

Firearms, Schools & Drills: What We Know What We Don't

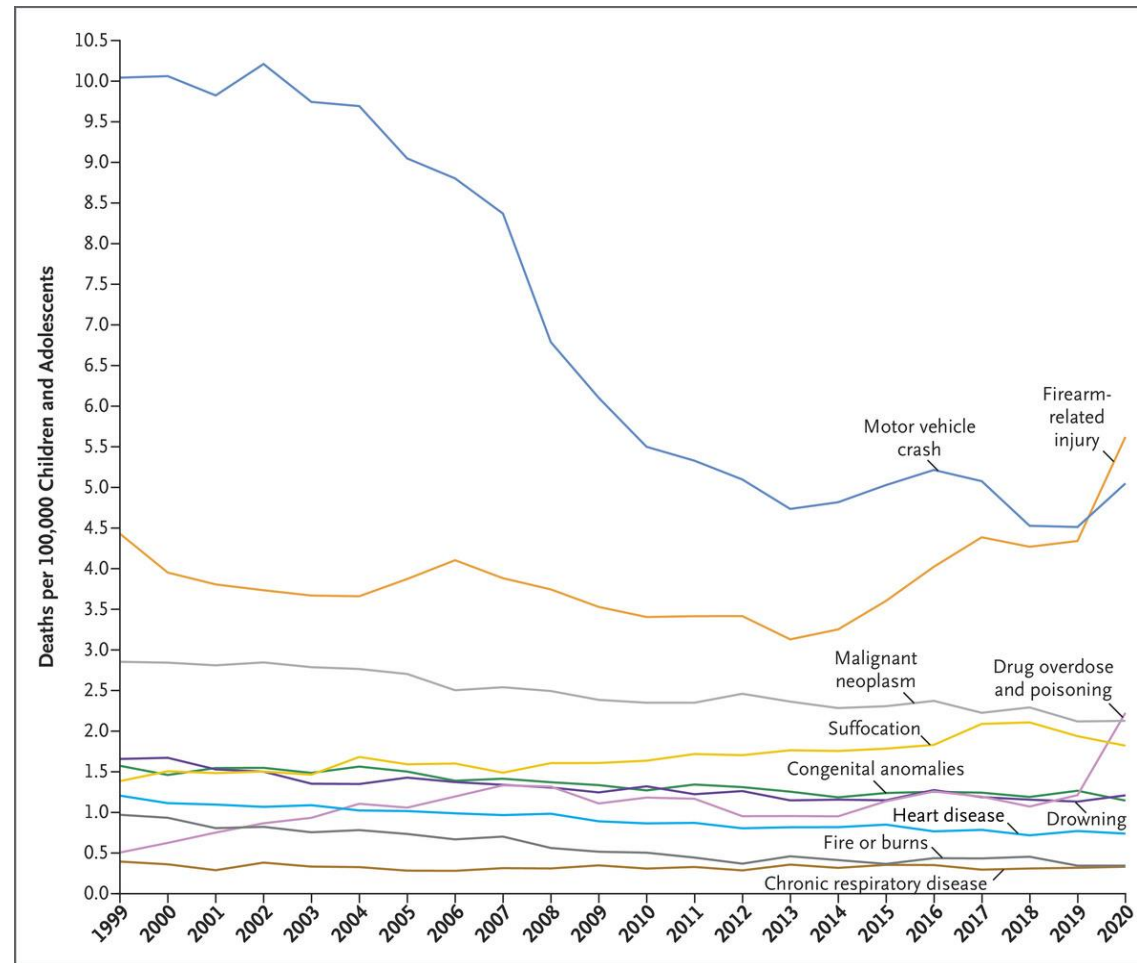
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Gun violence became the leading cause of death among children and adolescents in 2020



Crisis surrounding school shootings demands creative solutions

NATIONAL

Former student kills six in Nashville school shooting, police say

1 student shot, another arrested outside Jeremiah E Burke High School in Dorchester

Gunman kills 19 children, 2 adults in Texas school rampage

By ACACIA CORONADO and JIM VERTUNO May 25, 2022

Charges Filed Against Mother of 6-Year-Old Who Shot a Teacher

Prosecutors had previously decided not to charge the boy, a first grader who took the gun to his Newport News, Va., elementary school in January.

