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Rebecca Cunningham says public health research can help prevent gun injuries in children. MELANIE MAXWELL

Guns kill more U.S. kids than cancer. This emergency physician aims to change that

By [Meredith Wadman](#) | Dec. 6, 2018, 10:00 AM

ANN ARBOR, MICHIGAN—Rebecca Cunningham has only one kind of memory from her early childhood: violence. Her father shattered mirrors, tore up the house, and beat and threatened to kill her mother. Cunningham, then less than 5 years old, remembers her older sister trying to protect her.

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"When my father would start in with my mother, my sister would cover my eyes and try to hide with me behind the couch," recalls Cunningham, now a 48-year-old emergency physician and researcher at the University of Michigan (UM) here. "The police were in and out of the house a lot. If there had been a gun in my home in those years, my mother certainly would have been killed."

One day Cunningham's father, a lawyer, called her mother threatening to kill her. Her mother changed the locks on their New Jersey house. She sent Cunningham's two older siblings to live with a safely distant foster family. And she bought a handgun.

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Did that pistol make Cunningham and her mother safer? Public health experts can't answer that question: A 2003 study that examined whether abused women living apart from their abusers are safer with a gun was inconclusive. No study since has delved into the issue.

It's one of myriad questions about firearms and violence that remain unanswered, largely because of a dearth of funding to explore them. Guns are the second-leading cause of death of children and teens in the United States, after motor vehicle crashes. In 2016, the most recent year for which data are available, they killed nearly 3150 people aged 1 to 19, according to data from the Centers for Disease Control and Prevention (CDC) in Atlanta. Cancer killed about 1850. But this year, the National Institutes of Health (NIH) in Bethesda, Maryland, spent \$486 million researching pediatric cancer and \$4.4 million studying children and guns, according to its RePORTER database.

That's because gun violence research has been operating under a chill for more than 2 decades. In 1996, Congress crafted an amendment, named for its author, then-Arkansas Representative Jay Dickey (R), preventing CDC—the government's lead injury prevention agency—from spending money "to advocate or promote gun control."

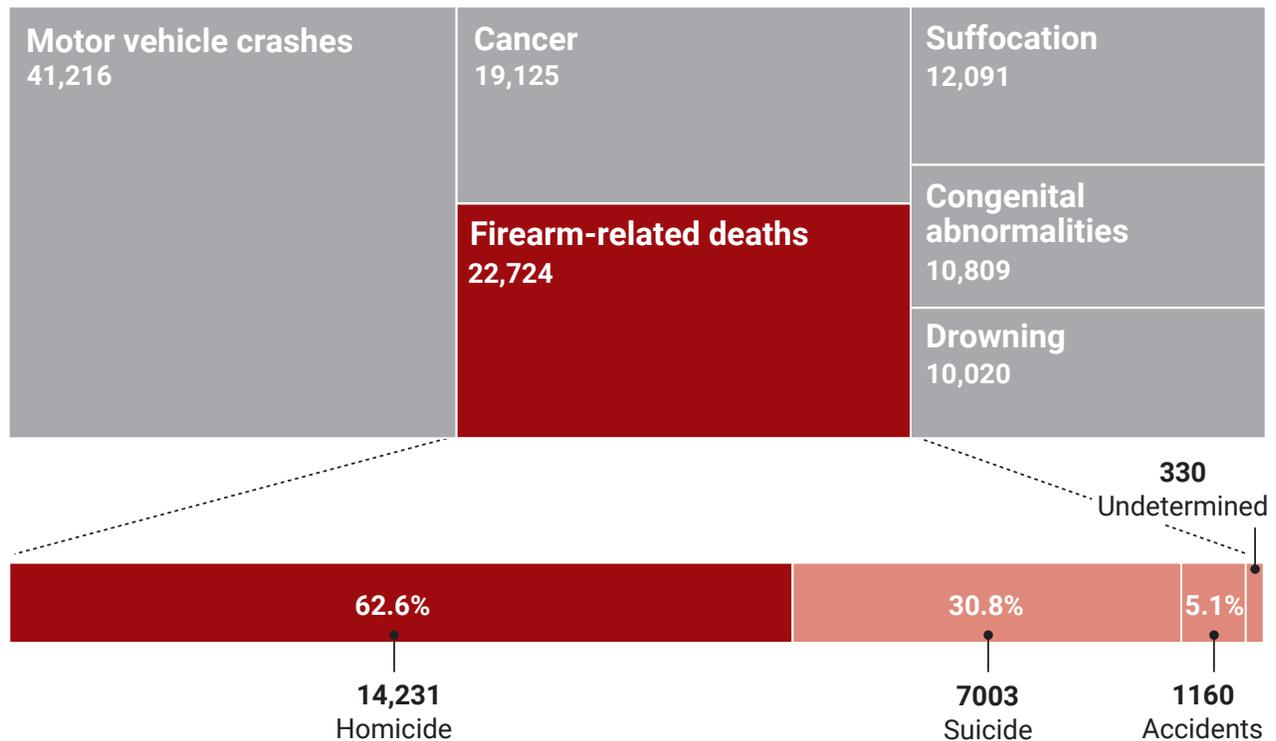
That law was widely interpreted as banning any CDC studies that probe firearm violence or how to prevent it. The agency's gun injury research funding was quickly zeroed out, and other health agencies grew wary. The few dozen firearm researchers who persisted were forced to rely on modest amounts from other agencies or private funders to tackle a massive problem.

