Firearm storage practices in households with children:

A survey of community-based firearm safety event participants

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A thesis

Submitted in partial fulfillment of the

Requirements for the degree of

Master of Public Health

University of Washington

2019

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Program Authorized to Offer Degree:

Department of Global Health, School of Public Health

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Abstract

Firearm storage practices in households with children: A survey of community-based firearm safety event participants

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Background/Purpose: Safe firearm storage is associated with lower risk of unintentional and intentionally self-inflicted firearm injuries among children and adolescents. Ten community-based firearm safety events were conducted across Washington state from 2015-2018. We sought to describe characteristics of event participants and assess whether presence and age of children were associated with firearm locking practices among firearm-owning households. Methods: We assessed demographic characteristics and baseline firearm storage behaviors of participants using a 13-item survey. Multivariable Poisson regression models were used to estimate prevalence ratios (PR) and corresponding confidence intervals (CI) for the association of presence and age of children in households with prevalence of storing a household firearm unlocked. Results/Outcomes: Of 2,956 participants, 58.3% were male and 57.8% lived with an individual under 18 years. Among the 90.5% participants living with firearms, 40.1% stored at least one firearm unlocked and 39.1% stored at least one firearm loaded. In adjusted analyses, there was no statistically significant difference in prevalence of storing a household firearm unlocked between those living with no children and those living with a child <11 years (PR=0.91; 95% CI: 0.80,1.04), or a child aged 11-18 years (PR=0.94; 95% CI: 0.81,1.09). Conclusions: A high proportion of participants stored a firearm unlocked or loaded at home and neither living with young children nor adolescents was associated with safer locking practices. In comparison with evidence-based interventions conducted in clinic settings, these community-based interventions were successful in enrolling a large number of participants who were more likely to be male and own firearms.

Introduction

Approximately 15,000 children and adolescents aged 18 years or younger were injured or killed with firearms in the United States (U.S.) in 2017.[1] The presence of a firearm in the home is an independent risk factor for suicide and unintentional firearm death and injury among children.[2–5] Almost 90% of firearm-related fatalities of young children (0-14 years) occur in the home,[6] and a majority of all unintentional, firearm-related child and adolescent (0-18 years) fatalities involve a firearm found in the home.[7] However, a 2005 study found that storing household firearms unloaded (as opposed to loaded) or locked (as opposed to unlocked) was associated with a respective 70% and 73% reduction in risk of unintentional and self-inflicted firearm injuries among individuals under 20 years of age.[3] Ecologic studies have also shown that rates of unintentional firearm injuries are higher in states where firearm owners are more likely to store their firearms loaded, or loaded and unlocked.[8] Current estimates indicate that safe storage of household firearms could prevent 6-32% of all unintentional and intentionally self-inflicted firearm deaths among U.S. youths aged 0-19 years,[9] and organizations such as the American Academy of Pediatrics recommend that all household firearms be stored locked and unloaded.[10] However, of the approximately 22-30% of U.S. adults who report owning a firearm, more than one-half report that they keep at least one household firearm unlocked, loaded, or both.[11–14] In 2015, approximately 4.6 million U.S. children resided in a household with an unlocked and loaded firearm; a nearly 3-fold increase from 2002.[15,16]

Improving our understanding of factors associated with firearm storage practices is critical for informing firearm-related policy and safety interventions. A key question is whether firearm storage practices vary based on the presence and age of children residing in the home. Several population-level survey studies have found that adults living in households with children are more likely to report safe storage practices than those in households with no children present.[12,16,17] Surveys from the early 2000s also found that, among individuals residing in households with both firearms and children, firearms are more likely to be stored safely if children in the home are under the age of 13 rather than 13 and older.[17–

[19] In comparison with these findings, investigators assessing firearm storage practices among participants of a community-based firearm safety intervention in 2001 found that prior to the intervention, the presence of children in the home was associated with *less* safe storage practices among participants.[20] This intervention provided tailored firearm safety information and free firearm locking devices to adults who attended the event at an urban shopping mall parking lot, and raises a question as to whether the storage practices of firearm safety event participants differ from those reported by respondents to population-level surveys.