By JACEY FORTIN

After school shootings, teachers struggle for years with trauma

Educators who survive school shootings must return every day to the site of their trauma.

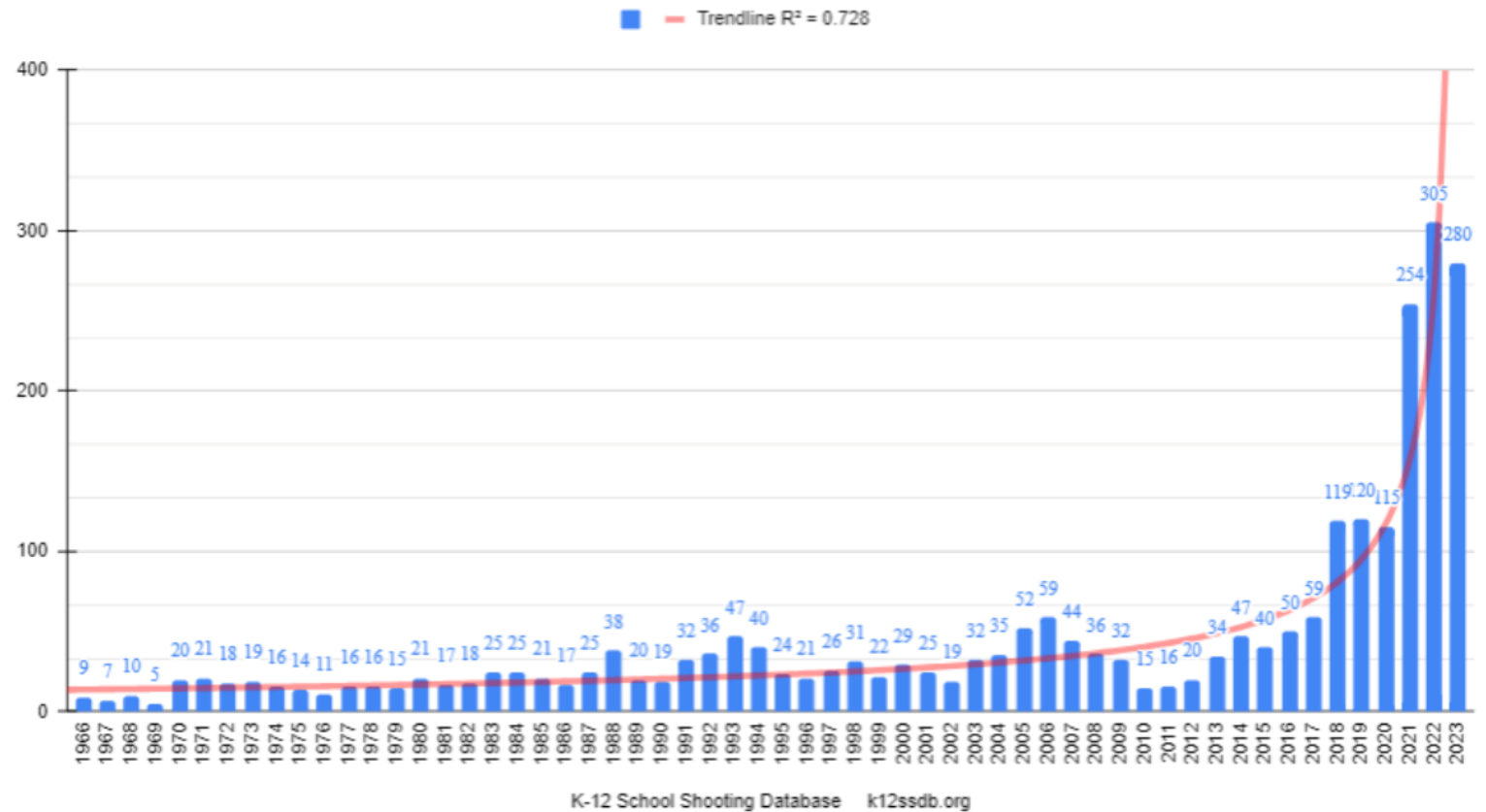
By Nicole Asbury • June 20, 2022

School Shootings: What We Know

- **There have been 389 school shootings since Columbine**
- **School shootings disproportionately affect Black children**
 - Almost all deadliest assaults - White gunmen -> false impression shootings exclusively affect White students
 - Children of color far more likely to experience campus gun violence: > 2x for Hispanic students & >3x for Black students
- **The median age of a school shooter is 16**
 - Children have access to firearms
- **School shootings are on the rise (dramatically since 2018)**

