

# How little we know: Experts document the lack of research on youth firearm injury

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A century ago, if a child or teenager died, an infectious disease was the most likely cause.

A half century ago, if a child or teenager died, the most common reason was injuries from an automobile crash.

Today, if an American child or teenager dies, firearm-related injuries and automobile crashes are almost equally likely to be to blame.

Research on everything from vaccines to seatbelts has changed the odds for [children](#) and adolescents, and the rate of crash-related deaths continues to drop. But research on firearm injuries has been lacking.

Now, experts have released the largest-ever examination of the state of research on all aspects of youth firearm injury—whether intentional, unintentional or self-inflicted.

The bottom-line conclusion: Far more research, and better research, is needed on children, teens and the prevention and aftermath of firearm injuries and deaths. If translated into action, such new knowledge could help reduce death and injury rates, and other effects.

The papers that lead to this conclusion make up the entire new issue of the *Journal of Behavioral Medicine*. Nearly all the papers in it come from researchers from across the U.S. who make up the Firearm Safety Among Children and Teens consortium funded by the National Institutes of Health.

Each of the papers in the issue focuses on firearm injury and violence as a public health issue—just as infectious diseases and automobile safety have come to be seen in decades past.

Rebecca Cunningham, M.D., co-directs FACTS and is interim vice president for research and an emergency medicine physician at the University of Michigan. "Firearm injuries and deaths have the potential to be understood much the same way as many other public health threats

have been understood, using scientific methods," she says. "Much more work is clearly necessary."

Cunningham and her U-M colleagues Patrick Carter, M.D., and Marc Zimmerman, Ph.D., who co-direct FACTS, wrote an overview of FACTS for the new special issue.

The research reviews done by FACTS members cover five key areas. Here are some of their findings and recommendations:

## **Factors that put young people at higher risk of firearm injury, or protect them from risk**

The researchers studying this issue found only 28 studies published between 1985 and 2018 on this topic, and only five that were rigorous studies that looked at data from a large population over time. Most of the studies looked at individual-level risk factors, not ones at the school or population level, or protective factors at either level.

Use of marijuana, and problematic use of alcohol, emerged as two of the most specific risk factors that were associated with higher risk of suffering a firearm injury or dying from one. So were holding attitudes favoring retaliation, and prior involvement in violent events, including as a victim. There is also some evidence that having post-traumatic stress disorder as a youth is a risk factor for firearm injury, as is living in a community where violence or economic disadvantage are higher than normal.

Risk factors for youth suicide by firearm has been studied, but the evidence is mixed about the impact of prior mental health issues and earlier suicide attempts on that risk. Living in a home where there is access to a gun, especially one that is unlocked or kept in plain sight, has

been found by several studies to be associated with increased risk of youth suicide.

The authors call for more research on larger and broader samples, and more attention to school- and family-level risk factors, and protective factors.

## **Prevention of injuries from firearms among children and teens**

The review identified only 46 studies that focused on preventive measures to reduce the risk of firearm injury and death among youth between 1985 and 2018. These included studies of "safe storage" efforts to encourage use of trigger locks and lock boxes or safes by gun owners with children in the home, and other initiatives to prevent children and teens from handling or carrying firearms or using them without supervision.

Parent education during a health care visit appears to increase safe gun storage when combined with the distribution of free gun locks, including general groups of parents and parents of teens who have survived a suicide attempt. Community efforts to give away gun locks have shown an impact on safe gun storage, but the impact on actual firearm injury rates among children are unknown.

Education programs designed to prevent unsupervised firearm handling by young children show some promise when they include children rehearsing behavioral skills, but effects outside of the classroom are unclear. Among adolescents, education programs based on "scare tactics" did not have evidence behind them, the researchers find. A recommended next step is to adapt effective youth violence prevention programs to focus on preventing firearm injuries among adolescents.

