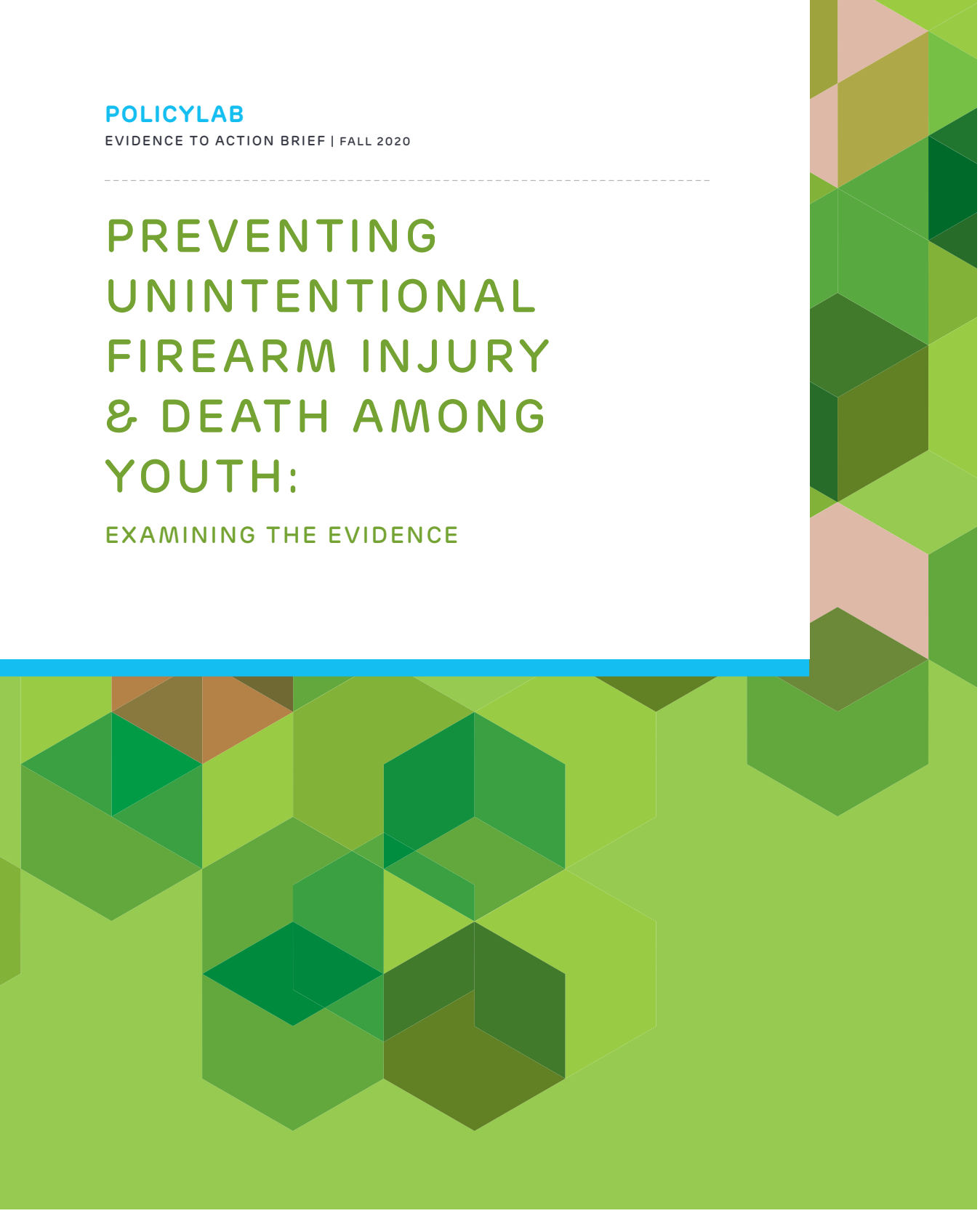
POLICYLAB

EVIDENCE TO ACTION BRIEF | FALL 2020

PREVENTING UNINTENTIONAL FIREARM INJURY & DEATH AMONG YOUTH:

EXAMINING THE EVIDENCE



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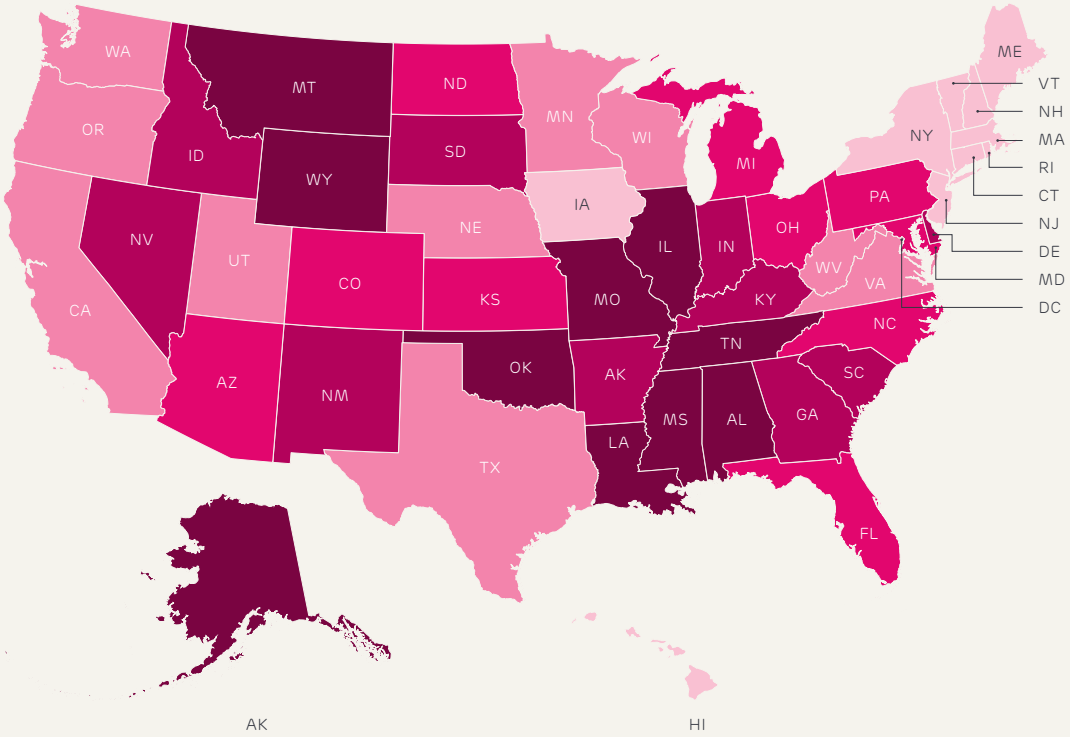
EXECUTIVE SUMMARY

Despite significant national attention to gun-related shootings involving children, and resulting calls for gun reform, little has been done to address gaps in research or promote policies that can help prevent child injury and death from firearms. Overall rates of firearm-related death in youth have increased over the past decade, particularly since the Sandy Hook shooting in 2012—thought by many to be a potential turning point in the discussion around firearm safety policy.[1] Yet even with increased attention on the epidemic of gun violence, firearm-related injury remains the second-leading cause of death in children as of 2018 (Figure 1).[2]

