that firearms are incidental to suicide rates because a person determined to die by suicide will do so whether a firearm is available or not. But there is now

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[4] RAND staffs the National Collaborative on Gun Violence Research but does not establish its research agenda or make decisions about which research projects to fund. Those decisions are made by an independent advisory committee. Information on the collaborative, its advisory committee, and RAND's staffing roles is available at National Collaborative on Gun Violence Research, homepage, undated, www.ncgvr.org.

[5] The statistics in this paragraph are from Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, "Mortality 1999-2020," on CDC WONDER, online database, 2021, http://wonder.cdc.gov/mcd-icd10.html. Data are from the "Multiple Cause of Death, 1999–2020," files, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program.

[6] Terry L. Schell, Samuel Peterson, Brian G. Vegetabile, Adam Scherling, Rosanna Smart, and Andrew R. Morral, *State-Level Estimates of Household Firearm Ownership*, RAND Corporation, TL-354-LJAF, 2020, https://www.rand.org/pubs/tools/TL354.html.

considerable evidence that this commonsense assumption is mistaken. Suicide attempts with firearms result in higher death rates than suicide attempts with other common methods.[7] This high lethality means that those who attempt suicide with a firearm are less likely to have the opportunity to reconsider their decision. This is especially consequential given evidence that suicide is often an impulsive decision. The time between decision and self-harm is typically minutes, not months. These crises usually pass with time, meaning that most people who survive a suicide attempt do not die by suicide later. This includes those who survive serious attempts involving, for instance, gunshots to the head.[8] So, firearms do not cause people to become suicidal, but, once they decide to harm themselves, those who attempt suicide with a firearm are more likely to die, and those without a firearm are more likely to never die by suicide.

For these reasons, it is not surprising that high firearm ownership rates are associated with high total suicide rates, not just high firearm suicide rates, at the state and individual levels.[9] This association is due to an association of firearm ownership with firearm suicide rates, as suicide by other means is not elevated among firearm owners.[10] Could this association be due to firearm purchases by suicidal individuals? In part, yes, but elevated risk of suicide among firearm owners continues for years after the purchase of the weapon,[11] and the risk extends to family members in the same household who did not themselves purchase the weapon.[12] Finally, the elevated suicide risk associated with household firearm ownership is not explained by differences in suicide attempts among groups with high versus low gun ownership.[13]

Therefore, there is good reason to believe that Vermont's high suicide rate is associated with its high firearm suicide rate, and that both may be associated with Vermont's high firearm

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[7] Andrew Conner, Deborah Azrael, and Matthew Miller, "Suicide Case-Fatality Rates in the United States, 2007 to 2014: A Nationwide Population-Based Study," *Annals of Internal Medicine*, Vol. 171, No. 12, December 17, 2019.

[8] Nicole M. Thomas, Catherine Barber, and Matthew Miller, "A Cohort Study of Initial Self-Harm Events: Method-Specific Case Fatality of Index Events, Predictors of Fatal and Nonfatal Repetition, and Frequency of Method-Switching," *International Review of Psychiatry*, Vol. 33, No. 7, 2021; David Owens, Judith Horrocks, and Allan House, "Fatal and Non-Fatal Repetition of Self-Harm: Systematic Review," *British Journal of Psychiatry*, Vol. 181, No. 3, September 2002.

[9] Douglas J. Wiebe, "Homicide and Suicide Risks Associated with Firearms in the Home: A National Case-Control Study," *Annals of Emergency Medicine*, Vol. 41, No. 6, June 2003; David M. Studdert, Yifan Zhang, Sonja A. Swanson, Lea Prince, Jonathan A. Rodden, Erin E. Holsinger, Matthew J. Spittal, Garen J. Wintemute, and Matthew Miller, "Handgun Ownership and Suicide in California," *New England Journal of Medicine*, Vol. 382, No. 23, June 4, 2020.

[10] Matthew Miller, Deborah Azrael, and Catherine Barber, "Suicide Mortality in the United States: The Importance of Attending to Method in Understanding Population-Level Disparities in the Burden of Suicide," *Annual Review of Public Health*, Vol. 33, 2012; Studdert et al., 2020.

[11] Studdert et al., 2020; Garen J. Wintemute, Carrie A. Parham, James Jay Beaumont, Mona Wright, and Christiana Drake, "Mortality Among Recent Purchasers of Handguns," *New England Journal of Medicine*, Vol. 341, No. 21, 1999.

[12] Matthew Miller, Yifan Zhang, Lea Prince, Sonja A. Swanson, Garen J. Wintemute, Erin E. Holsinger, and David M. Studdert, "Suicide Deaths Among Women in California Living with Handgun Owners vs Those Living with Other Adults in Handgun-Free Homes, 2004-2016," *JAMA Psychiatry*, Vol. 79, No. 6, 2022.