Another important question for those aiming to promote firearm safety is how best to reach different populations. Most clinic-based firearm safety interventions have aimed at promoting firearm safety within the context of pediatric injury prevention and in pediatric or family practice settings.[21] As a majority of parents or guardians who attend such visits are female,[22–25] these interventions may overlook important populations; a majority of U.S. firearm owners are male, and male partners in firearm-owning households are more likely to be responsible for making decisions about firearm storage practices.[19,26] Some patients and parents may also be reluctant to discuss firearm safety during clinical encounters.[27] Community-based interventions have the potential to reach a distinct population and may be helpful in reaching firearm owners who are less likely to be encountered in clinical settings. However, few effective community-based interventions have been reported in the literature.[28,29] Those interventions enrolled small numbers of participants (40-255), limiting our ability to understand how participants of community-based interventions may differ from those represented in clinic-based interventions.

This study includes data from nearly 3,000 participants of 10 community-based firearm safety events occurring in Washington state from 2015-2018. The aims of this study were to [1] describe the sociodemographic characteristics of event participants; and [2] assess whether the presence and age of children in the household are associated with firearm storage practices.

Methods

Study design

We conducted a cross-sectional study using self-administered surveys of participants at 10 community-based firearm safety events held across Washington state from 2015 to 2018. All participants were 18 years of age or older, spoke English or Spanish, and signed a liability release form necessary for event participation.

Firearm safety events

Participants were recruited using print and digital placements in local newspapers, radio, social media posts, and printed and electronic flyers. Recruitment materials focused on households where children and teenagers spend time and where firearms are present. Events were developed using principles of social marketing and the theory of reasoned action and were designed to increase awareness and action around the safe storage of firearms to reduce child and youth firearm injuries.

During events, participants received counseling on safe firearm storage, training on and practice with the proper use of storage devices, and their choice of a free firearm lockbox or trigger lock. Safety messaging emphasized keeping children and families safe and "triple safe storage" – storing firearms unloaded and locked, with ammunition stored separately in a locked place. Event details have been described in a previous evaluation of the intervention.[28]

Data collection

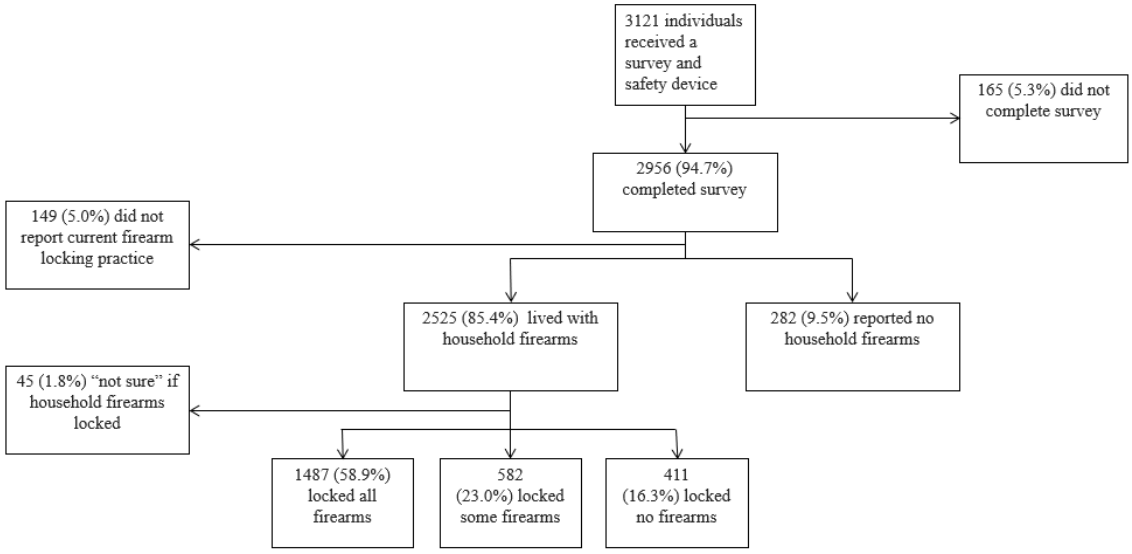
Prior to training and receiving a device, participants completed a 13-item voluntary, self-administered survey. The survey included multiple choice and open-ended items assessing sociodemographic characteristics (including presence and age of children in the home), current and intended firearm and ammunition storage practices, feedback on event location and promotion methods, and reason(s) for wanting a storage device.

Statistical analysis

We described the sociodemographic characteristics of respondents overall and by firearm storage practices and ownership. Storage practices were categorized in the following manner, consistent with the previous evaluation of this intervention[28]: firearms stored locked (all, some, none), firearms stored loaded (all, some, none), and ammunition stored locked (all, some, none). A composite variable was constructed to measure triple safe storage: all firearms locked, no firearms loaded, and all ammunition locked (yes/no).

