

Ruth Adewuya, MD (host):

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This episode is part of our Hot Topics miniseries, and it's focused on the important topic of school shootings and approaching it as a public health and policy issue. Dr. Maya Rossin-Slater is an associate professor of health policy at Stanford University's School of Medicine, as well as a senior fellow at the Stanford Institute for Economic and Policy Research, a research associate at the National Bureau of Economic Research, and a research affiliate at the Institute of Labor Economics.

She received her doctorate in economics from Columbia University and her bachelor's in economics and statistics from the University of California at Berkeley. Dr. Rossin-Slater's research includes work in health, public, and labor economics. She focuses on maternal and child wellbeing issues, family structure and behavior, health disparities, and public policies affecting disadvantaged populations in the United States and other developed countries. Dr. Rossin-Slater, thank you so much for chatting with me today.

Maya Rossin-Slater (guest speaker):

Thank you for having me.

Ruth Adewuya, MD (host):

Today's topic is a really difficult one. It's a hard one for all of us, but I do believe that it's an important one and that we should have a conversation about this issue. The AMA first declared firearm violence a public health crisis in 2016. Medical professionals increasingly widely recognize shootings as a public health crisis. Why is gun violence a public health epidemic?

Maya Rossin-Slater (guest speaker):

I think gun violence is a public health epidemic because of the way in which gun violence has spread through society, such that it's impacting not just our communities and neighborhoods, but also increasingly our schools, which are places where our kids should be safe and able to learn and grow. Instead, we're seeing that this learning and this growth is being more and more frequently disrupted by trauma from gun violence.

The other reason that I think it's a public health issue, an epidemic, is because the health impacts of gun violence are extremely far-reaching and are not solely captured by the direct numbers of deaths and physical injuries.

As research has shown, the ripples of gun violence, especially in school settings, really can last for many, many years after the actual gun violence event. Even in cases where there is no direct victim, thankfully, there are no deaths and maybe not even any injuries, we still see far-reaching health and wellbeing impact on kids and on their communities.

Ruth Adewuya, MD (host):

I understand that your research spans several areas of children's health impacted by gun violence in schools. Can you walk us through what you have found?

Maya Rossin-Slater (guest speaker):

Absolutely. I currently have two main studies in this space. The first one is a collaborative project with a big team of collaborators at Northwestern, Molly Schnell and Hannes Schwandt, and then also Sam Trejo and Lindsey Uniat.

We jointly looked at the impact of school shootings in the United States on youth antidepressant use. We were interested in understanding whether in the aftermath of a school shooting, whether the rate of antidepressant prescriptions in the local community is changing. We had data on prescription drugs prescribed to kids under the age of 20.

We found that in the two years following a school shooting, the rate of antidepressant prescriptions for kids under age 20 increased by more than 20%, relative to what was going on before the school shooting and also relative to very similar schools that, at this time, did not experience any shooting. Interestingly, these effects were fairly concentrated in the local area around the school.

Specifically, we focused on a five-mile radius surrounding the school where it is likely that most of the kids that we observe in our prescription drug data are actually attending the school where the shooting took place. When we looked a little bit further out, say, 10 to 15 miles away, we did not see these impacts.

The other kind of two main things from that study is that these effects were concentrated amongst shootings that had at least one fatality. This large increase in antidepressant prescriptions was driven by shootings where there was at least one death. Secondly, these effects really lasted for a long time.

I said the main set of findings was focused on the two-year follow-up period, but when we extended the follow-up window to three, four, even five years after, we still saw this elevated rate of youth antidepressant prescription drugs, indicating that these mental health issues that are arising in the local community... In the aftermath of school shooting, they likely last for many years to come.

It also echoes some of other research that have looked at this area who have, for example, found a heightened rate of suicides in local communities that have experienced very big mass shootings. So Sandy Hook, Parkland, Columbine, those types of events. In our study, we focused on all shootings, so not really just the really big mass ones, but we still saw these really big mental health impacts for shootings that had one death.