[13] Matthew Miller, Catherine Barber, Richard A. White, and Deborah Azrael, "Firearms and Suicide in the United States: Is Risk Independent of Underlying Suicidal Behavior?" *American Journal of Epidemiology*, Vol. 178, No. 6, September 15, 2013.

ownership rate and the ready availability of firearms for a large proportion of the state's residents. These conclusions have implications for how firearm legislation might affect Vermont's suicide rate.

Firearm Laws and Firearm Suicide Rates

Although many studies have found that states with permissive firearm regulations have higher suicide rates, these studies are often correlational rather than causal. That is, studies show that firearm laws and suicide rates tend to move together, but not necessarily that the firearm laws *cause* those rates. To better understand the causal effects of firearm laws, RAND has conducted and regularly updated a systematic review of studies designed to estimate causal effects of laws. This review examines the effects of gun laws on suicide, but also on homicides, mass shootings, defensive gun use, and four other outcomes that are important to policymakers like yourselves, as well as the public (see Table 1).

Our most recent update to this review, entitled *The Science of Gun Policy*,[14] was published last month. In it, we used standardized and rigorous criteria for evaluating hundreds of scientific studies to identify all that make scientifically credible claims about the effects attributable to specific state gun laws.

Of the 18 gun policies we studied, we were unable to identify rigorous studies for many of their possible effects. In other cases, we identified some studies but determined that they provided only weak or inconclusive evidence on the effects of a law. When studies met our standards of rigor and provided meaningful evidence, we applied a standardized scoring rubric to rate all such evidence as being *limited*, *moderate*, or *supportive*, our highest evidence rating.

Currently, our review identifies just one law as having supportive evidence of an effect on state suicide rates, and it identifies several laws that have moderate evidence for such an effect. Specifically, we found supportive evidence that laws requiring gun owners to store their weapons locked or where children cannot access them appear to reduce gun injuries among young people, as well as gun suicides, gun homicides, and gun assaults among them. There are several different ways these laws have been implemented. Some prohibit storage practices that could allow a child to access a firearm, while others prohibit storage in a way that results in a child actually gaining access. States also differ on their definitions of who, for the purposes of the law, counts as a child and whether they treat violations as felonies or misdemeanors. Although there is some weaker evidence that felony consequences may be more effective in reducing childhood deaths, most implementation differences across states have not been rigorously studied yet.

We found moderate evidence that two other laws may reduce state suicide rates: waiting periods and minimum-age-of-purchase laws. Waiting periods introduce delays between the purchase of a firearm and when the buyer may take possession of it. Such delays might give buyers intent on self-harm time to cool down, thereby deterring some impulsive suicidal acts. There is now moderate evidence that such laws do, in fact, reduce state firearm suicide rates. As

[14] Smart et al., 2023.

with child-access prevention laws, however, there is not yet compelling evidence on, for instance, whether waiting periods of different durations have differing effects on suicide rates.

Table 1. Policies and Outcomes Evaluated by RAND

Policies	Outcomes
Policies regulating who may legally own, purchase, or possess firearms	• Suicide
1. Minimum-age requirements	• Violent crime
2. Prohibitions associated with mental illness	• Unintentional injuries and deaths
3. Prohibitions associated with domestic violence	• Mass shootings
4. Surrender of firearms by prohibited possessors	• Officer-involved shootings
5. Extreme risk protection orders	• Defensive gun use
Policies regulating firearm sales and transfers	• Hunting and recreation
6. Background checks	• Gun industry
7. Licensing and permitting requirements	
8. Waiting periods	
9. Firearm safety training requirements	
10. Lost or stolen firearm reporting requirements	
11. Firearm sales reporting, recording, and registration requirements	
12. Bans on the sale of assault weapons and high-capacity magazines	
13. Bans on low-quality handguns	
Policies regulating the legal use, storage, or carrying of firearms	
14. Stand-your-ground laws	
15. Child-access prevention laws	
16. Concealed-carry laws	
17. Gun-free zones	
18. Laws allowing armed staff in K–12 schools	

There is also moderate evidence that states, such as Vermont, that have set their minimum age of firearm purchase above the floor set by federal law see reductions in firearm suicides

among young people. Federal law already prohibits the sale of handguns by licensed dealers to anyone under the age of 21. Typically, states that have raised their minimum age of purchase have done so for the sale of long guns and for sales of handguns by private sellers, as Vermont has done. These laws are often paired with minimum-age-of-possession laws that set age restrictions higher than federal laws for possession of both handguns and long guns.

Other laws, such as extreme risk protection orders, or "red-flag laws," do not yet have what we consider rigorous scientific evidence of a causal effect on state suicide rates. This does not mean that they have no such effects. Instead, it means that studies have not yet been conducted that would clarify what effects, if any, they have. Extreme risk protection orders are a fairly new innovation in state firearm laws, and it may take more time before enough states have enough experience with their effects for these to be well estimated by researchers.