Now, there may be early signs of a thaw. In March, in the wake of the mass shooting at a Parkland, Florida, high school, Congress wrote that CDC is free to probe the causes of gun violence, despite the Dickey amendment. (The agency has not done so, citing a lack of money.) And annual firearm-related funding from NIH, according to a search of its RePORTER database, roughly tripled after a 2013 presidential directive that was issued in the wake of the mass shooting at Sandy Hook Elementary School in Newtown, Connecticut. Just as importantly, the agency began to flag firearm violence in some of its calls for research.

A heavy toll

Firearms are the second-leading cause of death in children in the United States, after motor vehicle crashes. In the decade ending in 2016, more children died from gun injuries than from cancer.

Fatalities of 1–18-year-olds (2006–2016)



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(GRAPHIC) A. CUADRA/SCIENCE; (DATA) CDC

That's why Cunningham is now in charge of the largest firearm research grant that NIH has awarded in at least 30 years. With \$4.9 million from NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), she is co-directing a 5-year project to build capacity for researching firearm injuries in children. Cunningham and UM public health expert Marc Zimmerman are leading 27 scientists at a dozen institutions in work they hope will carry the field forward for years after this funding ends in 2022.

The grant is not designed to answer one particular question. Rather, the goal is to lay out what questions need answering first. The researchers are building a user-friendly archive of existing data and launching pilot studies. And they are training the young scientists who they hope will come after them.

Cunningham's grant "is unique" in U.S.-funded gun violence research, and not just for its size, says Garen Wintemute, a gun violence researcher at the University of California, Davis, who co-authored one paper with Cunningham but is not part of this grant. "In the last 20 years this is the first time that an award has been made not just to do a project, but to set up an infrastructure that would allow a lot of projects to be done."

Although gun rights groups continue to insist that public health scientists steer clear of gun violence, some researchers are feeling empowered to push back. Last week, surgeons writing in *JAMA Surgery* called on CDC to restart its own gun violence research. And last month, the National Rifle Association (NRA) in Fairfax, Virginia, provoked a firestorm when it tweeted that "self-important anti-gun doctors" should "stay in their lane." Hundreds of emergency department doctors tweeted back, many including photographs of their scrubs, hands, and shoes bloodied from treating gunshot victims. More than 40,000 health care professionals, including Cunningham, signed an open letter to NRA complaining that the group has hobbled gun violence research, declaring, "This is our lane!"

All the same, there's still little public money for gun research. And given the polarizing politics, Cunningham's team must walk a fine line: probing gun violence without being seen as advocating gun control. But she's betting that this is the beginning of the end of the funding chill. Her forward-looking NIH award "is more than another grant," she says. "[It's] the end of the silencing of a generation of scientists."

In the emergency room

Wearing a white coat and with the requisite stethoscope draped around her neck, Cunningham recently showed visitors around a trauma bay stuffed with monitors, tubing, and tanks at UM's University Hospital, which serves Ann Arbor and its rural surroundings. She works in the emergency department here several times a month. (She is also associate vice president for health sciences research at UM, and the fourth-leading NIH grantee among U.S. emergency room doctors.)

The young trauma patients Cunningham sees here underscore the need for research on guns and children. "The teen suicide survivors that I remember most clearly are kids or young adults who have blown off the front of their face," Cunningham says. "Those are some of the worst trauma patients I have seen because they are awake and utterly miserable. And they are going to have just devastating injuries."