Then the second study that we did was we wanted to take a broader lens and, again, look at all shootings, regardless of whether there were any deaths, so all shooting events, all incidents where a gun went off on school grounds during school hours.

No one had to be physically hurt in order for that event to count as a school shooting in our analysis, but the shooting did have to occur on school grounds and during school hours, with the idea that is when students are actually there and could be impacted by it.

We focused on the state of Texas. Texas is useful because it has obviously, increasingly experienced a lot of school shootings, in particular, most recently, the horrific tragedy in Uvalde.

They also have data that allowed us to basically track kids who were at schools that experienced shootings, and follow them over time, and look at both their short and longer-term outcomes in terms of their educational trajectories, their attendance, whether they graduate high school, whether they go to college, then even when they're young adults, are they working, and their earnings.

In this study, which was joint with another awesome team, Marika Cabral, Molly Schnell, Hannes Schwandt, and Bokyoung Kim, we jointly looked at 33 shooting events that took place in public schools in Texas, and then looked at how outcomes changed from before to after the shooting event, relative to

schools that are similar in terms of size, so demographics, the share of students on free or reduced-price lunch, and in terms of whether they're urban or rural area.

What we found is that in the aftermath of a shooting, we saw a much higher rate of chronic absenteeism amongst kids who are at that school. We also saw that those kids were much more likely to repeat a grade in the next few years. Then in the longer term, they were much less likely to graduate high school.

They were much less likely to go to college and, in particular, to go to a four-year college. They were less likely to graduate with a bachelor's degree. Then when they were young adults in their mid 20, they were less likely to be employed at those ages and were earning less. Then finally, the other margin of this that we were interested in is what was happening to staff at schools, like teachers.

We found two things. First, while we didn't see changes in the overall number of teaching staff, in part because it's hard to change the overall number of teaching staff, because you have to cover all the classes that you have, we did see a higher rate of turnover. Teachers who were there at the time of the gun violence were more likely to leave, were more likely to shift to part-time.

Then the second thing that we saw is we saw an increase in the number of assistant principals at the schools. Assistant principals are often folks that work with students on disciplinary and behavioral issues and things like that. It makes sense, as a response, that the school is engaging in in the aftermath of a shocking event, like a school shooting.

Ruth Adewuya, MD (host):

Wow. There's so much to unpack about the data that you just shared with us. It seems that the school setting is a particularly big factor in amplifying this impacts on children. What are some reasons this might be?

Maya Rossin-Slater (guest speaker):

That's a great question. Kids could be affected by gun violence in lots of places. There's a lot of really important research that does show that kids are adversely affected due to gun violence in their local community, due to, of course, gun violence in their own home, like domestic violence. What makes schools particularly bad places for gun violence to take place?

For several reasons. First, there's lots of things that could change in the school setting that could impact kids' learning and kids' wellbeing as a consequence of gun violence. For example, maybe a school might have to shut down for a few days in order to deal with the repercussions of a shooting. Maybe the curriculum is going to be disrupted as a result of that.

Some teachers might leave, as we show in our study. There might be a reorganization. They might increase more security measures. There might be all kinds of new disciplinary policies, things like that. There might be a response by the school that might further amplify any of the original effects of just the pure trauma of experiencing gun violence.

Second, as I said earlier, we view, in our society, schools as being kind of special places for kids, and there's something particularly traumatic when we disrupt that. Then third is idea of pure effects. When you think about a child experiencing violence in their home or in their local community, that's traumatic, right?

Then if that child comes to school, then they might act out more. They might be more disruptive. They might not be able to learn very well. That could actually affect their peers, even if their peers didn't experience any violence on their own because the classroom environment might be disrupted.

Now think about lots of kids being traumatized in one place as those interaction is being amplified. You could see how it sort of snowballs. It's not just one kid that had trauma in their home and then bringing that to school. We have lots of kids that have trauma, and they're now in this place altogether. You could imagine how that could be quite disruptive.

Ruth Adewuya, MD (host):

You're absolutely right. That's a great point. Another thing that came to mind was that you're finding that, even in school settings where gun was fired, but there weren't any fatalities, children face lifelong consequences. Can you tell us what you think about this and whether we see any differences in the severity of these effects when fatalities are involved?