In general, they conclude, much more research is needed to build evidence around different preventive strategies. They recommend that firearm owners should be partners in the development of such strategies, and the research to evaluate their effects—similar to what was done when children's car seats were being developed and refined through research. In the meantime, counseling about safe storage during a health care visit, and provision of locking devices, are identified as a next step to reduce firearm injuries and death among youth.

## **Association of firearm laws with outcomes in children and teens**

The authors found only 20 studies were done between 1985 and mid-2018 that looked at the relationship between laws regarding firearms and outcomes such as firearm injury by children and teens. Most looked at the impacts of laws designed to prevent children from accessing guns by threatening to charge adults with a crime if their guns were able to be taken or used by children.

The authors conclude there is strong evidence that child access prevention laws are associated with reductions in unintentional firearm mortality among children and teens. There is also evidence that these laws are associated with reductions in suicide.

Meanwhile, there are so few high-quality studies of the impacts of other firearm-related laws on outcomes in children and teens, it is not possible to draw conclusions about the laws' effects. The lack of a national surveillance system that systematically tracks nonfatal [firearm injuries](#) or firearm crimes, and researchers' reliance instead on hospital inpatient records and incomplete law enforcement data, make high-quality research more difficult.

In the end, the authors make a call for more, high quality research and surveillance systems to better determine the impact of firearm laws on childhood firearm injury and death, writing, "policymakers and other stakeholders often lack the evidence they need to craft, evaluate, and make informed decisions regarding firearm policies. This should not be interpreted as the policies not having an effect, but rather that the research is often too sparse to measure impact."

## **Long-term consequences of firearm incidents involving children and teens**

For this review, the researchers found only 31 published studies in English from 1985 to 2018 that documented the long-term impact of firearm injury on the mental and physical health of children and teens. Much of the existing literature was published using datasets from European countries. Existing literature is clear that a child's exposure to firearm injury increases the long-term risk of post-traumatic stress and future injury—regardless of the type of injury that a child is exposed to.

Of the 14 studies examining the effects of mass shootings on youth, 6 were written about a single event in Norway, and the only articles from the United States were written before the year 2000. No manuscripts examined the effect of school shootings or community gun violence on parents or teachers. No manuscripts described social media responses to mass shootings.

The authors note that more than 90% of youth firearm deaths are due to assault or suicide. Literature in these areas was particularly lacking. Although youth firearm suicide is common, very few studies examined mental health or suicide contagion among witnesses and survivors.

Most importantly, this review revealed that—despite the obvious

physical and mental effects of firearm injury on youth—there is almost no evidence on how to prevent future mental, physical, and behavioral issues in youth who experience or witness [injury](#).

## **Patterns of gun-carrying behavior by older children and teens**

This review found 53 studies of all aspects of teen firearm carriage, with most studies focused on urban African-American youth or youth involved in the criminal justice system. The authors rated one-third of these studies as high-quality.

In general, the studies show that among the 5% to 10% of teens who carry firearms during adolescence, most do so intermittently throughout their teenage years, and primarily for reasons of self-defense or protection. Researchers found only one study focused among rural teens, with this study demonstrating similar rates of firearm carriage to those conducted among urban adolescent populations. Youth who carried for a longer period of time during adolescence and those that carried consistently throughout adolescence had more exposure and involvement in violence, substance use, and the criminal justice system.

Based on their findings, the study authors called for more research on this issue, especially research with a focus dedicated to adolescent populations, including studies that examine firearm carriage among different gender and racial/ethnic groups, as well as within a variety of urban, rural, and suburban contexts.

The authors emphasize the need for more rigorous studies that evaluate firearm carriage separate from the carriage of other weapons such as knives. They also call for researchers to study what motivates teens to start carrying a firearm or continue carrying one, and what factors at a

population level are most associated with firearm carriage to inform public health interventions to decrease risky [firearm](#) behaviors among adolescent populations.

**More information:** Rebecca M. Cunningham et al, The Firearm Safety Among Children and Teens (FACTS) Consortium: defining the current state of the science on pediatric firearm injury prevention, *Journal of Behavioral Medicine* (2019). [DOI: 10.1007/s10865-019-00077-6](#)

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