In multivariable analyses, we classified the exposure of 'presence of children in the household' into three mutually exclusive groups: (1) no children, (2) at least one child aged 10 or younger (including households in which older children were present), and (3) at least one child aged 11 or older and no children aged 10 or younger. We defined firearm locking practices as (1) all household firearms are locked or (2) at least one household firearm is unlocked. Among firearm-owning households, we conducted Poisson regression models to obtain prevalence ratios (PRs) and 95% confidence intervals (CIs) to compare the prevalence of having at least one unlocked firearm by presence and age of a child in the household. We reported the crude prevalence ratio and the prevalence ratio adjusted for a priori-selected covariates of age and gender of the participants. The survey used in this research was approved by Seattle Children's Institutional Review Board. We conducted analyses with Stata Release 15.1 (StataCorp LP).

Figure 1. Identification and description of study sample



Results

Respondent characteristics

Of the 3,121 participants who received a storage device, 2,956 (94.7%) completed the survey (mean age: = 43.6 years, range = 18 – 88 years). A majority of respondents were male (58.3%), lived with a spouse or significant other (70.1%), and lived with at least one child and/or adolescent in the household (57.9%). Nine out of 10 respondents lived with at least one firearm in the household. The most common reason for wanting a storage device was overall firearm safety (56.9%), followed by child safety (42.0%; Table 1). A higher proportion of participants lived exclusively with children aged 11 or older (28.9%) than with children aged 10 or younger (18.5%) or children in both age groups (10.4%). Among participants living with a child and/or adolescent of any age, 56.4% were male and 53.7% were between the ages of 30 and 45.

Table 1. Characteristics of event participants [a]	
	Total (n = 2,956)
Characteristic	n (%)
Age, years	

18-29	473 (18.2)
30-44	983 (37.8)
45-64	864 (33.3)
≥ 65	278 (10.7)
Gender	
Male	1614 (58.3)
Female	1145 (41.4)
Other	10 (0.36)
Living in household	
Spouse/ significant other	
Yes	2071 (70.1)
No	885 (29.9)
*Children^*	
Child of any age	1501 (57.9)
Child ≤ 10 years old	1020 (34.5)
Child > 10 years old	751 (25.4)
No children	1093 (42.1)
How did you hear about the event?^	
Social media	942 (31.9)
Word of mouth	638 (21.6)
Came to the store	412 (13.9)
Newspaper	268 (9.1)
Event flyer	226 (7.7)
Works at store	37 (1.3)
Other	471 (15.9)
Main reason for wanting safety device^	
Overall gun safety	1683 (56.9)
To keep kids safe	1241 (42.0)
Protect guns from theft	284 (9.6)
Store other valuables (not guns)	109 (3.7)
Gift for someone	82 (2.8)
Other	25 (0.9)
Preferred safety device to receive	
Lock box	2527 (89.6)
Trigger lock	236 (8.4)
No preference	54 (1.9)

Came for information - did not receive device	3 (0.1)
Gun safety device currently used^	
Gun safe	1131 (38.3)
Gun lock box	376 (12.7)
Cable lock	531 (18.0)
Trigger lock	476 (16.1)
None	844 (28.6)
Other	144 (4.9)
Guns in home currently stored in a locked place*	
Yes, all	1487 (60.0)
Yes, some	582 (23.5)
None	411 (16.6)
Guns in home currently stored loaded*	
Yes, all	289 (12.0)
Yes, some	654 (27.1)
None	1469 (60.9)
Ammunition in home currently stored in a locked place	
Yes, all	1323 (48.7)
Yes, some	517 (19.0)
None	567 (20.9)
No ammunition in home	310 (11.4)
Plans to use this safety device to store guns in the next week	
Yes	2516 (89.0)
No	144 (5.1)
Not sure	166 (5.9)
[a] Missingness is not factored into percentages	
^ Percentages may add up to more than 100; participants were instructed to select all that apply	
*% only apply to those who have guns in the home	

Firearm storage practices

Of those living with firearms in the home, 60.0% reported storing all firearms in a locked place, 60.9% reported storing all firearms unloaded, and 53.7% reported storing all ammunition in a locked place

(Table 1). Just over one third (36.0%) reported that all firearms in the home were stored locked and unloaded, and only 23.7% of respondents practiced the triple safe storage method (all firearms locked and unloaded, and all ammunition locked separately). A small proportion of participants either were unsure of storage practices (1.5%) or did not answer that survey item (5.0%) and were not included in Table 2.