Maya Rossin-Slater (guest speaker):

Absolutely. In terms of the data, in our work in the Texas study, we do not see statistically significant differences in effects between shootings that do and do not have fatalities. Part of that is that at the end of the day, there's 33 events that we're studying, which is still too many, but from a statistical standpoint, it's relatively few to do a lot of heterogeneity analysis with.

The other thing is that, actually, over the time period that we looked at in the State of Texas, over the years of 1995 to 2016, all of the shootings that we looked at had at most one fatality. There's been no events with mass shootings like in more recent years in Texas, unfortunately, that were covered by our data.

That said, as I mentioned earlier, the other study in which we looked at antidepressant prescription drugs, there we did see this big difference where it was the fatal shootings that had the big mental health effect. I do think it matters, right? There's extra trauma that happens when there's a death in particular because, A, it's extremely scary and shocking and, B, because it's somebody people know, and they're grieving.

I think the important point, though, from the Texas study is that even for the events that didn't have a death, we still see these effects. I think it tells us that as our kids are growing up increasingly in a society where it feels like every few months or even weeks, we have coverage of yet another school shooting that's happening in this country, kids are paying attention to that.

If a gun goes off at their school, that could be a triggering event that reminds them of the possibility that they too could be a victim or their friends could be victims of these tragedies that we see in the media so much. I think that's an important piece of it to keep in mind.

Ruth Adewuya, MD (host):

I think you bring up a good point about the media, whether it's social media or the news, and how kids nowadays are so immersed in social media and how these videos are constantly appearing in all of our feeds and that trigger aspect, but I also wanted to synthesize some of the effects that you mentioned, these long-term consequences to school gun violence.

You mentioned the antidepressant use, how kids treat school, whether it's repeating a grade, whether it's actually graduating, and then even, long-term, affects their career, and how much they earn. I feel like that's a very wide spectrum of impact. Did I capture that correctly in terms of the consequences of gun violence in children?

Maya Rossin-Slater (guest speaker):

Yeah, that's right. Breaking it down a little bit more, one can see how these things build on one another. The first effect that we find, maybe arguably the most immediate that we could observe, is what happens to kids' attendance at schools. We see increase in chronic absenteeism, which is kids being absent more than 10% of school days.

Kids are missing a lot of learning. That might, for some fraction of those kids, lead to needing to repeat a grade. Then once you're falling behind, it's harder and harder to graduate high school. One of the things that we see, for example, is that those effects on high school graduation are really concentrated amongst kids who experience shootings in 10th and 11th grade.

If you are already in 12th grade, by the time that a shooting takes place, there's not much of, sort of, margin on whether or not you're going to graduate high school. Maybe you've already completed all of your requirements. There's just not much scope for this trauma to affect you in terms of likelihood of graduating high school.

If you're in 10th or 11th grade, if you fall off track and, suddenly, you start skipping school and being chronically absent, you could imagine that could have a real effect on whether or not you graduate high school. That's what we see.

Then if you don't graduate high school, then it's much harder to go to college. Then if you don't go to college, then we don't see you graduating college. Now, obviously, we know that college graduates earn quite a bit more than the high school graduates or high school dropouts, even. Then you see these earnings gap and employment gaps appear already when the kids are young adults.

Ruth Adewuya, MD (host):

Layering that with where the shootings happen and the communities... I don't know if you have the data on this, if school shootings happen in more disadvantaged locations already. This additional trauma just perpetuates a cycle.

Maya Rossin-Slater (guest speaker):

Totally. That's exactly right. The media makes it seem school shootings... They're pretty random. They're not that random. They're much more likely to take place in less advantaged schools, in more urban schools, in schools where have more students in free reduced-price lunch and so on.

The less advantaged schools are more likely to experience shootings that are crime or personal-conflict related, and gang violence, and things like that that take place on school grounds. Whereas schools in more advantaged places are the ones that are more likely to see these sort of mass and discriminate types of shootings that we typically see covered in the media more.