After working her way through college and medical school, Cunningham did her medical residency at UM in the late 1990s. She spent months staffing an emergency department 80 kilometers north in Flint, Michigan, an impoverished city where she saw a different kind of gun violence. After street shootings, she saw victims "shot in the leg, shot in the arm, shot in the belly, shot in the chest ... often multiple gunshot wound victims in one night. More than once, the teen was the second in the family to be killed. I cared for young children caught in crossfire walking to school."

She was often pregnant with one of her three daughters when she had to sit down with a mother to tell her that her child had been shot and killed. It was, she says, "completely senseless."

After her residency, Cunningham began 2 decades of research studying the impacts of violence on youth, but for many years she saw no way to study gun violence in particular. "No mentor of mine would touch it."





Family and friends commemorate DrayQuan Jones, 16, who was shot and killed this spring in Flint, Michigan. Guns disproportionately kill African-American children. JAKE MAY/THE FLINT JOURNAL-MLIVE.COM/AP PHOTOS

In 2010, Cunningham finally published a paper with guns in the title—a survey of handgun access in teens visiting the emergency department in Flint. Four years later, she came across a bigger opportunity.

In August 2014, NIH's child health institute sent out a broad call for team proposals to build research capacity for preventing any prominent cause of childhood injury. As Cunningham read the announcement, one sentence leapt off the page: "Increasingly, attention is being paid to firearm-related injury as a serious public health concern."

She contacted NICHD to make sure she had not misread its intent. She was told she had not. She and Zimmerman's first proposal was sent back for revisions. But on a second try, it received a perfect score from an NIH review panel.

One week later, Donald Trump was elected president. Given that NRA had funneled \$30 million to Trump's campaign, **NIH officials privately fretted about gun research**. "The election makes everything more complicated," one administrator emailed to another. But in September 2017, the grant money arrived, and Cunningham's team went to work, calling itself the Firearm Safety Among Children and Teens (FACTS) Consortium.

Four months later, a 19-year-old former student gunned down 17 students and staff at Marjorie Stoneman Douglas High School in Parkland. "My inbox was flooded with researchers wanting to join FACTS—even to volunteer," Cunningham says. "The idea that the topic is too political to study is passing with the urgency created after Parkland."

A violent childhood

Cunningham's own sense of urgency predates any news event. "My interest in gun violence prevention has ... roots [in] lived experience," she says. After his wife kicked him out in the mid-1970s, Cunningham's father continued to stalk her and 5-year-old

Cunningham, banging on the front door and breaking windows. To escape him, her mother began a series of moves to low-rent apartments in other towns. They relied on food stamps while Cunningham attended four schools in 3 years.

"We were terrified," Cunningham says. "I was scared my mother would be killed. She was scared she would be killed. My father told her not infrequently that he had a gun and would find her." The fear only lifted years later, after her father died.

Cunningham says her early experience helps her "understand that people sometimes buy guns when they think the law cannot protect them."

“ [The grant is] the end of the silencing of a generation of scientists. ”

Rebecca Cunningham

In late October, Cunningham convened the first in-person meeting of the FACTS team in a daylong event in a UM conference room. The roughly two dozen researchers and handful of trainees present included many of the public health scientists actively doing firearm research today: grizzled epidemiologists who are still standing after the 22-year funding drought; surgeons-in-training; data mavens; and clinical psychologists such as Rinad Beidas, an associate professor at the University of Pennsylvania who has been studying whether and how counseling parents on gun safety could be incorporated into routine pediatric visits.

"The overarching purpose here is how to rebuild the field," Cunningham told the meeting as it opened. "We want more firearm researchers at the end of this who know what they are doing."

Their animating principle is that gun violence, like any other public health bane, can be tackled scientifically, divorced from any political agenda. "There is a science to injury prevention," Cunningham says. She and others note that decades of studies on motor vehicle safety led to evidence-based policies such as car seat and seat belt laws, which have dramatically reduced childhood motor vehicle fatalities even though many more cars are on the road.

In the case of firearms, Cunningham says, "the person, the gun, the home environment—all are modifiable in some way or another. We have not even started to try to address the ways that make the combination safer."

The scientists discussed 10 candidate pilot projects over 5 hours; Cunningham and Zimmerman will soon decide which will move forward.

One project proposes to enlist focus groups of gun owners to craft effective safe storage messages, aiming to curb teen suicide in Michigan's Upper Peninsula. In such rural areas, the rate of suicide by gun is almost twice that in urban areas of the United States. Another proposed study, a survey, would separately ask teens and their gun-owning parents how accessible the household's guns are, to reality check parents' views.

