



# Parents' Perspectives on Safe Storage of Firearms

Mary E. Aitken<sup>1,2,3</sup> · Samantha D. Minster<sup>3</sup> · Samantha H. Mullins<sup>1,2,3</sup> · Heather M. Hirsch<sup>1,2,3</sup> · Purnima Unni<sup>4</sup> · Kathy Monroe<sup>5</sup> · Beverly K. Miller<sup>1,2,3</sup>

Published online: 17 October 2019  
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## Abstract

Firearms contribute substantially to leading causes of death among US children ages 10–19 (suicide and homicide). Safe storage of guns is important but poorly adopted. This study sought to understand knowledge, attitudes, beliefs, and firearm storage practices among parents living in households with firearms. Focus groups (FG) were conducted with gun-owning parents/guardians in three US states with high firearm ownership. Participants also completed an anonymous survey which included demographic characteristics, previous gun education, purpose of gun ownership, and storage practices. Eight FG were conducted with 57 parents. 74% of participants stored at least one firearm unlocked, with many loaded. Overall risk perception for firearm injury was low. Many participants believed modeling responsible use within the family would demystify the presence of a firearm and decrease accidental shootings. There was strong perception that safe storage interferes with personal protection needs, especially for handguns. Trigger locks were considered a nuisance and rarely used. Parents were confident in their youth's ability to handle guns safely and did not believe that safe storage would deter suicide. Preferred messengers for safe storage education were military or law enforcement rather than physicians. Participants advocated for safe storage education paired with hands-on use education. Gun-owning parents supported safety education and endorsed education from nonmedical sources. Education about suicide prevention may improve adoption of safe storage by parents. These results will inform the development of a firearm safe storage campaign with improved acceptability for communities with high firearms use and ownership.

**Keywords** Firearms · Safe storage · Injury prevention

## Background

Firearms contribute substantially to leading causes of death among children ages 10–19 (suicide and homicide) in the United States (US). Firearm injuries resulted in 39,773 deaths in the US in 2016, including 23,854 (60%) from suicides and 14,542 (36.5%) from homicides [1]. Deaths from firearms are estimated to cause \$21 billion in lifetime work loss and medical costs [2].

Risks of firearms in the home and the need for safe storage practices are supported by many studies and by concerning patterns of injury in the United States. Firearms are among the top three causes of death among US children and teens [3–5] and resulted in 13,723 nonfatal and 2762 fatal firearm injuries in children and adolescents < 20 years of age in 2015 [5]. Children as young as 3–4 years old are able to pull the trigger of most handguns [6]. A significant body of work over the past 25 years has established that the presence of a firearm in the home is linked to an increased

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Initial research findings were presented at the following: (1) The Annual Meeting of the Injury Free Coalition for Kids in Fort Lauderdale, Florida December 2, 2017; (2) Pediatric Academic Societies 2018 Meeting in Toronto, Canada May 7, 2018.

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✉ Mary E. Aitken  
aitkenmarye@uams.edu

- <sup>1</sup> Center for Applied Research and Evaluation, Department of Pediatrics, University of Arkansas for Medical Sciences, Little Rock, AR 72202, USA
- <sup>2</sup> Arkansas Children's Research Institute, Little Rock, AR 72202, USA
- <sup>3</sup> Injury Prevention Center, Arkansas Children's Hospital, #1 Children's Way, Little Rock, AR 72202, USA
- <sup>4</sup> Pediatric Surgery/Trauma, Monroe Carell Jr. Children's Hospital at Vanderbilt, Nashville, TN 37232, USA
- <sup>5</sup> Emergency Medicine, Department of Pediatrics, University of Alabama Birmingham, Birmingham, AL 35209, USA

risk of unintentional firearm deaths and suicide [7–14]. Guns stored in the home are associated with a threefold increase in the risk of homicide and fivefold increase in the risk of suicides [5].

It is estimated that approximately one-third of households with children in the US have at minimum one gun [15, 16] and in 21% of these homes the firearms are loaded and unlocked [15]. Homes with teenagers are more likely than homes with children in younger age groups to store firearms unlocked and loaded [17], despite the fact that adolescents 15 to 19 years of age have nonfatal firearm injury rates nearly 3 times that of the general population (62.9 vs. 23.9 per 100,000) [5]. Prior studies have shown that safe storage of guns is associated with a 75% reduction in the risk of firearm suicide and unintentional shootings among youths who are younger than 20 years [11, 18]. It has been estimated deaths to children and youths could be prevented by 6% to 32% if safe storage practices were increased [19].