We find that the shootings that are less likely to be covered, perhaps because they're taking place in communities where there's already more gun violence, are still impacting the kids that are there. These are the kids that have, obviously, fewer resources in general but, in particular, have less access to mental health supports, right?

What can we do to help? Are we doing enough? Well, we're not doing enough, but we're particularly not doing enough in the communities that are experiencing this type of gun violence at schools more regularly where we have those gaps and access to mental health resources and support.

Ruth Adewuya, MD (host):

I think that's a great segue to my next question for you. I have seen a pattern that after-school shooting... The conversation typically shifts to link mental illness as a reason for firearm violence. Do you see a danger in linking firearm violence to mental illness?

Maya Rossin-Slater (guest speaker):

I don't think that link is fully supported in the data. I don't think that there is very conclusive research that shows that mental illness is the main cause of gun violence at schools. That link is often made without proper, kind of, support, and evidence, and data to back it up.

Secondly, I think it misses the cause and effect. Even if it's the case that some amount of gun violence is being caused by mental illness, once the gun violence takes place, there's mental illness impacts as a result of that gun violence, in terms of PTSD, term, depression, and so on.

As we think about directing mental health resources, I think we first need to think about helping the kids that have already, the hundreds of thousands of American kids that have already experienced gun violence at their schools in the U. S. in the last couple decades.

In general, we could use more mental healthcare in this country and more equitably distributed healthcare. I think it's an open question as to whether that is going to really move the needle on preventing gun violence in school settings. Maybe a little bit, but my hunch is that there's other policies, including policies related to access to guns and so on, that would probably have bigger impacts.

Ruth Adewuya, MD (host):

Shifting gears to policy, how do we address gun violence through a health policy or economic approach?

Maya Rossin-Slater (guest speaker):

That's a really big question, and it spans health policy, politics, ideology. I can't necessarily speak to all aspects of that discussion, but here's where I can say in terms of research.

One of the things that you hear in the aftermath of school shootings is the inevitable policy discussions. Do we need more gun control? Do we need armed teachers? Do we need more mental health?

One of the pushbacks you get sometimes in these discussions is, well, we're really focusing on the wrong type of gun violence in terms of magnitude. School shootings, as horrific as they are, just really account for a tiny fraction of all gun violence that takes place in America. We really need to be focusing our efforts on strategies to address gun violence taking place elsewhere.

I think our research says that argument is flawed. One shouldn't just think about these events in terms of purely counting up the number of victims and direct victims, like deaths and injuries. The consequences, as we show, of these shootings are far more pervasive than in terms of just, literally, the number of victims.

If we're just going to be comparing numbers across different types of gun violence, these are not apples-to-apples comparisons. Shootings at schools are uniquely traumatic and have particularly lasting consequences because of the population that's being affected, kids. Because of all of the ways in which we already talked about, schools are bad places for these things to take place because of all of these ways in which these effects are getting amplified.

That's sort of point one, is that when we're making these cost discussions... What's the cost of gun violence in America? If people are saying the cost of school shootings is actually small compared to the cost of other types of gun violence, I think our research adds more nuance to that discussion and says, we shouldn't just count victims. We should actually consider these much bigger consequences on many more people that we're seeing.

Then the second point is, I think, a little bit more speculative based on the research, but I think still worth mentioning. One of the policy solution that sometimes gets brought up in these discussions is

put more guns on school campuses, so security, school resource officers, teachers with guns. You hear all of these things.

Our research in Texas suggests that that's probably a bad idea. Why? As we said, even when a gun goes off on school grounds and without any fatality, and it's not this mass school shooting, there's still bad effect. In fact, some of the events that we're looking at in our data are accidental discharges by school resource officers.

It has happened, and that is likely to be more traumatic than helpful, in my opinion. I think in this more guns versus less guns debate, my research can't answer that fully, but it is at least suggestive that more guns on school grounds is unlikely to be a good thing and could very well be a worse thing.