Figure 1

FIREARM-ASSOCIATED DEATHS IN CHILDREN CONTINUE TO OCCUR AT A HIGH RATE



Rate of Deaths Per Year Per 100,000 Children

0.5–2.4 *2.4–3.3* *3.3–3.7* *3.7–4.8* *4.8–9.9*

Death by firearms for youth ages 0–19 between 2008–2018

Source: Centers for Disease Control and Prevention's Web-based Injury Statistics Query and Reporting System

As pediatric health experts who see the consequences of firearm injury firsthand, we recognize the urgency for action on this issue and have identified unintentional firearm injury and death as an important starting point for intervention. This *Evidence to Action* brief is intended to evaluate existing research on firearm legislation and identify gaps, to highlight priorities for future research funding and scholarship, and to propose evidence-based, public health approaches to prevent unintentional firearm injury and death in children and teens. Policy and research recommendations included in this analysis reflect that there are different root causes for unintentional firearm-related injuries in children of different ages. The proposed child-focused policy recommendations and research areas are intended to equip caregivers, health care providers, community organizations, and policymakers with solutions to make communities and children across the country safer from avoidable firearm injury.

BACKGROUND

Approximately 1 in 3 children in the U.S. live in a home where a firearm is present.[3] Of gun-owning adults, 66% own more than one gun.[4] The U.S. has more guns than any other country in the world, and this can spell danger for children and teens.[5] In fact, multiple studies show that the number of gun owners in a community is the best predictor of gun-related death and injury among children.[4,6,7] As pediatric health experts and physicians, we have seen firsthand the devastating toll that gun violence and firearm injuries have taken across the country over the last several decades.[6–8]

Specifically, one of our top concerns is unintentional firearm-related injury in children, which is injury or death that is the result of a child using a gun to hurt themselves or someone else by mistake (Figure 2). Between 2014 and 2018, more than 15,000 children (ages 19 and under) died due to firearms, and at least 13,000 sustained firearm-related injury or death unintentionally.[1] Unfortunately, like many issues surrounding gun violence, there is a lack of research on which policies, programs, and approaches can best protect kids and teens from unintentional injury. The research that exists often has significant limitations: data may be focused on adults only, may include a small sample size, may not be generalizable to other settings or, in many cases, may not exist at all.

That being said, there are bright spots. In 2019, Congress specifically allocated funds to the Centers for Disease Control and Prevention (CDC) for firearm research for the first time in more than 20 years. Firearm safety is also being discussed more often in clinical settings by providers, including pediatricians. Studies have demonstrated that most parents are open to having discussions about firearms in a clinical setting if approached appropriately, and the American Academy of Pediatrics (AAP) has released guidance to inform these efforts.[9–11]

As an institution with a commitment to maintaining and improving the health and well-being of all children, we want to understand which evidence-based interventions work to protect kids and teens against unintentional firearm injury. This brief identifies existing research around unintentional firearm injury and death among children and related policies that show promise to address the issue, and provides recommendations rooted in that data for new public health approaches to protect youth. **Throughout this resource, we will use the term children to broadly describe those less than 19 years old, and use the terms "adolescent" or "teen" to refer to children aged 13–19, unless otherwise noted.**

We recognize that there are many other issues around firearms that have a profound impact on the physical and emotional health of children and families. Suicide, homicide, mass shootings, and community violence have ripple effects that lead to intergenerational trauma and long-term health consequences, as well as social and economic challenges for communities. For this brief we will not be touching on these critical areas, and will limit our focus to a specific opportunity for action: preventing unintentional firearm-related injury and death among youth.

It is also important to note that this resource was created during the COVID-19 pandemic in late 2020, during which there has been an unprecedented increase in firearm sales across the country.[12] Already, there have been rising rates of firearm injury and death compared to the same time last year.[13] The pandemic has also broadened existing inequalities, challenged the mental health of children and families, and has resulted in school closures and increased unstructured and potentially unsupervised time for youth. These are factors that may exacerbate the risks of unintentional injury for children. It will be critical to research the impact of this increase in gun ownership on child health and to implement the best available policies to prevent additional harm to children from taking place.

Parental Awareness of Child Access to Firearms in the Home

- Almost 40% of parents wrongly believe their children don't know where their guns are stored[14,15]
- 22% of parents wrongly believe their children have never handled household guns[14,15]

Figure 2

CHILDREN ARE MOST LIKELY TO BE INJURED OR KILLED BY GUNS IN THEIR OWN HOME

In 2019, there were at least

309

unintentional shootings by children age 17 and under, resulting in ***120 deaths*** *and* ***203 injuries****.*[16]

Among younger children (ages 0–12 years) who are killed by a firearm,

85%

are killed in their own home*.*[10]

In 2015, it was estimated that

4.6 million children

lived in a home ***with a loaded and unlocked gun.***[3]