The prevalence of gun ownership by household varies significantly by geography, ranging from an estimated low of 11.1% in New Jersey to 65% among households in Wyoming, with Southern states having consistently higher ownership rates [20]. Pediatric health and safety advocates, including the American Academy of Pediatrics (AAP), assert that the safest home is one without firearms [18] and that safe storage of firearms is vital to child safety. Safe storage is typically described as unloading all guns and storing them separately from ammunition in a locked case or with a disabling device such as a trigger or cable lock. Homes with children and firearms in the South are more likely than homes in other regions to have firearms unlocked and loaded or with ammunition [21]. Furthermore, purposes for gun ownership, storage practices, and owner demographics may be influencing factors to “gun cultures” that vary among geographic sectors [19, 22, 23] requiring thoughtful, tailored approaches to counseling and intervention for this topic in clinical settings [24].

The prevalence of firearm injury, evidence of low rates of safe storage, and regional variation in firearm storage have prompted clinical education and community campaigns to promote these practices. Two studies have demonstrated that brief physician counseling directed at parents, one of which was combined with the distribution of gunlocks, may be effective in promoting safer storage of guns in homes with children [23, 25]. While physicians are comfortable discussing the risk of firearms in the homes, most report a lack of knowledge of safe storage options and a lack of confidence in their ability to discuss options as the main barriers to counseling with families [26].

While some community-based interventions have demonstrated adequate quality and effectiveness in increasing knowledge about the need for safe storage, only a few have assessed changes in firearms storage practices, and more

well-evaluated interventions are needed [27–29]. Studies have shown that interventions aimed at increasing the safe storage of firearms are effective, even in rural areas where hunting and using firearms is a regular part of the culture [30]. However, these approaches may not resonate with parents whose motivation for keeping hand guns is self-protection [31]. Further, most community-based efforts have taken place in regions of the United States where the prevalence of firearm ownership is lower than the South and cultural norms are more supportive of such interventions [27, 28]. Gun avoidance programs are designed to educate young children not to touch firearms, but several studies have demonstrated that such programs do not prevent risky behaviors [32–35].

Given the burden of firearm injury-related death and disability, the potential dangers of ready access to firearms, and the complex political drivers surrounding firearm injury, engagement of varied perspectives in the development of interventions is warranted. Safe storage of guns, often paired with distribution of cable locks, has been suggested to prevent firearm injuries, but few studies have examined best approaches to educate and engage parents. Parental practices, influences, and preferences regarding safe storage and educational messaging in a national survey of firearm owners; however, less than a third of respondents had children in the home [36]. Further study is particularly needed for parental populations with high gun ownership (e.g. Southern, rural, and/or low income settings). The objective of this study was to better understand parental knowledge, attitudes, beliefs, and firearm storage practices that will support interventions to lower unsupervised child access to firearms.

## Methods

The UAMS Institutional Review Board reviewed and approved this study as exempt. Focus groups (FGs) were conducted with parents/guardians residing in three Southern US states with high household firearm ownership rates (51.6% Alabama, 58.2% Arkansas, and 45.9% Tennessee [19]) and comparable rates of firearm-related deaths to children under 18 years of age from 2007 to 2017 (4.0, 3.7, and 3.7/100,000, respectively) [1]. Participants completed an anonymous survey that included demographic characteristics, gun education, gun ownership and uses, and storage practices. FGs were conducted by staff consisting of a moderator and assistant moderator (BKM and SHM) both of whom had extensive experience with FG methodology and injury prevention research.

## Participant Selection and Compensation

Participants were recruited through social media, word of mouth, and flyer advertisements disseminated through established community partners and three pediatric hospitals (SHM, PU, KM). A screening process to determine eligibility was conducted via telephone (SHM). Eligibility criteria included ownership of any type of firearm and children under age 18 living in the home. Participants were provided a meal, a \$40 retail gift card, and a trigger lock for their participation.