Ruth Adewuya, MD (host):

Excellent. Thank you for expounding on that. One of our public health successes in this nation is the work to make car safer. My understanding is that using a public health approach to car safety, the United States reduced per-mile driving deaths by nearly 80% from 1967 to 2017, which has prevented more than 3.5 million deaths over this 50 years. What are your thoughts on applying the public health successes of auto safety and car safety to gun violence prevention?

Maya Rossin-Slater (guest speaker):

That's a really good question. It's a good example. We started this discussion with the idea that gun violence is a public health issue. Looping back on that, kind of, what are public health type solutions? The car safety intervention... That is a clear example where that has been quite successful, as you said.

I think one of the things that prevents more action from happening on the gun issue is, of course, people's ideologies regarding gun ownership. I think part of the challenge is that with something like car safety... I will say that I don't know the full history of that and all the details, but my guess is that it didn't take a ton to convince people that it was clear that if we put seat belts on and have speed limits on road, that we're probably going to reduce deaths.

I'm sure that there were some people that were saying, "No, no, no. I want to drive without my seatbelt. I like that freedom." I think overall, it was an easier sell to say, if we do these things that are minor inconveniences, maybe, it's actually going to matter. Then also, they were effective, right, pretty immediately.

I think the big challenge with guns, though, is that people that feel strongly about gun ownership, A, don't think that taking away the guns is going to reduce the gun problem. They don't think the policy solution works and, B, don't just think it's a minor inconvenience. They think it's a really big deal.

I think, as much as I would like to say that we should take those tools, it is about making it harder to access guns, and making guns more safe, and having more rules surrounding gun access, and all of these things. It might work just like it did with car safety.

I think the underlying ideology behind guns is probably stronger than the underlying ideology behind people driving cars. That said, I'm not a political scientist. That's just my opinion.

Ruth Adewuya, MD (host):

I would argue that a step in the right direction is allocating more funds and for more people to do the research that you are doing. When it comes to difficult topics, having the data, I think, is one step in the right direction. Really thankful for the work that you and your colleagues are doing to study, and make available this data, and hopefully to open our eyes to what the short and long-term implications are.

This is very much along the same lines of what happened with motor safety, right, where there was a lot of allocation of funds to study motor vehicle crashes and all of that. Hopefully, that incremental step will lead to other things and other conversations.

Maya Rossin-Slater (guest speaker):

I hope that the research that we and others have done can hopefully contribute to that discussion and be a building block for thinking about policy making. You're absolutely right about funding. Thinking about gun violence as a public health issue should hopefully also drive funding allocation in terms of what we think is a priority to fund research on. I think this should absolutely be at the top or towards the top of that list.

Ruth Adewuya, MD (host):

As we wrap up, what is your key takeaway for clinicians who are taking care of patients that have been impacted by gun violence?

Maya Rossin-Slater (guest speaker):

I mean, first of all, the clinicians that are on the ground, dealing with patients who have experienced trauma from gun violence, whether physical wounds or mental health consequences... This is really important work. I just want to say, thank you for doing that work, to all of the listeners who are involved in that.

Second of all, there's still more to be learned about what people who have survived gun violence, especially in school settings, need in order to overcome or at least to help mitigate the trauma that they have experienced. There's more research to be done there by folks like me or folks that work in public health and so on. Obviously, the clinicians that are on the ground, treating these patients and working with these patients know this.

Working together on this as a public health issue, I think, is really important and key to making progress on it in order to understand how to help, again, the hundreds of thousands of kids that have already experienced gun violence at schools and how to, of course, also work to prevent gun violence from happening in the first place, given that, statistically, it's pretty likely that it's going to keep happening, at least for the time being, unfortunately.

What we can do better to intervene, what have we learned from past events, that we could apply in order to help the kids that are yet to experience these events, unfortunately.

Ruth Adewuya, MD (host):

Thank you so much for sharing your insights with us on this topic. I think we started by saying that this is a hard topic. It's a heavy topic, but also very important. I really appreciate you chatting with me today.

Maya Rossin-Slater (guest speaker):

Thank you so much. I appreciate it as well.

Ruth Adewuya, MD (host):

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