2023: A Snapshot of Children at Risk

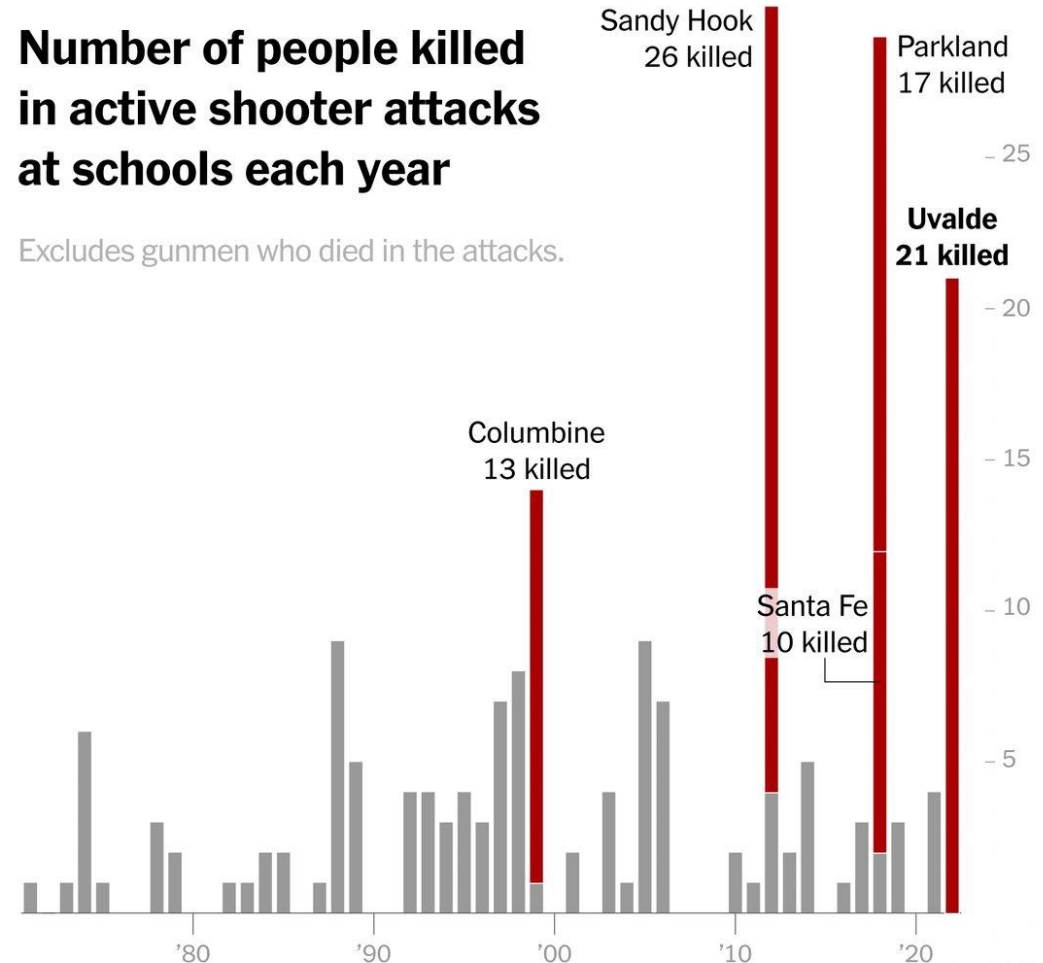
Incidents per year from 1966 - present with power regression model



Total # children exposed to gun violence at school has exploded: 187,000 in 2018 to 338,000 now

Number of people killed in active shooter attacks at schools each year

Excludes gunmen who died in the attacks.