A third proposal makes the chilling assumption that it won't be long until the next mass school shooting. In its aftermath, Megan Ranney, an emergency physician at Brown University, would study young people's use of social media to characterize post-traumatic stress and anxiety, as well as resilience. Fewer than 1% of gun deaths in children and teens occur in schools. But Ranney believes school shootings may have much broader mental health impacts.

Cunningham, who radiates both affability and the decisiveness of a seasoned emergency physician, ran the meeting as part pep talk, part crash assignment. She shut down digressions and poured on doses of budget reality when suggestions got too ambitious. "This is not a democracy, as I tell my children," she reminded the group.

Given the constraints imposed by the congressional amendment, Cunningham and her team are at pains to emphasize that they are not coming after anybody's guns. The official NIH project description promises to respect "gun ownership as an important part of the cultural fabric of U.S. society."

Cunningham is blunt: "Our goals are not political. We are not aiming to decrease total gun numbers. We respect Second Amendment rights."

A generation of scarcity

During the past 22 years, public funding for gun violence research has been modest. Private funders have tried to compensate.

| Funding source | Total funding (1996–2018) |
|------------------------------------|----------------------------------|
| U.S. National Institutes of Health | \$58 million |

| Funding source | Total funding (1996–2018) |
|----------------------------------|-----------------------------|
| U.S. Department of Justice | \$39 million |
| State of California | \$6 million |
| Joyce Foundation | \$24 million |
| California Wellness Foundation | \$10 million |
| Laura and John Arnold Foundation | \$20 million pledged (2018) |

FOIA/NIH; NIH REPORTER DATABASE

The team has signed up gun-owning stakeholders to advise them. These include groups like Gun Owners for Responsible Ownership, based in Lake Grove, Oregon, and individuals like James Berlin, police chief and former SWAT team leader in the Detroit suburb of Roseville, Michigan.

Berlin, in a phone interview, said he has turned down other research groups over the years because "it seemed like they were trying to find facts that fit their foregone conclusions." Cunningham's team struck him differently. "They are actually trying to get the answers" on pediatric gun deaths, he says, "so it doesn't happen in the future." He adds of Cunningham: "She made me feel like my opinion mattered."

But hard-line gun rights groups have refused to work with the team. Only "the most tame" groups have signed on, David Hemenway, a veteran injury prevention researcher at Harvard University's T.H. Chan School of Public Health in Boston, said at the meeting.

"It's year one," Cunningham replied. "There's more time for more voices." But she acknowledged that local and national NRA chapters had failed to return her team's repeated phone messages and emails. (NRA also did not respond to *Science's* repeated requests for comment for this article.) The National Shooting Sports Foundation in Newtown, the gun industry's trade association, declined to sign on because of "concern about the 'public health' focus," Bill Brassard, the group's senior communications director, wrote in refusing Cunningham's request.

In a statement provided to *Science* last month, Brassard added, "Though we do not oppose research per se, too often 'research' from some in the public health field is biased and

designed to advance a predetermined antigun policy outcome. ... Gun-related violence is largely a criminal justice matter and not a public health issue."

An uncertain future

For a woman who began life at more risk than most for gun violence, Cunningham has landed well. She divorced—because "marriages are miracles"—then remarried and now co-commands a blended family of five teenagers. She lives on the outskirts of Ann Arbor, on a forested lot with a chicken coop overseen by her daughters. Her 77-year-old mother, who is also happily remarried, lives nearby. She still has the gun, stored away, unloaded.

Like many U.S. parents, Cunningham finds her own children affected by gun violence. "My kids come home after those shootings and they are terrified in school."

But despite powerful public reaction to school shootings, some experts are not as sanguine about the future of gun research as Cunningham. "I don't see this as a turning point," says David Studdert, a health policy expert at Stanford Law School in Palo Alto, California, who's not part of the FACTS project. And pediatrician Fred Rivara, a FACTS team member and veteran firearm researcher at the University of Washington in Seattle, worries about future funding for his young trainees.

However, Wintemute, who has studied gun violence for 30 years, thinks this may be a watershed moment. He notes Cunningham's grant and other new money—his group recently received a \$5 million award from the state of California—plus the groundswell of physician activity on Twitter. "It's entirely possible that this is the beginning of a new mobilization," he says.

Cunningham is confident that the problem of gun violence can be solved with science—and with participation from all sides. So, she keeps searching for common ground. "We are not having any conversations here that are an 'us and them' narrative," she told scientists at the meeting. "We are about reducing kids dying."

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