## Framework for Moderated Discussions

A moderator guide, developed using the Health Belief Model [37] framed discussions that included participant practices and beliefs about firearm storage, self-efficacy for restricting access to firearms by children, suggestions for safe storage messaging, dissemination methods for safe storage campaigns, and identification of potential facilitators and barriers to campaign success (SHM, BKM, MEA, PU, KM). The moderator guide was structured to direct group conversation using an open-ended format that encouraged diverse perspectives. Participants were reminded that they were not required to answer any questions and that the purpose of the session was how to keep children safe from firearm-related injury or death.

## Data Collection and Analysis

Field notes were maintained by the assistant moderator (SHM) and sessions were audio-recorded. Sessions were debriefed between the two moderators immediately after the FGs to discuss general themes and impressions. FGs were transcribed by injury prevention staff (HMH, SDM) and reviewed for accuracy (SHM). Transcript-based analysis was employed and data was managed using HyperRESEARCH (v3.7.5), a content analysis software package for qualitative research. Transcribed data was coded to identify important themes in an ongoing process during data collection by a team member who did not attend the focus groups (SDM) and reviewed with the principal investigator (MEA). A grounded theory approach was used to code data, with the data dictating the development of major and minor themes. Grounded theory allows qualitative researchers to generate explanations about occurrences when a viewpoint is expressed by a large number of participants; therefore, the explanation is grounded in the data. While the two moderators (BKM and SHM) were not the chief data coders, they did serve as content reviewers to eliminate discrepancies. Any coder disagreements were discussed until a consensus

was reached (SM, SHM, BKM, MEA). In the comparative coding process, it was determined that data saturation was achieved when no new ideas emerged from the data.

## Results

### Demographics and Survey Results

Eight FGs were conducted in three states: Arkansas (5), Alabama (1), and Tennessee (2) with 57 parents/family members that have homes with firearms and children present. Five FGs were conducted in rural communities. Although the remaining three FGs were conducted in urban sites, participants included persons from outside metropolitan areas. The size of the FGs ranged from a low of 5 to a high of 9. More females (68%) than males participated. Most participants were white (86%), 30 to 49 years old (77%), and were a parent/stepparent (93%). See Table 1.

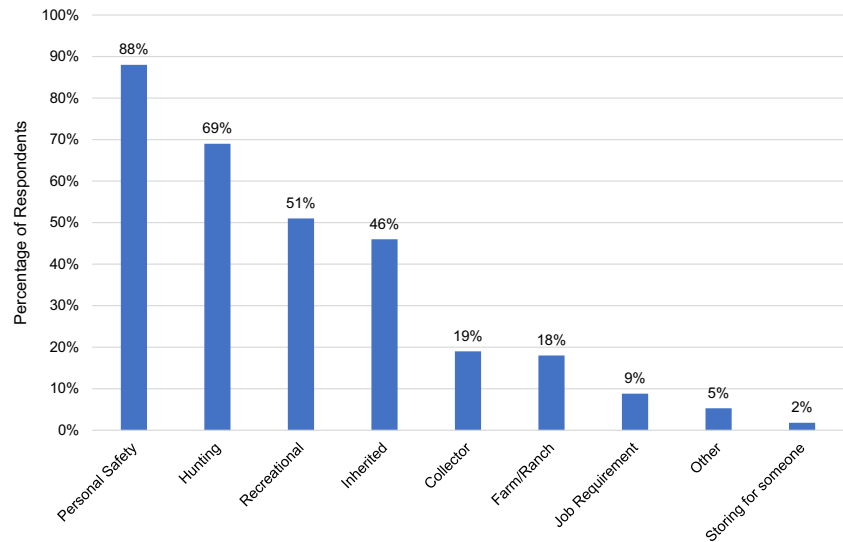
Many of the participants (88%) listed personal safety as a reason for gun ownership. Hunting was also a common reason (69%) for gun ownership. Other purposes included recreation (51%), inherited (46%), collector (19%), and farm/ranch work (18%). See Fig. 1.

Participants were asked how many firearms they owned by type: handguns, long guns, and muzzle loaders/air guns.