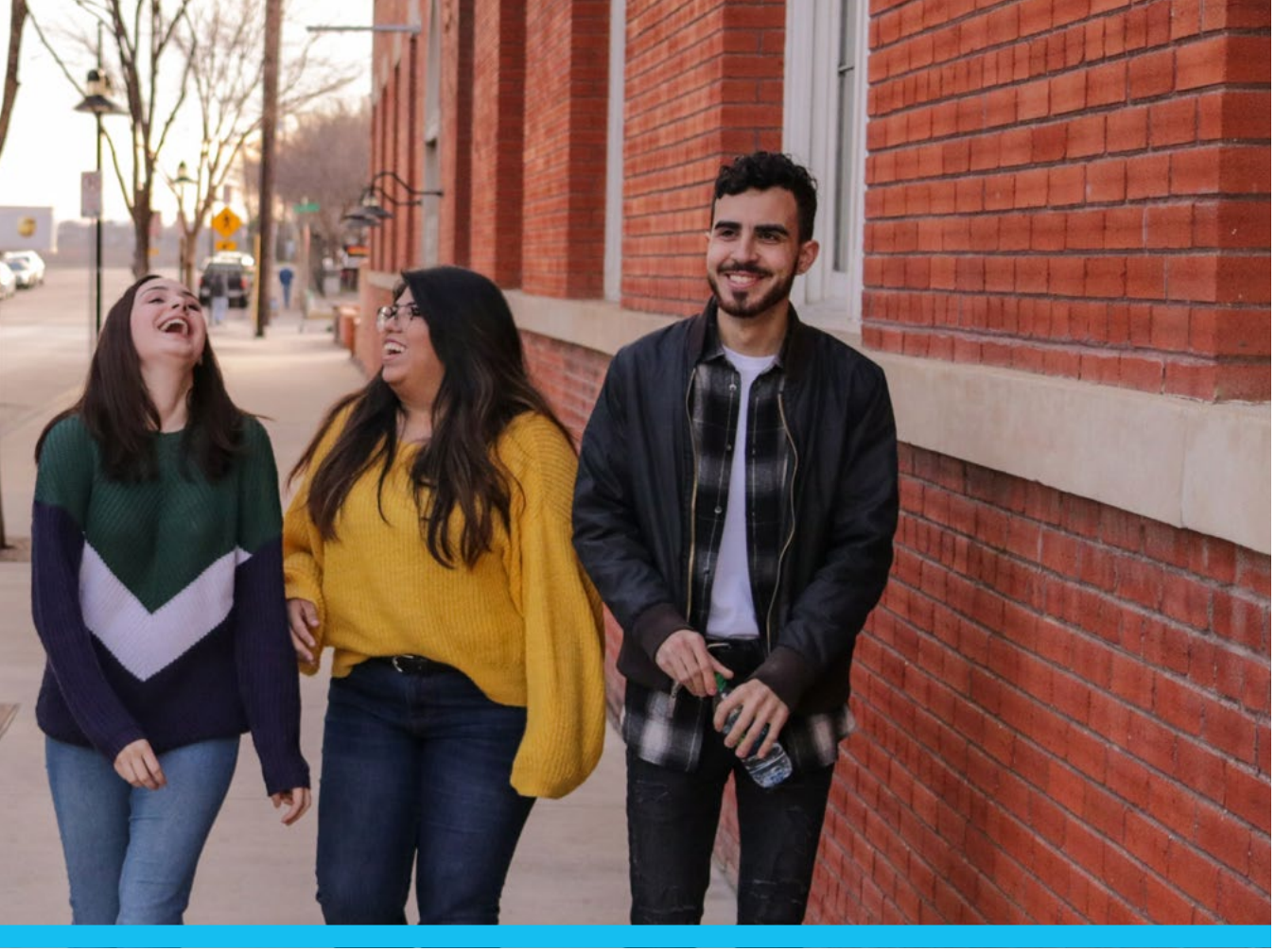
An additional

11.4 million children

lived in a home ***with a gun that was kept either loaded or unlocked.***[3]

APPROACH

This *Evidence to Action* brief is the result of both a policy analysis and research review. We conducted a review of the policy landscape using a broad range of sources including nonpartisan organizations, advocacy groups, policy documents and media sources. The research review included 53 peer-reviewed studies of gun-related policies and interventions.



We evaluated studies based on the following criteria:

- **Study characteristics.** Meta-analyses and randomized control studies were considered a higher level of evidence than cohort studies and case series.
- **Population.** Inclusion of and sample size of pediatric patients, as well as the generalizability of the study population, were considered.
- **Relevance.** Studies based on more recent data and specific to unintentional injury received higher consideration.
- **Robust analysis.** There are many barriers to studying the impact of health policy on population health. We gave studies more weight in determining our policy recommendations that acknowledged and accounted for these limitations—for example, by conducting and commenting on statistical results both with and without adjusting for confounders, or by validating their findings in multiple settings.

Policies that have been studied are grouped into two categories in the following pages: those that aim to prevent children from handling an adult's gun, and those that aim to prevent children from illicitly possessing a gun. For each policy we identify, we provide an overview of the evidence found in call-out boxes throughout the brief.

WHAT WE KNOW

When it comes to unintentional injury or death among children, we know that there are different root causes across different age groups. Among children younger than 10 years old, unintentional injury often occurs when a child accidentally fires a gun at themselves or someone around their age.[17] Our team explored the research behind policies that could potentially mitigate this risk by preventing or dramatically decreasing the likelihood that a child would access and unintentionally fire a gun (Figure 3).

Among older children or adolescents, injury is more likely to be due to mistakenly firing a gun at friends or bystanders.[17] To address this issue among adolescents, we looked at data surrounding policies that would decrease teen gun possession.

- **PREVENTING CHILDREN FROM UNINTENTIONALLY FIRING A GUN**
- **DECREASING ADOLESCENT GUN POSSESSION**

Figure 3

INFLUENCES ON FIREARM-ASSOCIATED INJURY OR DEATH IN CHILDREN AND ADOLESCENTS

	FACTORS			
PHASES		HOST (Children, teens and adults)	AGENT/VEHICLE (Firearm)	ENVIRONMENT (Physical and social)
	PRE-INJURY (Before a child uses a gun)	• Firearm education	• Safe storage devices	• Child Access Prevention laws • Depiction restrictions • Comprehensive background checks • Lost and stolen legislation
	INJURY (Once a gun is in the child's possession)		• Gun safety design	• Prevent gun carrying in schools and communities using metal detectors, school personnel and enforcement of illicit possession laws

This Haddon Matrix uses an injury science framework to evaluate factors that can lead to firearm injury. Policy alternatives discussed in this brief are summarized based on the factor they impact (host, agent, environment) and the time point they intervene upon (pre-injury, injury).

PREVENTING CHILDREN FROM UNINTENTIONALLY FIRING A GUN

Encouraging Safe Gun Storage

OVERVIEW OF EVIDENCE:
We identified nine studies that evaluated the relationship between Child Access Prevention (CAP) laws and unintentional pediatric injury and death.

RELEVANCE TO TOPIC:
We identified six studies that evaluated the effects of Child Access Prevention laws on pediatric mortality and two that evaluated the effects on pediatric unintentional injury.

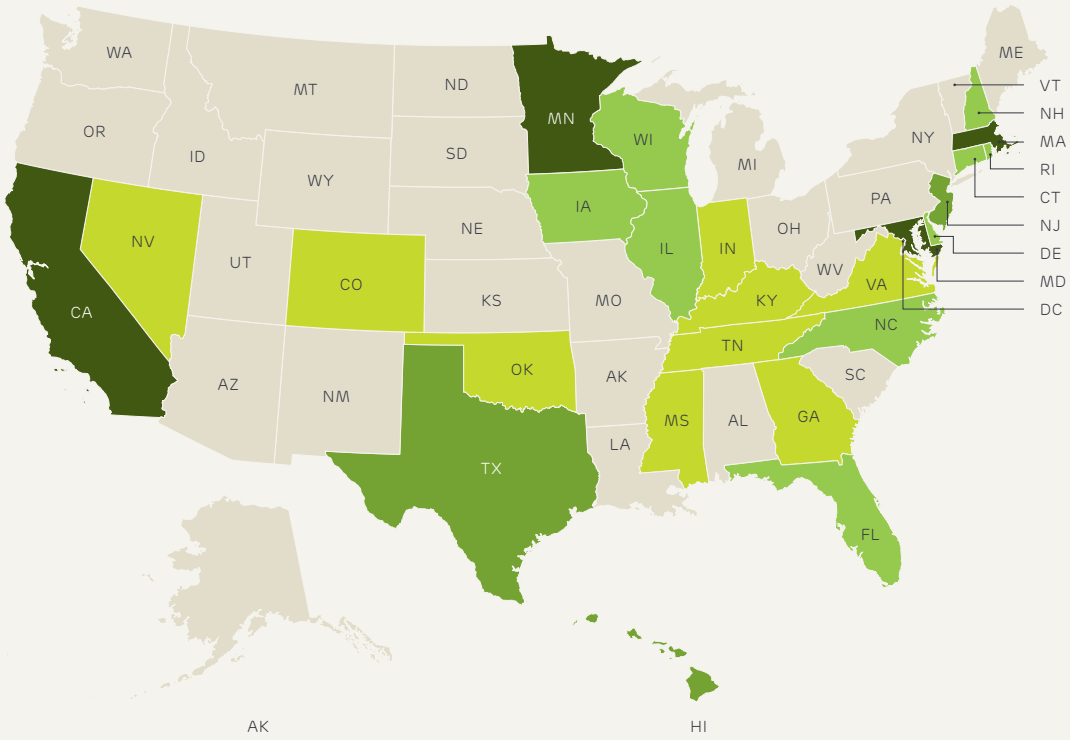
The safest home for children is one without firearms.[11,18,19] However, when a firearm is present, we know that gun storage practices have a direct impact on unintentional injury risk in children. Gun owners who keep their guns locked, unloaded and separate from their ammunition are less likely to have unintentional injury occur in their homes, and locking up both the firearm *and* ammunition adds an additional layer of protection to prevent a child from accidentally firing the weapon.[20,21] However, many gun owners do not store their guns safely. The best estimate we have is that about 20% of U.S. gun owners who live in a household with children are currently storing all of their guns loaded and unlocked.[3,22]