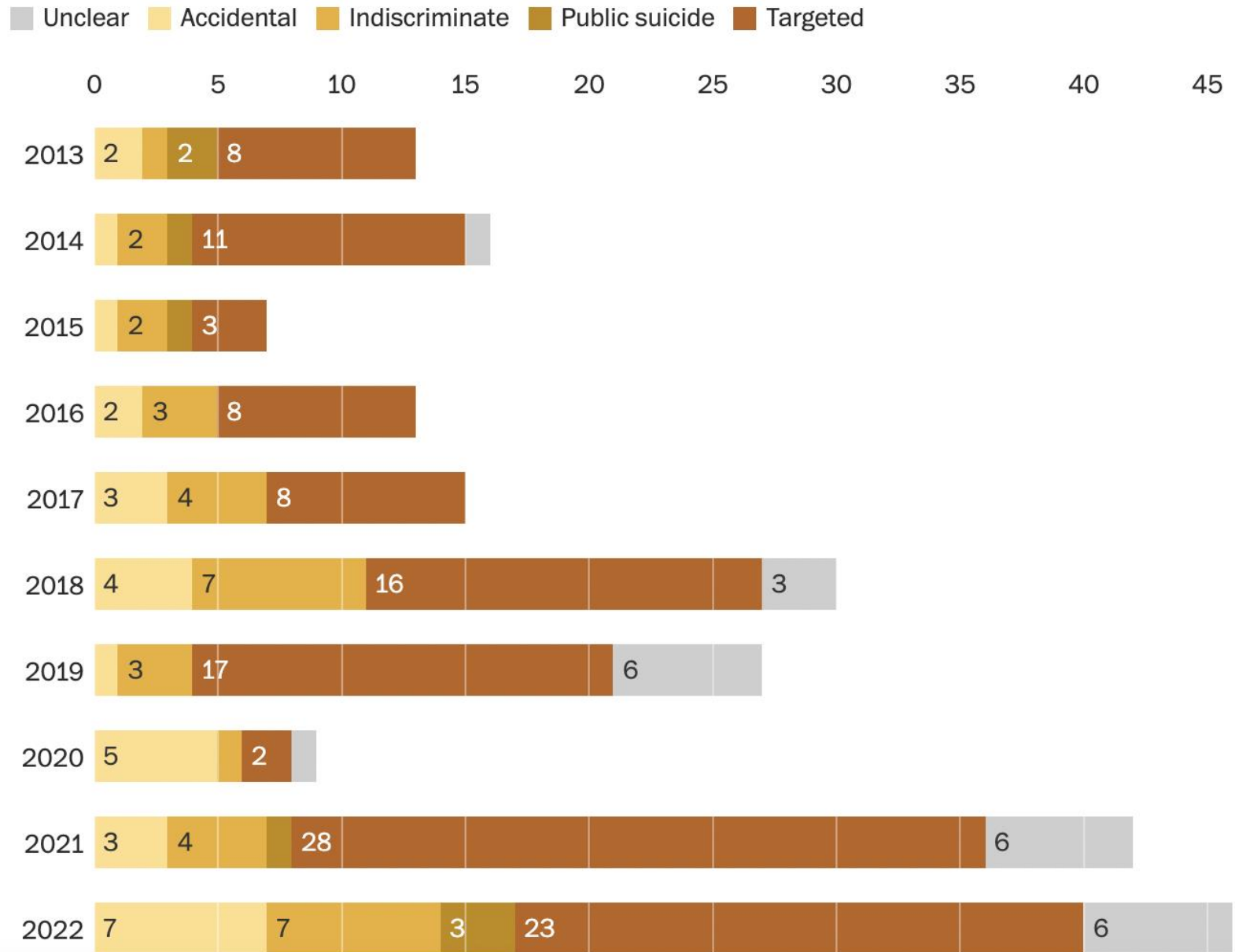


Source: K-12 School Shooting Database



Most school shooters seek specific targets

As school shootings have surged in recent years, targeted shootings have remained the leading type of shooting