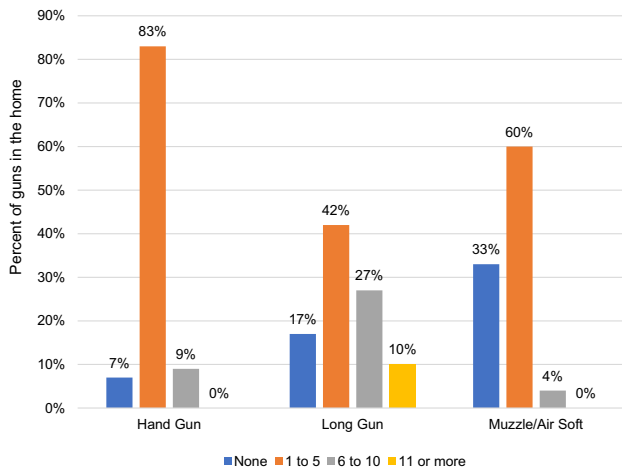
**Table 1** Focus group participant demographics

Adult focus group participants		
<i>N</i> = 57		
Gender		
Male	18	32%
Female	39	68%
Race		
White	49	86%
African American	5	9%
Asian	1	2%
Other	2	3%
Ethnicity		
Hispanic/Latino	3	5%
Not Hispanic/Latino	53	93%
Prefer not to answer	1	2%
Age range		
18–29	4	7%
30–49	44	77%
50–69	8	14%
Prefer not to answer	1	2%
Relationship to youth in home		
Parent/stepparent	53	93%
Grandparent	3	5%
Aunt/Uncle	1	2%

**Fig. 1** Reasons for guns in the home (N = 57)



Categories are not mutually exclusive and may total greater than 100%.



Categories are not mutually exclusive and may total greater than 100%.

**Fig. 2** Types and numbers of guns in participants' homes (N = 57)

Ninety-three percent of participants owned 1 to 5 handguns. Forty-two percent also owned 1 to 5 long guns; 10% owned  $\geq 11$ . Sixty percent owned 1 to 5 muzzle loaders/air guns. See Fig. 2.

Participants were asked where firearms were kept and if stored loaded or unloaded (Fig. 3) Forty-four percent store their firearms unloaded in a drawer, shelf, or closet; 30% store them loaded in similar locations. Fourteen percent store a gun, typically a handgun, loaded and in the open (desk, dresser, etc.) for “quick use,” while 19% position an unloaded gun for quick use. Fifty-six percent of participants store unloaded in a safe or with a trigger lock, while 32% store in a safe, but loaded. Guns stored in vehicles (30%) were likely to be loaded. Forty-two percent

store their firearms unloaded and separate from ammunition; 5% reported storing firearms loaded and separate from ammunition.

Participants also reported firearm safety training or education they and their children have had (Fig. 4) Hunter’s education and concealed carry classes were the most frequent forms of training for themselves (44%, 42%) and hunter’s education, basic course and shooting sports training for their children (16%, 12%, 9%).

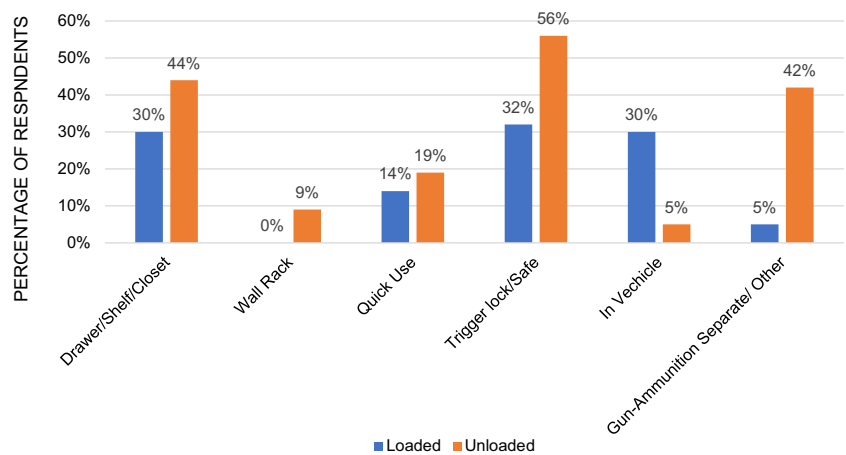
## Focus Group Discussion Results

Four major themes were identified in focus group analysis: (1) perception of what gun safety is and how it is modeled, (2) behavior around household rules in relation to gun handling and gun storage, (3) attitudes towards personal risk of gun ownership and perceived external risk, and (4) impressions of current safe storage messaging and suggested messaging. Each major theme is detailed below with sub-themes and key quotes that emerged during analysis.