We also know that parents have misconceptions about their child's knowledge and handling of their guns. Most parents don't think their child knows where their gun is stored, but when researchers ask children directly, 40% of these same children are able to correctly identify the location of the gun.[15] Parents also often incorrectly believe their child has never handled their gun, when in reality, they have.[14,15] By motivating more gun owners to use safe storage practices, we could potentially decrease pediatric firearm mortality by as much as 32%.[23]

One policy approach to motivate safe storage is through Child Access Prevention (CAP) laws. CAP laws hold a gun owner accountable if their gun is not stored safely. Many states, such as Pennsylvania, don't have any CAP laws (Figure 4). For states that do have CAP laws, they differ in whether they hold a gun owner accountable if the gun owner intentionally gives a child a gun (known as "recklessness laws"), versus if they impose criminal liability if a gun owner neglects to safely store a gun in a home with children (known as "negligence laws") (Figure 5).[24] There have been four high-quality studies demonstrating a decrease in child unintentional

Figure 4

LAWS REGARDING CHILD ACCESS TO GUNS BY STATE



Child Access Prevention laws vary in the liability they place on a gun owner to protect the child against gun misuse. Many states have no laws regarding preventing child gun use.

Source: Azad HA, Monuteaux MC, Rees CA, et al. Child access prevention firearm laws and firearm fatalities among children aged 0 to 14 years, 1991–2016. JAMA Pediatr. 2020;174(5):463–469. doi.org/10.1001/jamapediatrics.2019.6227.

Figure 5

AMONG STATES WITH CHILD ACCESS PREVENTION LAWS, LAWS ENFORCED BASED ON NEGLIGENCE ARE MORE EFFECTIVE IN PREVENTING CHILD INJURY

Source: Azad HA, Monuteaux MC, Rees CA, et al. Child access prevention firearm laws and firearm fatalities among children aged 0 to 14 years, 1991–2016. JAMA Pediatr. 2020;174(5):463–469. doi.org/10.1001/jamapediatrics.2019.6227.

injury and death in states with CAP laws that impose criminal negligence on gun owners who fail to store their guns safely.[24–27] **Taken together, these studies provide good evidence to support that negligence-based CAP laws reduce unintentional child injury or death due to firearms.**

We also identified two studies that demonstrate CAP laws had an impact in some states, but not in others, potentially due to variation in the type of CAP laws implemented in each state.[20,21,28] Two other studies did not find an impact of CAP laws on unintentional death, but did not distinguish between recklessness or negligence laws and did not study the effect on unintentional injury.[29,30] More research needs to be done to determine if recklessness laws have an impact on child injury or death, and to understand what makes a CAP law more or less effective.

Voluntary transfer of a firearm from a gun owner to a trusted friend, family member, gun store or law enforcement may be another way to keep guns stored out of the hands of children.[31] There have been no studies on the impact of these types of arrangements on unintentional gun injury in children. Further research in this area may help clarify if this is an effective method for gun owners to temporarily remove all guns from their home while maintaining ownership of their weapon.

There is good evidence that gun owners store their guns more safely when they are given a safe storage device in tandem with an educational intervention.

Firearm Education for Adults

OVERVIEW OF EVIDENCE:

No studies have evaluated the impact of this policy on pediatric unintentional injury or death.

RELEVANCE TO TOPIC:

We identified fifteen studies that evaluated whether clinician counseling impacted safe storage behaviors. Eight studies looked at whether being given a safe storage device at the time of counseling had an impact on gun storage behaviors.

Firearm safety education for adult gun owners is another approach to motivate safe storage of guns. Currently, the United States does not have federal gun licensing or firearm safety training requirements. Some states have taken action by instituting their own permit, licensing or training requirements, but there is no standard curriculum.[32] A 2016 audit revealed that only 70% of firearm safety classes discussed preventing child access to firearms, and a 2018 survey found that only 61% of gun owners report receiving formal firearm training.[33,34]

We could not find any research on whether firearm training that is required by state policy has an impact on safe storage behaviors. However, there is research investigating the effectiveness of firearm safety education for adults. These studies **have not identified a conclusive link between firearm safety education and safe storage behaviors.**

We identified six studies in which clinicians provided gun safety counseling but did not provide a corresponding firearm storage device for the adult to follow through on what they learned.[35–40] There were two studies that showed some positive impact when counseling alone was provided to parents of adolescents coming to the emergency department with Major Depressive Disorder, and one study that found an effect of a brief counseling intervention in a family practice clinic.[35–37] Otherwise, firearm counseling alone did not demonstrate a significant impact on safe storage, even when combined with an economic incentive for purchasing a safe storage device.[38–40] Similarly, a community-wide intervention including billboard, TV and radio advertising, community-distributed materials and economic incentives for safe storage was not found to have an impact on storage behaviors.[41] **More research is needed to identify firearm safety education programs that will have a lasting impact on safe storage behaviors.**

However, there is good evidence that gun owners store their guns more safely when they are given a safe storage device in tandem with an educational intervention. In our review, all seven studies in which firearm counseling was combined with provision of a free gun storage device did result in a positive impact on storage behaviors. Two of these studies took place in pediatric clinics where health care providers offered the counseling.[42,43] These studies relied on self-report of gun storage behavior, which may lead to bias. However, they had large sample sizes, were randomized and controlled, and adjusted appropriately for factors that may have influenced the findings, including variability in practitioners.

These findings were reproduced in four community studies—in which gun locks or gun safes were provided free of charge to gun owners in community settings such as parking lots, door to door and by police officers—that also demonstrated a statistically significant increase in safe storage behaviors.[44–47] Overall, these studies suggest that **firearm counseling combined with providing a free storage device may result in lasting improvements in safe storage behaviors.**

Firearm Education for Children

OVERVIEW OF EVIDENCE:

No studies evaluated the impact of this policy on pediatric unintentional injury or death.

RELEVANCE TO TOPIC:

We identified seven studies evaluating the impact of firearm safety programs on youth knowledge and real-world behavior change.