The prevalence of household firearms was slightly lower among individuals who lived with children than those who did not live with children (89.5% vs. 92.2%). Compared to individuals who stored all of their firearms unlocked, a greater proportion of participants who stored all of their firearms in a locked place were between the age of 30 and 44 (40.8% vs. 30.9%), were male (61.2% vs. 55.4%), and stored all household ammunition locked (74.4% vs. 10.9%; Table 2).

Table 2. Characteristics of event participants by current firearm storage practices

	Firearm-Owning Households*			Non-Firearm-Owning Households
	All firearms currently stored in a locked place	Some firearms currently stored in a locked place	No firearms currently stored in a locked place	
Characteristic	n (%)	n (%)	n (%)	n (%)
All respondents	1,487 (53.8)	582 (21.1)	411 (14.9)	282 (10.2)
Age, years				
18-29	235 (17.4)	92 (16.8)	81 (21.4)	50 (19.2)
30-44	552 (40.8)	192 (35.0)	117 (30.9)	104 (40.0)
45-64	437 (32.3)	194 (35.3)	132 (34.8)	88 (33.7)
≥ 65	128 (9.4)	71 (12.9)	49 (12.9)	19 (7.3)
Gender				
Female	559 (38.4)	214 (37.4)	177 (44.1)	157 (56.9)
Male	891 (61.2)	357 (62.4)	222 (55.4)	117 (42.4)
Other	5 (0.3)	1 (0.2)	2 (0.5)	2 (0.7)
Living in household				
Spouse/ significant other				
Yes	1132 (76.1)	446 (76.6)	280 (68.1)	164 (58.2)
No	355 (23.9)	136 (23.4)	131 (31.9)	118 (41.8)

Children				
Child of any age	813 (58.7)	312 (57.0)	186 (51.7)	155 (64.6)
Child ≤ 10 years old	561 (37.7)	194 (33.3)	137 (33.3)	103 (36.5)
Child > 10 years old	417 (28.0)	165 (28.4)	75 (18.6)	77 (27.3)
No children	571 (41.3)	235 (43.0)	174 (48.3)	85 (35.4)
How did you hear about the event?^				
Social media	500 (33.7)	193 (33.1)	139 (33.8)	86 (30.5)
Word of mouth	306 (20.6)	136 (23.4)	86 (20.9)	94 (33.3)
Came to the store	224 (15.1)	97 (16.7)	53 (12.9)	25 (8.9)
Newspaper	136 (9.2)	58 (10.0)	43 (10.5)	15 (5.3)
Event flyer	123 (8.3)	41 (7.0)	35 (8.5)	18 (6.4)
Works at store	21 (1.4)	12 (2.1)	2 (0.5)	1 (0.3)
Other	241 (16.2)	87 (15.0)	69 (16.8)	58 (20.6)
Main reason for wanting safety device^				
Overall gun safety	925 (62.2)	330 (56.7)	229 (55.7)	150 (53.2)
To keep kids safe	617 (41.5)	267 (45.9)	199 (48.4)	117 (41.5)
Store other valuables (not guns)	47 (3.2)	13 (2.2)	13 (3.2)	35 (12.4)
Protect guns from theft	142 (9.6)	65 (11.2)	52 (12.7)	19 (6.7)
Gift for someone	37 (2.5)	5 (0.9)	10 (2.4)	27 (9.6)
Other	9 (0.6)	7 (1.2)	6 (1.5)	2 (0.7)
Preferred safety device to receive				
Lock box	1,326 (90.1)	523 (90.2)	353 (87.2)	252 (90.0)
Trigger lock	125 (8.5)	46 (7.9)	37 (9.1)	22 (7.9)
No preference	21 (1.4)	11 (1.9)	14 (3.5)	5 (1.8)
Came for information - did not receive device	-	-	1 (0.3)	1 (0.3)
Guns in home currently stored loaded*				
Yes, all	13.6 (192)	36 (6.4)	55 (14.1)	-
Yes, some	351 (24.8)	240 (42.4)	58 (14.8)	-
None	872 (61.6)	290 (51.2)	278 (71.1)	-
Ammunition in home currently stored in a locked place				
Yes, all	1,069 (74.4)	179 (31.4)	43 (10.9)	12 (4.4)
Yes, some	216 (15.0)	258 (45.3)	34 (8.6)	3 (1.1)
None	128 (8.9)	122 (21.4)	291 (73.9)	14 (5.1)