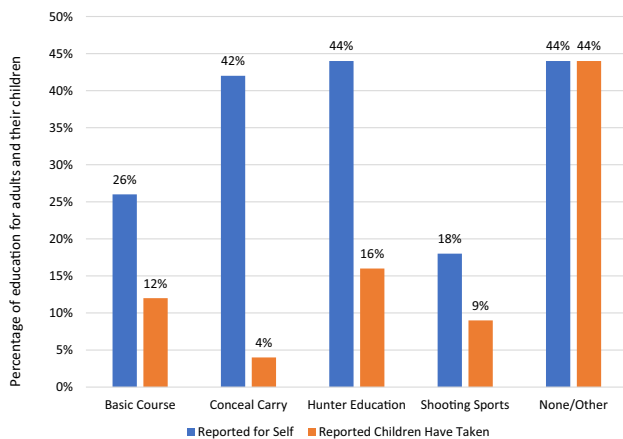
## Perception of Gun Safety and Risk

Participants discussed what the term “gun safety” meant to them. Some defined gun safety as safe use of the gun, not safe storage of the firearm: “Gun safety to me would be understanding how to use a weapon and it would be the same to me as you use a vehicle... If you really don’t know the power behind it...how to work it or if you are not familiar and you are scared to touch it, then yeah, accidents are going to happen.” “...you want to bring it to the table as a family, and put it out there...educate them on why you have it and what you would use it for...”

**Fig. 3** Firearm storage practices of focus group participants (N = 57)



Categories are not mutually exclusive and may total greater than 100%.



Categories are not mutually exclusive and may total greater than 100%.

**Fig. 4** Gun safety education (N = 57)

Several participants expressed concern that many parents fail to educate their children on gun safety or to enforce strict rules about gun use. Multiple participants commented about the need for parents to model responsible gun use and to teach their children about guns to dispel the mystery and curiosity about hidden guns, reducing the need for locks or safes. One parent stated: “I think about safety as far as like other kids that come to our house that aren’t familiar or don’t have the education. That’s why we always keep ours [locked away]. Like, our 8 year old: he knows you don’t touch guns. The 3 year old: he also knows that, but you can’t really trust a 3 year old. But also just having the friends over...that don’t know about guns, or don’t have guns in their homes. I always make other parents aware that we do have guns, but they are put up and things like that because that’s a big thing for me” The overall perception of injury risk from firearms to family members was low.

Participants were asked who made the rules and decisions about storage of guns in the home. Frequently, the person in the home with the most knowledge and experience of guns made the decisions, regardless of gender.

The perceived need for personal protection competed with interest in safe storage. Comments were frequently made that “accidents will happen” regardless of storage methods used, “gun locks are a nuisance,” and that guns needed to stay unlocked and loaded for safety in the case of home invasions. One parent states: “...coming from, uh, self-defense, home safety perspective, why even have it if I have...got these safety measures in place, why add one more that’s just going to delay the keeping my family safe.” Although widely owned, trigger locks were rarely used by this group. Conventional locks and even newer biometric technology were perceived as potentially hampering self-defense efforts. Gun safes were used in many cases to protect guns from fire, theft, or water damage, rather than for safety. The cost of better safes was a major concern; some participants were willing to store guns more safely if they had an affordable, easy-to-access alternative, such as a biometric safe. Comments included: “I would use a fingerprint type safe if I could afford one...” and “...with people hacking and getting into things, it would only be a matter of time before someone figures out a way to bypass...”

### Storage Practices

FGs also reviewed why participants stored guns as reported. Common themes focused on the importance of safe storage for high-value inherited guns and guns used for hunting purposes. Many participants had one gun in the home, typically a pistol, which was kept within easy reach and loaded for personal safety. When parents were asked if their children were aware of the guns in the home, some stated they were, but many commented their children did not know they

had them and they were well hidden. Some felt that self-protection needs were paramount. One parent commented: “My son needs access to our pistol in case he is home alone and there is an emergency; he also keeps his hunting rifle in his closet...” Others recognized competing risks to personal safety concern: “...your kids aren’t always going to...tell you what’s going on. So having it (the gun) out is dangerous because you might not know what’s going on with your kid, they can just kill themselves and that would be on you. But then if you didn’t have it out, that’ll also be on you if something’s happened in the house. It’s kind of a hard decision.” Some participants stated they plan to change storage practices after learning about safe storage options from the FG.