Implementing youth firearm safety education programs is another approach to preventing unintended firearm injury in children. National, state, and local firearm safety programs have been developed to inform and teach children how to react if they come across a firearm in an unsupervised setting.[48] Safety skills assessments differ across programs, but typically incorporate either situational assessments, where a simulated situation is completed with a trainer, or a knowledge assessment, evaluated by pre- and post-tests or by orally asking the child about what they would do in a situation.[48–50] Developed in 1988, the National Rifle Association's (NRA) Eddie Eagle knowledge-based training has been taught to over 15 million children, and is one of the most widely recognized and implemented programs, despite a lack of evidence that the program is effective.[51–53] In fact, few studies have evaluated the effectiveness of different child-based gun safety programs, and others are not generalizable due to their small sample size and minimal statistical analyses.[48,50]

While there are some interventions that are shown to increase a child's knowledge about gun safety, none have demonstrated behavior changes when children are placed in real-world scenarios with a gun present.[48–50,52–58] Four randomized control trials that tested the effectiveness of different firearm safety programs did not find a difference in gun-play behavior between children who did and did not receive instruction.[52,54,55,58] Only Behavioral Skills Training, which uses active learning approaches such as instruction, modeling, rehearsal and feedback, was effective in teaching children to perform gun safety skills in supervised role play.[52,53,57] Incorporating behavioral skills into training programs has been shown to have some effect on children's demonstration of gun safety knowledge, but minimal effect in teaching generalizable behaviors—meaning knowledge learned in one scenario may not apply to a vastly different setting.[48,50,52]

Unfortunately, if children do not change their behavior in real-life situations, this knowledge will not make a difference for their health and safety.[48,49,52,53,57] A sentinel study of boys aged 8–12 found that when a real gun was hidden in a room, 76% of those boys who found the gun handled it, and 48% pulled the trigger with enough force to discharge, in spite of 90% of the participants having previously received safety training.[56] This difficulty integrating concepts from training into real-life scenarios is consistent with the developmental psychology of children. It is natural for children to be curious and to not see the consequences of their actions. Learning to inhibit these behaviors can be challenging and requires training that is targeted towards a child's developmental stage. **More research is needed to determine if there is any effective, age-appropriate way to transfer classroom-based teachings to children's behaviors towards real-life interactions with firearms.**

It is natural for children to be curious and to not see the consequences of their actions. Learning to inhibit these behaviors can be challenging and requires training that is targeted towards a child's developmental stage.

In a review of data from unintentional and undetermined firearm deaths, one study found that 44% of gun deaths could have been prevented by safety designs, including a personalized device, a loaded chamber indicator or a magazine safety.

Gun Safety Design

OVERVIEW OF EVIDENCE:

No studies evaluated the impact of this policy on pediatric unintentional injury or death.

RELEVANCE TO TOPIC:

We identified one study that evaluated gun deaths that could have been prevented through better safety designs.

Another approach to preventing unintentional child injury is making the gun itself safer, by either making it harder for a child to shoot a gun or designing the gun so it doesn't shoot unintentionally. A seminal 1987 study of accidental gun deaths found that gun malfunctions and guns that were easy to use, such as handguns, contributed to unintentional firearm deaths, suggesting gun design could play a key role in protecting children.[59] Safety designs can range from gun lock devices to "smart guns," or guns that incorporate technology to prevent anyone other than the authorized user from unlocking and firing the weapon.[60] Examples include built-in fingerprint sensors and radiofrequency technology that requires a matched device in range to turn the gun on.[61] These types of safety features could protect a child or teen should they have access to a firearm in the home or elsewhere.

Currently, no federal laws exist pertaining to personalized guns and their purchase, or that encourage national movement among manufacturers toward this type of gun design.[60] In fact, firearms are the only products sold in the U.S. that are exempt from federal consumer safety requirements—the gun industry has exclusive oversight over firearms and sets their own standards for design and safety (Figure 6).[62] Smart gun technology has been developed, but is not currently available to U.S. consumers for a multitude of reasons, including interest group reactions to the passage of state laws requiring that all guns sold in the state must be smart guns as soon as a smart gun is commercially available.[63] Research has shown that gun owners would be open to gun design technology, but they want the *option* to purchase this type of weapon rather than a *directive* from the government to do so.[64,65]

The disincentives for gun manufacturers to sell these smart weapons means that **evidence is extremely limited regarding the potential impact on unintentional child injury.** In a review of data from unintentional and undetermined firearm deaths, one study found that 44% of gun deaths could have been prevented by safety designs, including a personalized device, a loaded chamber indicator or a magazine safety.[66] However, a 2019 survey of gun owners suggested that those who were already likely to safely store a gun or who had taken a gun safety course were more likely to be interested in smart guns.[64] This result suggests there may be a smaller incremental benefit of personalized firearms than expected. In addition to firearm technology, there has also been interest in developing and utilizing smart technology for firearm storage devices, though research on the effectiveness of these devices in preventing child access is extremely limited.

More research is needed to determine potential effectiveness of safety designs, though there are limits to this approach overall due to the lack of smart weapons in the U.S. and no requirement for manufacturers to follow federal safety guidelines.

Figure 6

FIREARMS DO NOT MEET GENERAL FEDERAL REGULATORY STANDARDS THAT ARE SET FOR MANY OTHER COMMONLY USED HOUSEHOLD PRODUCTS

		CONSUMER PRODUCTS			
		TOYS	CARS	SWIMMING POOLS	GUNS
FEDERAL REGULATORY STANDARDS	THIRD PARTY TESTING REQUIRED PRIOR TO SALE	✓	✓	✓*	✗
	LABELING REQUIRED FOR SAFE USE OF PRODUCT	✓	✓	✗	✗
	MANDATED REPAIR, REPLACEMENT OR REFUND OF DEFECTIVE PRODUCT	✓	✓	✓	✗

**Safety vacuum testing required for public pools only.*

Gun Violence Depiction Restrictions

As youth firearm-related injuries have increased in frequency, there has been concern that violent depictions in the media contribute to these incidents. A 2017 survey found that 60% of adults in the U.S. pointed specifically to this type of violent depiction in video games as a contributing factor for gun violence across the country.[67] **In reality, there are significant gaps in research linking violent video games to gun violence, and much of the recent research has yielded mixed results.**

Some studies suggest no link between violent behavior and video games.[68] Others suggest video games rated for mature content could actually have a beneficial impact on reducing injury, serving as an outlet for aggression.[69] However, additional studies found the opposite, indicating violent video games increased aggression or hurtful behavior among children and adolescents.[70,71] Overall, there is no research that specifically evaluated the effect of video games or other violent media on unintentional injuries in children.

In 2020, the American Psychological Association published a ***resolution*** and research review identifying important nuance from existing research: "all violence, including lethal violence, is aggression, but not all aggression is violence." It's important to note that while some findings demonstrate a link between violent video games and aggression, that does not mean that a child or teen will commit a violent act.

In reviewing the impact of background checks on child injury and death, we found strong evidence in favor of comprehensive background checks—specifically those that eliminate private sale loopholes—in reducing overall firearm-related mortality.