No ammunition in home	24 (1.7)	11 (1.9)	26 (6.6)	246 (89.5)
Plans to use this safety device to store guns in the next week				
Yes	1,389 (93.8)	558 (96.0)	385 (94.6)	118 (42.3)
No	37 (2.5)	5 (0.9)	12 (3.0)	86 (30.8)
Not sure	55 (3.7)	18 (3.1)	10 (2.5)	75 (26.9)
* Excludes those who were unsure of current storage practices				
^ Percentages may add up to more than 100; participants were instructed to select all that apply				
Note: Participants who were unsure of storage practices or did not respond to storage questions are not included in this table				

In analyses adjusted for age and gender of the respondent, in comparison with participants who reported no children in the home, neither living in a household with at least one child aged 10 or younger (PR = 0.91; 95% CI = 0.80, 1.04) nor living exclusively with a child aged 11 or older (PR = 0.94; 95% CI = 0.81, 1.09) were significantly associated with prevalence of keeping an unlocked firearm in the home (Table 3).

Table 3. Crude and adjusted prevalence ratio for the association between presence and age of children in the home and presence of an unlocked firearm among participants living with firearms

	Prevalence of an unlocked firearm at home*	Model 1^	Model 2ł
	% (95% CI)	PR (95% CI)	PR (95% CI)
No children	41.7 (38.7, 44.9)	1 (reference)	1 (reference)
At least one child ≤ 10	37.2 (34.0, 40.4)	0.89 (0.79, 0.99)	0.91 (0.80, 1.04)
At least one child > 10 and no children ≤ 10	39.8 (35.2, 44.5)	0.95 (0.83, 1.09)	0.94 (0.81, 1.09)
PR = Prevalence Ratio; CI = Confidence Interval			
* Compared to all locked			
^ Crude			
ł Adjusted for age and gender of respondent			

Discussion

To the best of our knowledge, this is the largest study of participants of community-based firearm safety events to date. Four in 10 participants kept an unlocked firearm in their home, and only one-third stored all household firearms both locked and unloaded. Fewer than one-quarter stored all firearms locked and unloaded with ammunition locked separately. Adults living with children of any age were just as likely as those living with no children to report keeping an unlocked firearm in the home. A majority of participants were male, under 45 years old, lived with a spouse or significant other, and lived with a child and/or adolescent. This study adds to the limited literature on community-based firearm safety interventions while highlighting the high prevalence of unlocked firearms among participants and the continued importance of understanding both the intended and reached populations in this intervention.

The prevalence of unlocked firearms in our study population is relatively consistent with that found in previous firearm safety interventions, which commonly range between 30% and 50% among both clinical and community-based interventions.[23,24,30,31] There have been few published investigations into the general characteristics and storage behavior of firearm safety event participants, and even fewer that focus on the potential relevance of the presence and age of children in the home. By characterizing nearly 3,000 participants, we had the opportunity to gain a more comprehensive understanding of individuals who attend firearm safety events. Furthermore, a majority of firearm prevention interventions take place in pediatric clinics, which may have a limited reach and may miss the opportunity to reach certain key populations.

We found that current messaging is reaching our intended audience, namely individuals who live with both firearms and children. Nine out of 10 of those who came to one of the events lived with firearms, and more than one-half lived with children. Compared to pediatric clinic-based interventions, which generally find that 7.8- 36.0% of their patient population live in firearm owning households, 89.5% of our event participants who lived with a child also lived with a firearm.[23–25] In further contrast to clinic-

based firearm safety interventions, in which a majority of parent or guardian participants are female,[31] 58.3% of our participants were male. This is relevant as males are more often reported as being the owner of a firearm and responsible for its storage.[19,26] It is possible that these roles could incline males to attend firearm-related events in the community and partially explain the high proportion of males in our population as compared to clinical populations. This finding is particularly important as non-firearm-owning partners who live in the same home are less likely to be aware of presence and storage practices of household firearms.[19]

In light of recommendations to store firearms safely in the presence of children and results from national surveys,[12,16,17] we expected that adults living with children - especially young children - would report higher prevalence of safe storage practices. Furthermore, attendance at a firearm safety event early on a Saturday morning may indicate that these individuals see value in safe firearm storage. However, we found no significant difference between storage practices in households with either young children or adolescents compared to households with no children.