### Attitudes Towards Safe Storage of Firearms

Participants were asked about specific rules in their homes surrounding guns. Some participants were confident their children know how to handle guns safely, and that their children understood and would obey gun rules, particularly the rule of “Don’t Touch.” There was a general perception that children and adolescents could be in charge of hunting guns. Participants were asked if they felt they could keep another person’s child safe from their firearms if they were at risk of suicide. Parents expressed a belief that suicide will happen regardless of means available and did not feel that safe storage would keep this from happening. One parent stated: “...if we go away for a weekend, I don’t necessarily put up the guns...but I have moved medication...hidden medication. I have hidden an alcohol bottle...”

Participants were asked about safety concerns when their children visit other households, rules for visiting other homes, their practices about inquiring about storage practices from other parents, and how they handle other children visiting their own home. Overall the perception related to risk of guns in the home was very low. Parents were confident that if children were taught to respect guns at a young age, they would treat all guns as loaded. One quote from a focus group illustrates the general attitude towards gun risk: “I am more worried about the snakes in my yard than the guns in my home, so when kids come over to play, that’s what I say, watch for snakes.”

### Messaging: Impressions of Current Firearm Safety Information

Participants were asked to describe messages they have seen about gun safety and gun storage and sources. Some stated that they have had their family doctor ask them how many guns they own, but not in a home safety context. Some felt they were being negatively judged during these interactions. Some reported hearing messages from local media after injuries or deaths occurred in their community. Common

sources of gun safety information included: internet, news, television and radio advertising, video games, and YouTube.

### Messaging: Suggestions for Future Messaging

Participants stated they would accept firearm safety messages from medical professionals and hospitals, but that police, military, or those with a professional affiliation such as 4-H or the NRA, concealed carry trainers, and gun store owners were preferred sources of information. They did not want their family physician to judge them on how many guns they owned, but if gun safety was addressed as part of a home safety conversation they would not feel offended. Participants were divided on the use of scare tactics in messaging, some felt it was needed, some felt it would not be helpful.

Participants felt strongly that the style and type of messenger was very important. Credible sources would include hospitals, gun safety courses, insurance companies, police, fire departments, military groups, national firearms organizations, and state game and fish agency. Participants felt that stores selling firearms should also provide education prior to sale. Hands-on experience with shooting and handling firearms as a prevention method was endorsed. Gender-specific delivery (ex. female instructor for a female class) was suggested as a way to make training and education more effective. The “credible” messenger/trainer was key for this group of gun-owners: “And it needs to come from people who wear a badge.... It needs to be someone that these kids can respect.... It needs to be someone in authority.”

Participants felt that early exposure and demystification of guns in the home would be the best way to get messages to youth. One participant stated “...the 6 year old handles guns, the 3 year old not so much yet—he’s a wild child. But the older children...know how to clean them, they break them down, they’ve gone to hunt out as well, the older two have. So like we’re real big on (this)—just the curiosity is gone—we teach respect of guns.”

Participants recommended that education focus on personal safety, safe gun use, safe gun storage, and hands on practice. Education, along with a discounted price for gun storage devices, would convince them to store guns more safely. “It would be nice if classes were taught..., say, one every season. That way you could sign your kid up...whether you had to bring your own gun or not.”

### Discussion

Engaging gun owners who are part of a widespread and deeply-rooted social gun culture is challenging [38, 39]. Due to demonstrated differences in the prevalence of gun ownership and storage practices, along with differences in cultural

norms around firearms, careful attention to the development, delivery mechanisms, and tone of safety campaigns is particularly necessary [40]. Our qualitative study was designed to inform such tailored interventions by examining the firearm storage practices of parents in Southern, highly rural states, assessing their attitudes, beliefs, and self-efficacy toward safe storage and related messaging.

Consistent with national surveys, participants in our study reported personal safety, hunting and competitive or recreational purposes as major reasons for owning a gun. Others stated they had inherited their guns, are gun collectors or use guns on a farm or as part of their work. Our study found similar proportions of long guns and a high prevalence of handguns.