DECREASING ADOLESCENT GUN POSSESSION

Across the U.S., it is legal for teens to possess specific firearms for hunting and sport, but federal law states that minors under age 18 cannot purchase or possess handguns and cannot purchase rifles or shotguns from a licensed dealer (Figure 7).[29] When teens possess guns, either illegally due to licensing loopholes, or because they are given a weapon as a gift, research has shown that they, their friends, and other bystanders are at risk of unintentional injury or death.[17]

There are many reasons, however, why a teen might want a gun, including being a victim of community violence or bearing witness to it; suffering the ripple effects of intergenerational trauma and living in ongoing fear; and societal influences that glorify firearms and make having a gun desirable to youth, particularly boys. **There is a critical need to understand and address these underlying risk factors for illicit gun possession.** However, for the purposes of this discussion we will focus instead on specific policy alternatives to address teen gun possession and teen gun carrying.

Comprehensive Background Checks

OVERVIEW OF EVIDENCE:

We identified one study that evaluated the impact of this policy on pediatric mortality.

RELEVANCE TO TOPIC:

We identified one study that evaluated this policy's impact on adolescent gun possession. Six other studies, including one meta-analysis, analyzed the impact of this policy on overall injury and death.

Background checks prevent serious criminals, fugitives or other individuals who cannot lawfully own a gun from purchasing a gun at the point of sale. Since 1993, ***the Brady Act*** has mandated that firearms cannot be transferred from a federally authorized dealer without a background check, which is run through the FBI's National Instant Criminal Background Check System (NICS).[72,73] Since this system was instituted in 1998, more than ***1.5 million individuals*** have been denied a gun at the point of sale, representing fewer than 1% of total background checks completed.[73] However, this federal law does not extend a mandate on background checks to private gun sales or transfers. As a result, significant gaps exist in the number of U.S. gun owners who have had a background check before obtaining a weapon. A 2017 national survey demonstrated 22% of gun owners who obtained their weapon in the two years prior to the study did not have a background check, and another study estimated that 40% of gun transfers occur as private sales.[74,75]

To close this loophole, 22 states have gone beyond the requirements of federal background check laws (Figure 8).[76] Thirteen states require background checks at point of sale for all sales and transfers, from both licensed and private sellers. Maryland and Pennsylvania require background checks at the point of transfer for all handguns, including private transfers, but do not extend this requirement for long guns. Finally, instead of point-of-sale background checks, Hawaii, Illinois and Massachusetts require all firearm purchasers to obtain a permit, available only after passing a background check to buy a firearm.

Figure 7

THOUGH THERE ARE FEDERAL LIMITATIONS ON WHO CAN SELL OR DELIVER FIREARMS TO YOUTH, LOOPHOLES EXIST

MINIMUM AGE FOR GUN SALES AND TRANSFERS (Under federal law)		
	HANDGUNS	LONG GUNS (Rifles and shotguns)
LICENSED FIREARMS DEALERS	Dealers may not sell or deliver a handgun or ammunition for a handgun to any person the dealer has reasonable cause to believe is **under age 21**.	Dealers may not sell or deliver a long gun, or ammunition for a long gun, to any person the dealer knows or has reasonable cause to believe is **under age 18**.
UNLICENSED PERSONS	Unlicensed persons may not sell, deliver or otherwise transfer a handgun or handgun ammunition to any person the transferor knows or has reasonable cause to believe is **under age 18**, with certain exceptions.	Unlicensed persons may sell, deliver, or otherwise transfer a long gun or long gun ammunition to **a person of any age**.

Source: Adapted from Giffords Law Center Minimum Age Summary

The following organizations have ***called for background checks*** to extend to all gun purchases to prevent the illegal possession of guns:[77]

- American Academy of Family Physicians
- American Academy of Pediatrics
- American Bar Association
- American College of Emergency Physicians
- American College of Obstetricians and Gynecologists
- American College of Physicians
- American College of Surgeons
- American Psychiatric Association
- American Public Health Association

In reviewing the impact of background checks on child injury and death, we found **strong evidence in favor of comprehensive background checks—specifically those that eliminate private sale loopholes—in reducing overall firearm-related mortality.** A large study specific to children found that states with universal background checks that have been in effect for more than five years had a reduction in overall pediatric firearm-related mortality.[78] Multiple large studies and a meta-analysis show similar findings in the overall population.[79–83] For example, a study evaluating all of the firearm-related deaths in 2010 demonstrated that universal background checks for firearm purchase, ammunition background checks and an identification requirement for firearms were all associated with significantly reduced overall firearm-related mortality.[83]

A 2017 national survey demonstrated 22% of gun owners who obtained their weapon in the two years prior to the study did not have a background check, and another study estimated that 40% of gun transfers occur as private sales.

There is also one study showing that **comprehensive background checks directly reduce adolescent gun possession.** In this study, comprehensive background checks reduced adolescent gun carrying by 25%, while the NICS federal background check alone did not have a significant impact on teens' possession of guns.[84] This study showed a significant finding after accounting for covariates, which helps to explain that the result of less adolescent gun carrying is due to the policy itself and not differences between states. Another way the researchers confirmed this finding was to compare carrying of other weapons, such as knives, with gun carrying. In this analysis, universal background check legislation was demonstrated to have an impact on firearm carrying but not on carrying of other weapons.

Although more research is needed to look at the effect of background checks on preventing firearm injury in younger children, the available research suggests that they are an important tool in reducing illegal possession of firearms by adolescents and reducing unintentional death in this age group.

Lost and Stolen Firearm Legislation

OVERVIEW OF EVIDENCE:
No studies evaluated the impact of this policy on pediatric unintentional injury or death.

RELEVANCE TO TOPIC:
Two studies evaluated how youth involved with the criminal justice system had obtained firearms.

A lack of oversight over lost and stolen guns leaves another opportunity for adolescents to illegally acquire firearms. Lost and stolen legislation allows for law enforcement to deter straw purchasing, by which guns are bought legally and then sold to someone else who is not able to legally purchase a firearm themselves, such as an adolescent.[85] Additionally, lost and stolen legislation may encourage gun owners to take more measures to ensure that their guns are not easily accessible.[86] Currently, ten states and Washington, D.C. require firearm owners to report lost or stolen firearms to law enforcement, but there are no federal laws requiring mandatory reporting.[85]

States that do not have or enforce lost and stolen legislation provide the opportunity for gun purchasers to claim that a gun was lost, when in fact, they knowingly and illegally provided that gun to an adolescent. Lost and stolen legislation requires a gun owner to report a lost gun and allows gun owners to be held liable should death or injury occur as a result of an unreported firearm. Approximately 40% of lost or stolen guns are never reported to police, and according to nationally representative survey data, about 380,000 guns are stolen from individuals each year.[85,87]

Stolen guns are a frequent source of firearms for those who are not legally permitted to own firearms, including minors, but no studies have examined policies that require reporting of lost or stolen firearms.[88–91] A 2002 survey of incarcerated youth found that 25% acquired their gun by finding it randomly, and 48% were not in search of a gun when the gun came into their possession.[90] A 1992 survey of justice-involved youth noted that while guns are easily stolen by minors, the exact number of stolen firearms could not be determined since the youth surveyed could only trace where their gun came from back to the person they received it from.[89] We know that youth can acquire firearms illegally through theft, but **more research is needed to determine how mandatory reporting of lost or stolen firearms affects how many adolescents illegally acquire firearms.**

Figure 8

COMPONENTS OF BACKGROUND CHECK LAWS AT FEDERAL AND STATE LEVELS

	REQUIRED OF LICENSED FIREARMS DEALERS:
FEDERAL LAW	• Background checks completed on potential buyers • Maintain record of gun sales • Make records available to law enforcement for inspection • Report certain multiple sales • Report theft or loss of firearm from licensee's inventory
STATE LAW EXTENSIONS	• Background checks extended to some private sellers • Background checks at point of transfer (sold or transferred to another person) • Permitting/licensing system for private purchasers • Background checks at gun shows

Source: Adapted from Giffords Law Center Universal Background Checks information on "Key Legislative Elements"

Increased Prevention of Gun Carrying in Schools

OVERVIEW OF EVIDENCE:

No studies evaluated the impact of this policy on pediatric unintentional injury or death.