Drills

- Since World War I, schools have been holding safety drills: fire drills, natural disaster drills, etc
- Modern active-shooter drills can expose students and staff to frighteningly realistic scenarios
- For students today, **the threat is not theoretical**
- Students have seen and heard about children just like them who were shot dead in classrooms just like theirs – often over social media



Drills

- 95% of American public schools hold lockdown drills/procedures
- Almost no research affirming the value of these drills for **prevention** or **protection**
- The impact of hyper-realistic drills must be re-considered
- While only 0.2% of gun deaths a year occur on school grounds, drills to prepare students and staff have become a near-universal practice
- Do drills harm students more than they help?
 - ***Demands more research***

What is the cost?

Ten months after Parkland, Lake Brantley High (200 miles North) a “code red” emergency over the intercom, > 2,700 students immediate danger

“Active Shooter reported at Brantley,” read a text sent to teachers.
“Initiate a Code Red Lockdown.”

Students wept, had asthma attacks, messaged parents goodbye

The drill was kept secret “so people will take it seriously,” a spokesman later argued, insisting it was “the only way to get their attention.”

False Narrative, Flawed Logic

- Drills have been built around a narrative of a deranged outsider, trying to get into every classroom and to kill as many students as possible
- This narrative was built out of Sandy Hook: very uncommon circumstance
- In every single public space: shooting, fire, gas, leak, train crash – we tell people “get away by every means possible”
- But without any evidence to drive procedure, students are being told to sit quietly in their classrooms
- **Overwhelming school shootings are committed by a current or former student at the school:** knows the plan and layout (Uvalde)

Drills: Might be Necessary

Existing drills do not consider students' ages and developmental stages, if they have special health care needs or disabilities, or if they have learning challenges

Largely reactive measures and are not taking into consideration the need for preventative programs to create a **culture of safety** in schools

Investing in a multistrategy, multidisciplinary health-based approach that takes into consideration student and faculty development, and mental and emotional health

Goal: transform fear into courage and anticipation into action by implementing student-focused strategies **rooted in prevention**

Drill Guidelines

Should not mimic an actual incident (i.e. hyper-realistic)

Provide advanced notice when a drill is planned

School personnel should help create appropriate drill content that involves trauma-informed approaches to address students' well-being

Unheard Voices: School Nurses

- Amid the national crisis around school shootings, there is increasing demand for partnerships with gun violence prevention programs and schools.
- MGH CGVP developed and launched a pilot gun violence prevention curriculum for school nurses.
- There is no existing, validated curriculum for school nurses to develop comfort around gun violence prevention efforts
- School nurses are essential to maintaining a safe, supportive environment for students
- School nurses may be uniquely poised to identify at-risk students and as such should be educated on how to ask about gun presence, gun safety, and the conditions when “red flag” measures should be considered.

School nurses

The first step of pilot: two large focus groups with a representative sample of school nurses from across the country.

As healthcare providers working within schools, which serve as major hubs and pillars of community standards, school nurses are well positioned to champion cultural change around the topic of gun violence prevention.

Themes: lack of support & resources

- *And so, although my heart is very much into wanting to make these systemic changes, I just you know my day is crowded with, you know, important issues. But I just find a hard time kind of dividing up my time to be able to focus on some of these bigger issues. I feel like I'm putting fires out all day, and that doesn't even really touch on the gun violence issue. That's just looking at some of the bigger, just health and safety issues that are also important. So for me, I feel like I'm 2 steps behind, because I'm just feeling like I need to advocate for better understanding- what a school nurse is, and what our education and our skills are, and how we are best utilized."*

Theme: Mental health crisis & culture of fear

- *“I feel like post-COVID, with the parents, with the staff, there’s still a lot of anxiety. People get angry quite quickly. And sometimes you just don’t know the right questions to ask to deescalate things or to find out more about a child’s family life without insulting or upsetting someone in the process.”*
- *“We’re afraid. Our safety is a concern. The mental health of our students and our staff is I think worse than I’ve ever seen it. Those YRBS reports – well before COVID were already trending in the wrong direction and everything in the pandemic just kind of compounded it. And we need a path, we need a road to get into those. If we’re all not ok, none of us are going to be ok.”*