The four practices of keeping a gun locked, unloaded, storing ammunition locked and in a separate location are each associated with a protective effect to reduce firearm injuries in homes with children and teenagers [13]. The participants in this study reported high rates of unsecured firearms, frequently storing a gun in drawer, shelves or closet. One in four stored a gun in their vehicle, often loaded. Lock boxes or gun safes were utilized by many homes for long guns and were frequently attributed to the monetary value of the firearm itself and not due to safety concerns. Only a few reporting gun or trigger lock usage although many, if not most, reported owning such devices. Inconvenience was the most frequently reason for not using trigger locks.

Our study provides insights into the beliefs of parents and their preferences for messaging regarding safe storage, including the strong belief that guns are needed for emergencies and therefore the gun should be kept loaded and easily accessible. In addition, many also reported that their children need access to loaded guns in case of emergency. Consistent with other studies that have shown that nearly three quarters of parents who own guns think their 4 to 12 year olds could tell the difference between a real and a toy gun and 23% believed their child could be trusted with a loaded gun [41], many parents in our study also felt confident their children knew how to handle guns and that their children understand and would obey gun rules. Therefore, they believed hiding firearms would increase curiosity and that early education about guns would be protective. Parents stated that there were other household items, such as medications, that were more dangerous than guns and expressed the belief that locking the gun would not prevent suicide. A key message that may be important in future campaigns is acknowledging a firearm's presence through safe storage is being respectful of its role in the family's environment.

Consistent with findings of the Crifasi et al. study, participants voiced a desire to have gun safety education from gun store owners or other knowledgeable groups (police, military, outdoor resource departments, etc.) who use firearms professionally [36]. In addition to training, they felt

education was their own responsibility as parents. The majority were uncomfortable with physicians asking stand-alone questions about firearm ownership and preferred pediatricians to incorporate any gun safety advice within overall home safety messages. Suggested outreach methods included blogs, commercials, events at gun stores, social media, and waiting room poster/video or live demonstrations. In all cases, safe storage campaigns and messages need to incorporate awareness of the purposes for which firearms are present in people's homes. Specifically, acknowledgement of the tension between perceived need for quick access to firearms for personal protection and the awareness of risks of unsecured guns in the home should be incorporated into training and safety campaigns for these efforts to be deemed credible.

To remove barriers to safe storage practices, parents desired discounts/coupons on gun safes and improved biometric and other technology for safe storage. The participants also supported improved design of safes (shape, weight, and portability) and quicker access. Barriers to safe storage include the perception that currently available safes are designed poorly and are too expensive and that gun locks are a nuisance that could delay access to a firearm in an emergency. This theme reinforces calls for advocacy for innovative storage technology [28].

There were limitations to our study. The Health Belief Model that was used to frame the moderator guide elicits individual factors in decision making. Further study to better understand the cultural and environmental influences on safe storage of firearms is warranted, especially given regional differences in ownership. Secondly, participant composition of FGs was not stratified by age, gender, or ethnicity. Doing so in future studies could provide further insight into parental decision making.

## Conclusion

Gun-owning parents in three Southern, largely rural states supported safety education, but perception of risk from the presence of firearms in their homes was low. Our findings indicate that firearm safety counseling may be most acceptable from nonmedical sources and in context of ongoing training programs and community level campaigns. When physicians provide advice, parents prefer age- and gender-specific guidance and that firearm safe storage be discussed as part of overall home safety advice. Pediatricians should consider partnering with other groups that are seen as more knowledgeable about guns to more effectively deliver messaging. With regard to adopting safer storage approaches, parents felt that improved technology for safe storage is needed to reliably allow access in emergencies. Further education about the value of lethal means restriction for

suicide prevention may improve adoption of safe storage by this population. Our study results can inform both physician counselling approaches and the development of firearm safe storage campaigns to improve acceptability for populations with high firearms use and ownership.

**Funding** This study was funded by a Children’s University Medical Group (CUMG) intramural Grant from Arkansas Children’s Research Institute.

## Compliance with Ethical Standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical Approval** The local Institutional Review Board reviewed the study protocol and approved this study as exempt; therefore, written informed consent for participation was not required.

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