RELEVANCE TO TOPIC:

We identified six studies that evaluated the impact of school policies on adolescent gun carrying behavior.

Under the Gun-Free Schools Act of 1994, states are required to pass legislation preventing students from carrying guns at school as a condition of receiving federal funding.[92] Currently, nearly all states, including Pennsylvania, require at least a one-year expulsion for any student that has a firearm on school property, as well as referral to a criminal justice or juvenile delinquency system.[93]

Preventing violence at schools has far-reaching effects and is a priority for school personnel in keeping students safe.[94,95] The CDC's 2017 Youth Risk Behavior Survey reported that 3.8% of students had carried some type of weapon on school property at least once in the past month, and that 6% of students had been threatened or injured with a weapon on school property one or more times in the past year.[96] Despite increased federal funding and support for school security measures in recent years, there is a lack of rigorous research examining the effects of these measures on firearm injury and death in adolescents.[97,98]

Research should include the evaluation of trauma-informed program models, along with strength-based interventions to counteract underlying risk factors that may lead to firearm use.

Among available literature, there is **insufficient evidence to determine if enforcement of gun carrying laws at school reduces the risk of firearm injury among students.**[99–101] One longitudinal study showed that adolescents who had been suspended or expelled from school for carrying a weapon were more likely to report bringing a gun to school and bringing a gun to school or work in adulthood as compared to adolescents who had not been seriously sanctioned for carrying a weapon.[99]

There is also insufficient evidence on the impact of school metal detectors on violent behavior. One study found that students in schools with metal detectors were less likely to carry firearms to school, but that there was no difference in the rates of carrying guns outside of school.[102] Two other studies found no association between school metal detectors and students' risk of physical assault or student possession of firearms at school.[100,101]

Some have suggested implementing other "hardening" measures in schools, such as employing armed school resource officers or installing school-wide video cameras.[103,104] Although further study is needed, currently there is no research that indicates these measures have any effect in keeping students safe from firearm-associated violence.[103] There is research, however, demonstrating that strict enforcement of gun carrying restrictions at school increases juvenile justice involvement, and that youth of color may be disciplined at a disproportionate rate compared to their peers.[105]

Finally, there has been discussion of arming teachers with guns, and nine states have passed bills allowing this to take place.[106] There is no research to suggest that arming teachers or other school personnel prevents firearm-related injury, but there is a concern that the increased presence of guns in schools could lead to unintentional or bystander injury.[105]

Increased Enforcement of Illicit Possession Laws

OVERVIEW OF EVIDENCE:

No studies evaluated the impact of this policy on pediatric unintentional injury or death.

RELEVANCE TO TOPIC:

We identified two studies that evaluated the impact of youth involvement in the juvenile justice system on future firearm carrying behavior.

Increasing punishment for adolescents who are charged with possessing or carrying firearms is another strategy employed to deter illicit possession. In 2018 alone, nearly 12,000 juveniles were arrested by law enforcement for carrying or possessing a firearm.[107] Sanctions for these offenses vary greatly depending on state and local jurisdiction, but can include differing periods of confinement or transfer into the adult justice system.[108]

Some programs have seen success with gun courts, specialized courts focusing on firearm crimes, and decreasing probation violations.[109,110] **However, there**

is no existing literature that examines how illicit possession laws affect adolescents' future firearm carrying behavior or risk of unintended firearm-related injury or death. Some studies suggest that juvenile involvement with the justice system as a result of possessing or carrying a weapon can in fact have the opposite effect, exacerbating violent behavior and repeated offenses in adulthood.[111,112]

In an effort to reduce gun violence among youth through prevention strategies in schools and communities, the federal Office of Juvenile Justice and Delinquency Prevention identified over 60 "promising strategies," including the use of specialized gun courts and implementing other strategies to deter illegal gun possession and carrying.[108,113] These types of prevention programs need to be studied more broadly to determine their overall effectiveness and to see whether they can be translated into effective policies to deter adolescents from acquiring and carrying firearms. Research should include the evaluation of trauma-informed program models, along with strength-based interventions to counteract underlying risk factors that may lead to firearm use. **More research on illicit possession laws is needed to determine best program and policy practices, and to avoid unintended consequences of youth involvement in the juvenile justice system.**

WHAT CAN BE DONE

Following our review of the evidence, we identified recommendations for which programs and policies are most likely to impact unintentional firearm-related youth injury and death.

RECOMMENDATIONS FOR POLICYMAKERS

Implement Proven Policies

While the evidence we uncovered on many policies was limited, there are two policies for which we believe the evidence was strong enough to recommend broader implementation. Both Child Access Prevention (CAP) and comprehensive background check laws show promise in reducing unintentional injury and death among children, and present an opportunity to impact gun violence, injury and death more broadly. **The research review shows that CAP laws that hold parent gun owners responsible for a child accessing a gun, no matter if the parent intentionally gives the child a gun or not, are most likely to reduce unintentional injury among youth.**

There are also many nuanced policy options that can be applied to background checks, but as a starting point, states should look to go beyond the federal requirement and seek to implement background checks for any private sale or transfer of guns.

Implementation of these evidence-backed laws across the country could provide critical protections against unintentional injury among youth.

Increase Funding for and Create a Comprehensive Research Agenda

A key takeaway from our evidence review is that research around gun policy is limited, hindering the ability for decision-makers and stakeholders to make informed, evidence-based decisions on policy directions to protect children. While we do have some information on what works, there are often significant limitations: data may be focused on adults only, may include a small sample or have other issues with validity and generalizability to other settings or, in many cases, may not exist at all. The 2019 limited increase in funding for the CDC for firearm research is a critical and promising step in the right direction to help fill in the gaps, but **more funding is needed to explore policy options for reducing unintentional injury and death among children, as well as school and community violence.**

To truly address the epidemic of gun violence in the U.S., we must take a public health approach, starting with the implementation of a comprehensive research agenda. Groups such as the ***Firearm Safety Among Children and Teens (FACTS) Consortium*** have developed key priority areas for pediatric gun safety.[114] Based on this work and our own, we recommend including the following research priorities to specifically influence unintentional firearm injuries in children and related policy alternatives, in order of potential for impact:

- Identify components of firearm safety education that will improve safe firearm storage among gun owners.
- Determine the best program and policy practices for illicit possession laws, including how to avoid unintended consequences of youth involvement in the juvenile justice system.
- Determine effectiveness of various firearm violence prevention practices within schools.
- Explore gun safety technology and effectiveness in reducing injury and death.
- Examine whether mandatory reporting of lost or stolen firearms to law enforcement affects adolescents' rates of illegally acquiring firearms.