There are several possible explanations for this finding. First, it is possible that among firearm safety event participants, factors other than presence of children have greater influence on firearm safety practices. For example, participants may prioritize ease of access to firearms for personal and/or household protection. Two-thirds of U.S. firearm-owners cite protection as a major reason for owning a firearm,[11] and owning a firearm for protection has been associated with less safe firearm storage practices among certain populations.[32] Second, it is possible that findings of this study conducted in Washington state may not be generalizable to other settings in different parts of the country, contributing to the difference between our results and reports from national surveys. Lastly, firearm owners may underestimate the risk of self-injury and harm that an unlocked firearm poses to children and adolescents.[33] Participants may focus on training older children in firearm safety as a protective measure rather than keeping firearms locked and unloaded, and may believe that younger children are not aware or capable of using of firearms in the house.[34,35]

The main limitations of our study were constraints on the data collected and potential for social desirability bias. We were unable to measure certain factors known to affect storage practices, such as urbanicity of households, participants' personal ownership of household firearms, and the primary reason for firearm ownership (e.g. recreation or protection).[15,36,37] We also did not collect information on amount of ammunition or the number and type of firearms owned, which may affect storage practices as well as the usefulness of offered storage devices; lock boxes distributed can only be used to store handguns and small amounts of ammunition. Although these will be important questions to ask in future research, our survey was necessarily brief and unobtrusive given the nature of this large-scale community-based intervention. These events promoted safe firearm storage, and as such participants may have felt reluctant to admit the presence of an unlocked firearm in their home (i.e., social desirability bias). To limit the risk of bias, participants were not approached while filling out the survey and were instructed to place the anonymous survey in a box when they received their device. Self-report is the standard for most firearm storage studies.

Despite these limitations, this study adds meaningful information to the literature on firearm injury prevention efforts. Nationally, a majority of firearm-owners (66%) and non-firearm-owners (90%) agree that it is important to lock household firearms when there are children in the home,[11] and 4 in 10 participants of this intervention cited keeping children safe as a primary reason for wanting a safety device. Qualitative studies indicate that successful safety promotion requires the emphasis of trust in the message and in the messenger,[38] indicating that basing firearm safety interventions on the needs and priorities of communities is essential as we move toward the common goal of keeping children safe.

Conclusion

There is a need to promote safe storage practices to protect children, family members, and communities. Given the high burden of firearm injury and death across the U.S., interventions to increase awareness of the risks of unsafe firearm storage continue to be paramount. Community-based firearm safety events can

attract large numbers of individuals who live in households with firearms. As this study shows, such events have the potential to reach unique groups of individuals with a high prevalence of firearm ownership who might not otherwise be encountered by evidence-based interventions implemented in other settings. Future research should focus on promoting a culture of firearm safety by engaging firearm owners in a conversation about the risks that unsafe storage presents to children, household members, and communities.

Acknowledgments:

Above all I would like to thank and acknowledge Tizzy Bennet, Cassie Simeona and Lauren Stanek of Seattle Children's and Joe Simonetti of University of Colorado and the Rocky Mountain Mental Illness Research, Education, and Clinical Center of the Veterans Health Administration. Without the constant support and excellent guidance of this team, this work would not have been possible. I would also like to thank Ali Rowhani-Rahbar for believing in me and supporting my work at every turn, as well as Alison Roxby for joining my committee and providing valuable insight on this investigation and writing.

I would like to acknowledge the substantial contributions of Chelsie Gallagher (Seattle Children's) and the Seattle Children's Firearm Injury Prevention Research Team in the planning and implementation of these events and data collection for this study. I would also like to acknowledge the substantial contributions of the volunteers and community partners who made these events possible, including Seattle Children's, the Harborview Injury Prevention & Research Center (HIPRC), Public Health Seattle & King County's Lock It Up program, community hospitals, public health departments and Safe Kids Coalitions across Washington State. Lastly, I would like to acknowledge the INSIGHT internship at HIPRC. Data analysis for this investigation was conducted through INSIGHT and was funded in part by the Northwest Center for Public Health Practice.

Ethics Approval: Seattle Children's Institutional Review Board, Seattle, Washington, USA

References

1. Web-based Injury Statistics Query and Reporting System (WISQARS. Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC. National Center for Health Startistics (NCHS), National Vital Statsticsystem. https://www.cdc.gov/injury/wisqars/index. Accessed January 9, 2018.