Theme: Unstable environment

- *“I know from my vantage point, we are seeing really concerning behaviors of children, and truthfully, of staff. We have dysregulated people in our world at the moment. And so they’re not helpful to children, if a dysregulated staff member cannot necessarily help a dysregulated child. And we see a huge access to weapons that are being brought to school. So these are the concerns.”*
- *“I was a building nurse and now I’m a district nurse. I go building to building now. And I gave up my office because I didn’t feel safe. You gotta protect yourself, you gotta protect yourself”*

Theme: Firearms & Safety

- “I think a tool that’s missing from my belt is really how to quickly assess and ask that question and normalize it... how to have a conversation about guns in the home. Almost like the algorithm if you have a student that you know that is talking about suicide – there’s a very easy algorithm to kind of go and try to go through that. But we don’t have an algorithm for this. What quick questions should we be asking to put something in a hot category versus a warm category versus a cold category?”
- You have concerns over, versus calling them a threat. I think the language – the law enforcement language does not meet the language of a school community and it pathologizes, possibly, a child, or it is accusatory which would be even more – would even anger a parent more. I’m throwing a lot of ideas out there, but the idea is that, what’s most concerning to you?”
- **“We don’t really do anything around the prevention.”** Or if you’re going to have guns in your home, what is gun safety, because a lot of times, kids end up, just out of curiosity, harming themselves or someone else by playing with it. And we haven’t done that. And I don’t know, like many of the other nurses, I don’t know that that’s something that I would be comfortable taking on right now.”

Theme: Drills & safety

- *“I do want to say that the big picture here is that we had no standard response protocol for anything, and that is the big Grand Canyon gap. We are, as we did with Covid, which didn’t go well, flying the plane as we’re building it. That doesn’t work in public health... law enforcement is trying to win a battle, public health is trying to solve a problem. And so there is room for all of these pieces. What we have our expertise in is public health.”*
- *“The active shooter drills are traumatizing students. We had a football game at the high school, and they were playing, and somebody yelled “gun” and let me tell you, teachers, students, parents, the whole community. Just talk about reunification - It's not gonna happen. Everybody just ran. They were jumping fences because they really thought it was a gun, and it was very traumatic. It was, you know it was somebody yelled out something in the stands for the high school game, and that trauma carried on to the next 2 days to school”*

Theme: Drills & Safety

- *“I mean, okay, you had active shooter drills. But what about having... what about expounding on that and making certain that your building is safe, making certain that the locks work, that you know that the window latches work, and that security measures are implemented beyond the active shooter drills to ensure safety and a lot of districts for whatever reason, whether it’s political, financial, or otherwise, they just don’t have this in place, and everybody, you know, is ... nobody’s talking.”*

We Must Give Oxygen to Hope

- *“When I first started nursing, having those conversations about body odor, freaked me right out. How do you ask somebody if they can take a shower? I had a hard time with that. Over time and with practice, you just ask the question. It’s something I’ve become comfortable with over the years. And I hope that in time, that the gun safety thing, because guns aren’t going away, and gun bans are not going to happen. **we have to talk about access and safety. I think we have to talk about the reality of where we’re at. Otherwise we’re just pushing against a steamroller and we’re going to get nowhere so I think if we reframe our conversation – we can’t go into homes and take guns away. But maybe we can educate on how to make it safer.** If you do have guns this is a better way to do it, with the cabinets and the locks and the armor- you know all the stuff that they can do.”*



Simulating School Gun Safety Strategies: 'Hardening Measures' Versus the Status Quo

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Background

- Firearm-related injuries are the leading cause of death among children and adolescents in the United States.
- Some gun violence prevention interventions include 'hardening schools': e.g implementation of school resources officers (SRO's), cameras, bulletproof glass, identification for staff, metal detectors, active shooter plans, classroom door locks, locker checks, and patrolling of schools by law enforcement. None of these 'hardening schools' interventions have been shown to reduce school shootings
- Arming teachers, aimed at stopping possible school shooters, also has not been shown to reduce school shootings
- Hardening measures raise concerns for increased anxiety among students, staff, and parents.
- Given that a very small proportion (less than 2%) of firearm homicides take place at school or on the way to or from school – resource allocation to prevent gun violence should account for the effectiveness of school-based strategies

Objectives

- Determine the impact of hardening of schools on quality adjusted life years in a school-age population that does or does not experience gun violence
- Determine changes in anxiety rates that may result from 'hardening schools.'