Figure 9

CHARACTERISTICS OF FIREARM SAFETY LAWS IN NEW JERSEY, PENNSYLVANIA & DELAWARE

	NEW JERSEY	PENNSYLVANIA	DELAWARE
UNIVERSAL BACKGROUND CHECKS	✓	✓*	✓
GUN OWNER LICENSING	✓	✗	✗
EXTREME RISK PROTECTION ORDERS	✓	✗	✓
ASSAULT WEAPON RESTRICTIONS	✓	✗	✗
CHILD ACCESS PREVENTION LAWS	✓	✗	✓†
COMMUNITY VIOLENCE INTERVENTION FUNDING	✓	✗	✗
LOST & STOLEN FIREARM REPORTING	✓	✗	✓

✓ *State has enacted this law* ✗ *State has not enacted this law*

* *Universal background checks for handguns*

† *Certain Child Access Prevention laws*

Source: Adapted from Giffords Law Center Scorecards for New Jersey, Pennsylvania and Delaware.

Align Oversight with Other Industries

Unlike other products that might be found in or around homes such as motor vehicles, swimming pools and even children's toys and products, the federal government has no oversight over the build or design of a firearm. This means that there is no mechanism by which the government can recall guns if there are safety concerns or if a weapon is found to be defective. Currently, the gun industry has exclusive oversight over its products and sets the standards for design and safety.[62] Decision-makers should enact policies that treat guns as potentially dangerous products requiring consumer-facing warnings and collection of data on harmful use, similar to other potentially dangerous household items.

Pediatricians should ask parents how they are storing their guns, and help to strategize ways families can either remove all guns from the home or adopt proven safe storage habits: keeping a gun locked, unloaded and separated from locked ammunition.

RECOMMENDATIONS FOR PROVIDERS AND HEALTH SYSTEMS

Incorporate Firearm Safety into Routine Counseling

Our review reaffirms that parents want to talk to their pediatricians about strategies for safe gun ownership. As with all health-related counseling, these conversations should be personalized and rooted in motivational interviewing techniques.[115] Pediatricians should ask parents how they are storing their guns, and help to strategize ways families can either remove all guns from the home or adopt proven safe storage habits: keeping a gun locked, unloaded and separated from locked ammunition. These discussions are especially critical to have with parents of children who are at risk of suicide. Combining this counseling with provision of a free storage device, such as a gun lock or safe, is an effective strategy to sustainably improve parents' self-storage capabilities. A ***novel program at Children's Hospital of Philadelphia*** that provides gun lockboxes for parents of teens at risk of suicide is one such intervention. Determining how to reliably and effectively integrate this critical counseling into all pediatric entry points—including primary care clinics, emergency rooms and hospitals—will require ongoing health system collaboration and implementation science research.

Promote Evidence-Based, Child-Focused Gun Policy

Firearms are the second-leading cause of death in children and have countless ripple effects on child health and well-being. Evidence on strategies to prevent undue harm from firearms in children is often limited, and the available evidence often is not harnessed appropriately to drive policy change. Pediatric health care providers should rely on the current evidence base, which we have detailed in this brief, to promote child-focused gun policies such as CAP laws and comprehensive background checks. Pediatric providers also have a responsibility and opportunity to speak out against interventions that are ineffective and potentially harmful, such as firearm safety education programs in schools or illicit possession laws that promote unnecessary involvement of the juvenile justice system. Federal funding for gun safety research is critical in developing evidence-based interventions, and pediatric providers and researchers can support ongoing funding for pediatric-relevant firearm research.

RECOMMENDATIONS FOR PARENTS AND COMMUNITY ORGANIZATIONS

Promote and Embrace Safe Storage

Our research review suggests that counseling in combination with providing gun storage devices to families can reduce unintentional firearm injury or death. There is a two-fold opportunity here for both community organizations and parents. Community organizations can serve as the convener, seeking out others willing to provide counseling and storage devices to families and offering a location for an event. Parents can advocate for this type of event within their communities or, if a parent is a gun owner, can commit to attending an event like this and practicing safe storage in their home at all times.

Be Champions for Child Safety

Caregivers and community leaders can play a role in promoting child safety and protecting youth from the dangers of firearms by educating themselves on these issues using reliable sources, such as information from the CDC and the AAP. Playing a critical role in the lives of kids and teens, these trusted adults can spread the word about evidence-based policy solutions that would be beneficial within local schools and communities. Their voices could serve as key motivators to move gun policy forward at the local, state and federal levels. Caregivers can also take an active role in ensuring their children are in safe environments outside the home. Brady offers concrete steps to do this through their ***Asking Saves Kids (ASK)*** campaign, which teaches parents how to talk about gun storage in homes where their children spend time.[116]

Caregivers and community leaders can play a role in promoting child safety and protecting youth from the dangers of firearms by educating themselves on these issues using reliable sources, such as information from the CDC and the AAP.

CONCLUSION

The gun and gun violence epidemic in the United States has received increased attention over the last several years, yet rates of firearm-related death continue to rise and firearm-related injuries among children remain largely unchanged. Many policies have been proposed to protect children against firearm-related injury and death; however, the evidence on what policies are most effective is oftentimes limited and in some cases doesn't exist at all. It is our hope that the recommendations made in this resource can guide action and address policy shortcomings to protect our nation's children.

In reviewing existing research around policies that could have the most impact on unintentional injury and death among children, it is clear that some policies—such as Child Access Prevention laws and comprehensive background checks—have enough evidence behind them to warrant immediate action among decision-makers to move them forward. At the same time, there is also a critical need for more research and funding to determine additional policy strategies and implementation approaches that are effective in preventing child injury and death. By taking a public health approach to the issue of firearm safety for children, we can create a comprehensive research agenda to fill in gaps, and can work together with providers, policymakers, caregivers, and community organizations to make evidence-informed decisions to keep children safe in their homes, schools and communities.

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ACKNOWLEDGEMENTS

For their review and input, we would like to thank:

- Dr. Eric Fleegler, Boston Children's Hospital
- Dr. Monika Goyal, Children's National Medical Center
- Ahaviah Glaser and Sarah Guerrieri, Children's Hospital of Philadelphia

SUGGESTED CITATION

Krass P, Cavello L, Sabrick J, Matone M, Rosenquist R, Fein JA. *Preventing Unintentional Injury & Death Among Youth: Examining the Evidence.* PolicyLab at Children's Hospital of Philadelphia; 2020. Retrieved from *http://bitly.com/Preventing-Unintentional-Firearm-Injury*

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We conduct community-focused research and design innovative, evidence-based programs that are implemented, disseminated and sustained across clinical, school and neighborhood settings. Our work is trauma-informed and rooted in racial equity and social justice.

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