Vermont's extreme risk protection order law permits only law enforcement to petition a court to have firearms temporarily removed from a person who poses an imminent risk to themselves or others. Other states allow family members or others, in addition to law enforcement, to initiate these petitions. Currently, however, we know of no rigorous evidence on the relative effectiveness of these different versions of extreme risk protection order laws. Nevertheless, it is clear that when states permit families to petition for temporary removal of firearms, families use this option. Studies of Oregon's and Maryland's laws, for instance, show that between 35 and 45 percent of all petitions in those states were initiated by family members.[15]

Even when states do not permit citizens to initiate petitions, however, it is often family members who contact the police about their loved one's dangerous behavior. In a study of Connecticut's firearm removal cases, for instance, researchers found that 41 percent were initially reported to police by family members.[16]

In each of these studies, the majority of orders are issued to prevent self-harm or suicide. While our review found inconclusive evidence for extreme risk protection order laws' population-level effects, studies evaluating outcomes for individuals who were subject to such laws suggest the possibility that completed suicides among individuals whose firearms were removed pursuant to a protective order are lower than would be expected had the individuals retained their weapons.[17]

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[15] Leslie M. Barnard, Megan McCarthy, Christopher E. Knoepke, Sabrina Kaplan, James Engeln, and Marian E. Betz, "Colorado's First Year of Extreme Risk Protection Orders," *Injury Epidemiology*, Vol. 8, 2021; Shannon Frattaroli, Elise Omaki, Amy Molocznik, and April Zeoli, "Extreme Risk Protective Orders in Maryland: An Analysis of Petitioners," in *APHA 2022 Annual Meeting and Expo*, American Public Health Association, 2022.

[16] Jeffrey W. Swanson, Michael A. Norko, Hsiu-Ju Lin, Kelly Alanis-Hirsch, Linda K. Frisman, Madelon V. Baranoski, Michele M. Easter, Allison G. Robertson, Marvin S. Swartz, and Richard J. Bonnie, "Implementation and Effectiveness of Connecticut's Risk-Based Gun Removal Law: Does It Prevent Suicides?" *Law and Contemporary Problems*, Vol. 80, No. 2, 2017.

[17] See, for example, Swanson et al., 2017; and Jeffrey W. Swanson, Michelle M. Easter, Kelly Alanis-Hirsch, Charles M. Belden, Michael A. Norko, Allison G. Robertson, Linda K. Frisman, Hsiu-Ju Lin, Marvin S. Swartz, and George F. Parker, "Criminal Justice and Suicide Outcomes with Indiana's Risk-Based Gun Seizure Law," *Journal of the American Academy of Psychiatry and the Law*, Vol. 47, No. 2, 2019.

The Full Costs and Benefits of Gun Laws Are Not Known

Even where evidence for the effects of a gun law is strongest, we generally know about the effects of the law on only a subset of outcomes, typically firearm suicides, homicides, or injuries. This is a problem for legislators because, typically, there are many other possible effects of the law that raise concerns among different stakeholder groups. For instance, we found that child-access prevention laws have supportive evidence of reducing childhood deaths and injuries. Nevertheless, most states, including Vermont, have not adopted these laws. One reason for their reluctance may be that some gun owners fear that, if their guns are locked up, they will not be able to access them quickly in an emergency. This is particularly a concern among handgun owners, the large majority of whom acquired their weapons for reasons of self-defense.[18]

Unfortunately, we know of no rigorous studies that have tried to estimate how often child-access prevention laws prevent a homeowner from accessing his or her weapon when it is needed. This could happen, but we do not have the information needed to understand the trade-offs these laws might entail between child lives lost and lives lost due to foregone self-defense opportunities.

In addition to the lack of research on defensive gun use, there is almost no rigorous research that has been published on the effects of state gun laws on hunting and sport-shooting participation; officer-involved shootings; or the gun industry, including gun sales or economic outcomes for shooting range operators, hunting outfitters, trainers, and others. These outcomes concern constituencies that are often influential in gun policy debates. Unfortunately, we have little rigorous research to provide legislators with information on the wider set of costs and benefits attributable to state gun laws.

Conclusion

More than 700 Vermont residents died of gunshot wounds in the decade from 2011 to 2020.[19] Eighty-eight percent of these deaths were suicides. This is 17 percent more than the number who died from car crashes in the state over the same period and represents a suicide rate considerably higher than the national average.

The research I have summarized today suggests that laws preventing the unauthorized access of firearms and those that delay acquisition of purchased firearms may help reduce Vermont's high suicide rate. I cannot say whether expanding the scope of Vermont's extreme risk protection order law to allow family petitioners might also help bring suicide rates down, although evidence from other states is clear that families that have run out of other options will petition the courts for temporary orders against their loved ones if such petitions are available to them.

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[18] Deborah Azrael, Lisa Hepburn, David Hemenway, and Matthew Miller, "The Stock and Flow of U.S. Firearms: Results from the 2015 National Firearms Survey," *Russell Sage Foundation Journal of the Social Sciences*, Vol. 3, No. 5, October 2017.

[19] The statistics presented in this paragraph are from Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, "Mortality 1999-2020," on CDC WONDER, online database, 2021, http://wonder.cdc.gov/mcd-icd10.html.