2. Anglemyer A, Horvath T, Rutherford G. The Accessibility of Firearms and Risk for Suicide and Homicide Victimization Among Household Members. *Ann Intern Med*. 2014;160(2):101-110. doi:10.7326/M13-1301

3. Grossman DC, Mueller BA, Riedy C, et al. Gun storage practices and risk of youth suicide. *Jama*. 2005;293(6):707-714.

4. Wiebe DJ. Homicide and suicide risks associated with firearms in the home: A national case-control study. *Ann Emerg Med*. 2003;41(6):771-782. doi:10.1067/mem.2003.187

5. Miller M, Barber C, White RA, Azrael D. Firearms and suicide in the United States: is risk independent of underlying suicidal behavior? *Am J Epidemiol*. 2013;178(6):946-955. doi:10.1093/aje/kwt197

6. Hemenway D, Solnick SJ. Children and unintentional firearm death. *Inj Epidemiol*. 2015;2(1). doi:10.1186/s40621-015-0057-0

7. Grossman D, Reay D. Self-inflicted and Unintentional Firearm Injuries Among Children and Adolescents: The Source of the Firearm.(Statistical Data Included) - Northeastern University. *Arch Pediatr Adolesc Med*. 1999;153(8):875.

8. Miller M, Azrael D, Hemenway D, Vriniotis M. Firearm storage practices and rates of unintentional firearm deaths in the United States. *Accid Anal Prev*. 2005;37(4):661-667. doi:10.1016/j.aap.2005.02.003

9. Monuteaux MC, Azrael D, Miller M. Association of Increased Safe Household Firearm Storage With Firearm Suicide and Unintentional Death Among US Youths. *JAMA Pediatr*. 2019;02115(Gl 144):1-7. doi:10.1001/jamapediatrics.2019.1078

10. Firearm-Related Injuries Affecting the Pediatric Population. *Pediatrics*. 2012;130(5):e1416-e1423. doi:10.1542/peds.2012-2481

11. Parker K, Horowitz J, Igielnik R, Oliphant B, Brown A. *America's Complex Relationship with Guns*.; 2017. www.pewresearch.org.

12. Crifasi CK, Doucette ML, McGinty EE, Webster DW, Barry CL. Storage practices of US gun owners in 2016. *Am J Public Health*. 2018;108(4):532-537. doi:10.2105/AJPH.2017.304262

13. Deborah Azrael, Lisa Hepburn, David Hemenway, Matthew Miller. The Stock and Flow of U.S. Firearms: Results from the 2015 National Firearms Survey. *RSF Russell Sage Found J Soc Sci*. 2017;3(5):38. doi:10.7758/rsf.2017.3.5.02

14. Kalesan B, Villarreal MD, Keyes KM, Galea S. Gun ownership and social gun culture. 2016;101:216-220. doi:10.1136/injuryprev-2015-041586

15. Azrael D, Cohen J, Salhi C, Miller M. Firearm Storage in Gun-Owning Households with Children:

Results of a 2015 National Survey. *J Urban Heal*. 2018;95(3):295-304. doi:10.1007/s11524-018-0261-7

16. Okoro CA, Nelson DE, Mercy JA, Balluz LS, Crosby AE, Mokdad AH. Prevalence of household firearms and firearm-storage practices in the 50 states and the District of Columbia: findings from the Behavioral Risk Factor Surveillance System, 2002. *Pediatrics*. 2005;116(3):e370-6. doi:10.1542/peds.2005-0300

17. Schuster MA, Franke TM, Bastian AM, Sor S, Halfon N. Firearm storage patterns in US homes with children. *Am J Public Health*. 2000;90(4):588-594. doi:10.2307/6005

18. Johnson RM, Miller M, Vriniotis M, Azrael D, Hemenway D. Are Household Firearms Stored Less Safely in Homes With Adolescents? *Arch Pediatr Adolesc Med*. 2006;160(8):788. doi:10.1001/archpedi.160.8.788

19. Azrael D, Miller M, Hemenway D. Are Household Firearms Stored Safely? It Depends on Whom You Ask. *Pediatrics*. 2000;106(3):e31-e31. doi:10.1542/peds.106.3.e31

20. Coyne-Beasley T, Schoenbach VJ, Johnson RM. "Love Our Kids, Lock Your Guns." *Arch Pediatr Adolesc Med*. 2001;155(6):659. doi:10.1001/archpedi.155.6.659