Methods

- We developed a Markov model to compare 'hardening' K-12 schools, which includes placing armed guards in schools, fortifying building perimeters, and investing in active shooter trainings in addition to the existing status quo.
- Input parameters included effectiveness of strategies to 'harden' schools compared to the status quo. All model parameters were estimated from published sources, such as the Washington Post School Shooting Database and the National Center for Education Statistics.
- Per-person lifetime outcomes included mental health (anxiety), and gun-related injuries and deaths, which were quantified using quality-adjusted life years (QALYs) for a cross-sectional cohort of 100,000 US kindergarten-12th grade school students and school-based staff.
- We performed a threshold analysis to quantify the difference in effectiveness required to change the preferred strategy.

'Hardening schools' does not increase QALYs compared to the status quo and likely increases student anxiety

Methods Cont.

Table 1. Select simulation model input parameters

Input parameter	Value	Source
Gun Incident		
probability of gun incident	0.000442	[2]
probability of adverse childhood experience*	0.999148	[9]
probability of dying in school shooting*	0.000495	[2]
probability of chronic disability*	0.000356	[11]
*conditional on gun incident		
No Gun Incident		
probability of no gun incident	0.99964	[2]
probability of anxiety	0.419	[3]
probability of no anxiety	0.581	[3]
QALE		
disability	51.67	[5]
ACE (adverse childhood experience)	53.4	[9]
anxiety	53.4	[8]
no anxiety	55.1	[10]

Results

Table 2. QALY Analysis of Hardening Versus Status Quo

Strategy	Probability of Intermediate Outcomes (per 100,000)			Total QALYs from Intermediate Outcomes*	Total QALYs
HARDEN	pACE	pDisability	pDeath	0.024	54.39
gun incident	44.162	0.016	0.022		
	Probability of Anxiety or No Anxiety			Total QALYs from Anxiety*	
	anxiety	no anxiety		no anxiety	32.00
no gun incident	0.419	0.581		anxiety	22.37
STATUS QUO	pACE	pDisability	pDeath	0.024	54.56
gun incident	44.162	0.016	0.022		
	Probability of Anxiety or No Anxiety			Total QALYs from Anxiety*	
	anxiety	no anxiety		no anxiety	37.51
no gun incident	0.319	0.681		anxiety	17.03

*Values are product of QALE of intermediate outcomes or anxiety and probability of going down that pathway

Results Cont.

- In the base-case analysis, hardening schools resulted in **0.17 fewer per-person lifetime QALYs** compared to the status quo strategy, driven by increased anxiety among students and lack of effectiveness in preventing school shootings.
- Threshold analysis revealed that the acceptable **increase in anxiety rates associated with hardening schools would be 0.00049%** assuming this strategy eliminated gun violence in schools entirely.

Conclusions

- 'Hardening schools' has not been shown to decrease incidence of school shootings or associated trauma, disability, and death. In this exploratory model, we demonstrate that 'hardening schools' can have a substantial impact on QALYs due to anxiety associated with hardening measures.
- Any strategy to reduce gun violence in schools must be carefully weighed against its risks, such as increasing adolescent anxiety.

Future Directions

- Examine the impact of hypothetical interventions to enhance school-based mental health resources or trauma-informed gun violence curricula
- Incorporate age- and sex- stratified inputs and results

Limitations

- There is very limited data on interventions that result in effective decrease in firearm injuries
- QALY estimates for mental health are also limited

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Do the unproven benefits of these drills outweigh their known collateral consequences to school communities' mental health and wellbeing?



Existing Research Supports

- Access to mental health professionals and social support
- Non-punitive and non-exclusionary disciplinary processes
- Trauma-informed emergency planning
- Robust crisis intervention teams
- Education on gun locks and safe storage for firearm owners