21. Rowhani-Rahbar A, Lyons VH, Simonetti JA, Azrael D, Miller M. Formal firearm training among adults in the USA: Results of a national survey. *Inj Prev*. 2018;24(2):161-165. doi:10.1136/injuryprev-2017-042352

22. Oatis PJ, Fenn Buderer NM, Cummings P, Fleitz R. Pediatric practice based evaluation of the Steps to Prevent Firearm Injury program. *Inj Prev*. 1999;5(1):48-52. doi:10.1136/ip.5.1.48

23. Carbone PS, Clemens CJ, Ball TM. Effectiveness of gun safety counseling and gun lock give away in a Hispanic community. *Arch Pediatr Adolesc Med*. 2005;159(11):1049-1054. doi:10.1001/archpedi.159.11.1049

24. Barkin SL, Finch SA, Ip EH, et al. Is Office-Based Counseling About Media Use, Timeouts, and Firearm Storage Effective? Results From a Cluster-Randomized, Controlled Trial. *Pediatrics*. 2008;122(1):e15-e25. doi:10.1542/peds.2007-2611

25. Garbutt JM, Bobenhouse N, Dodd S, Sterkel R, Strunk RC. What Are Parents Willing to Discuss with Their Pediatrician About Firearm Safety? A Parental Survey. *J Pediatr*. 2016;179:166-171. doi:10.1016/j.jpeds.2016.08.019

26. Coyne-Beasley T. Do Partners With Children Know About Firearms in Their Home? Evidence of a Gender Gap and Implications for Practitioners. *Pediatrics*. 2005;115(6):e662-e667. doi:10.1542/peds.2004-2259

27. Betz ME, Azrael D, Barber C, Miller M. Public opinion regarding whether speaking with patients about firearms is appropriate: Results of a national survey. *Ann Intern Med*. 2016;165(8):543-550. doi:10.7326/M16-0739

28. Simonetti JA, Rowhani-Rahbar A, King C, Bennett E, Rivara FP. Evaluation of a community-based safe firearm and ammunition storage intervention. *Inj Prev*. 2017:1-6. doi:10.1136/injuryprev-2016-042292

29. Rowhani-Rahbar A, Simonetti JA, Rivara FP. Effectiveness of Interventions to Promote Safe Firearm Storage. *Epidemiol Rev*. 2016;38(1):111-124. doi:10.1093/epirev/mxv006

30. Sidman EA. Evaluation of a Community-Based Handgun Safe-Storage Campaign. *Pediatrics*. 2005;115(6):e654-e661. doi:10.1542/peds.2004-1625

31. Albright TL, Burge SK. Improving firearm storage habits: impact of brief office counseling by family physicians. *J Am Board Fam Pract*. 2003;16(1):40-46. doi:10.1016/j.chb.2014.04.043

32. Simonetti JA, Azrael D, Rowhani-Rahbar A, Miller M. Firearm Storage Practices Among American Veterans. *Am J Prev Med*. 2018;55(4):445-454. doi:10.1016/j.amepre.2018.04.014

33. Anestis MD, Butterworth SE, Houtsma C. Perceptions of firearms and suicide: The role of misinformation in storage practices and openness to means safety measures. *J Affect Disord*. 2017;227(November 2017):530-535. doi:10.1016/j.jad.2017.11.057

34. Marino E, Wolsko C, Keys S, Wilcox H. Addressing the Cultural Challenges of Firearm Restriction in Suicide Prevention: A Test of Public Health Messaging to Protect Those at Risk. *Arch Suicide Res*. 2018;22(3):394-404. doi:10.1080/13811118.2017.1355285

35. Baxley F, Miller M. Parental misperceptions about children and firearms. *Arch Pediatr Adolesc Med*. 2006;160(5):542-547. doi:10.1001/archpedi.160.5.542

36. Nance ML, Denysenko L, Durbin DR, Branas CC, Stafford PW, Schwab CW. The rural-urban continuum: variability in statewide serious firearm injuries in children and adolescents. *Arch Pediatr Adolesc Med*. 2002;156(8):781-785. doi:10.1542/peds.2017-3318

37. Nordstrom DL, Zwerling C, Stromquist AM, Burmeister LF, Merchant JA. Rural population survey of behavioral and demographic risk factors for loaded firearms. *Inj Prev*. 2001;7(2):112-116. doi:10.1136/ip.7.2.112