Investigating Occupation and Environmental Factors Influencing the Practice of Safe Firearm Storage

Jason Dickens

A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Public Health

University of Washington

2020

Committee:

Andrew Dannenberg

Debbie Cherry

Paul Faestel

Arthur Wendel

Program Authorized to Offer Degree:

Environmental and Occupational Health Sciences

University of Washington

Abstract

Investigating Occupation and Environmental Factors Influencing the Practice of Safe Firearm Storage

Jason Dickens

Chair of the Supervisory Committee:

Andrew Dannenberg

Environmental and Occupational Health Sciences

Objectives

Suicide and unintentional deaths related to firearms are a problem in the United States. Findings cited by the National Center for Health Statistics show a 33% increase in the U.S. suicide rate over the past two decades. According to the National Centers for Injury Prevention and Control's Web-based Injury Statistics Query and Reporting System (WISQARS), two-thirds of gun deaths are suicides and half of all suicides involve guns. Suicide death risk is three times higher if there is access to a firearm. Multiple studies have shown a significant reduction in firearm related suicide if firearms are stored safely. The Tacoma-Pierce County Health Department (TPCHD) conducted three education and distribution events where locking firearm storage devices were given out after participants received instruction on proper device usage. The purpose of this study was to provide a better understanding of how occupation and perception of neighborhood safety are associated with safe firearm storage practices in order to guide the focus of future community-based programs, efforts, and policies, which would then ultimately decrease gun related suicide and unintentional injury and death.

Methods

In this study, we performed cross-sectional analysis of the data of TPCHD's safe firearm storage event survey. We studied data from 496 respondents who participated in three safe firearm storage events in Pierce County, WA. We used logistic regression to evaluate the associations between: 1) safe firearm storage practices and low skill vs high skill occupations; 2) safe firearm storage practices and working as a first responder; and 3) safe firearm storage practices and perception of neighborhood safety, adjusted for relevant confounders. To determine low vs high skill occupations, the responses were manually coded into categories based on the sectors from the 2017 North American Industry Classification System. These sectors were then divided into low vs high skill occupations based on research presented by the Lincoln Institute of Land Management. Participants were asked directly on the survey of their first responder status. Perception of neighborhood safety was measured by dichotomizing participant responses to a ten-point scale asking how safe they perceive their neighborhoods to be with numbers one to five equating to "not safe" and numbers six to ten equating to "safe". In all three analyses, effect modification by sex, children living in or visiting the home, and military service was assessed.

Results

Low skill occupations were associated with a higher level of safe firearm storage. Low skill occupations had 1.74 (95% CI 1.02, 2.99) times the odds of safe firearm storage, after adjusting for sex. There was attenuation noted after further adjusting this model for children living in or visiting the home and military status. No significant associations were noted between first responder status nor perception of neighborhood safety and safe firearm storage practices.

Conclusion

This study demonstrated an association between occupational skill level and safe firearm storage practices. To our knowledge, it is the first study to look at how environmental factors such as perception of neighborhood safety might influence safe firearm storage practices. Future research looking at the association between specific occupations and how environmental factors might influence safe firearm storage practices is needed.

INTRODUCTION:

A. Gun Violence

Gun violence is a growing concern in America. More than 1.2 million people in the United States have been shot in the past 10 years[2]. Each year in the United States, 36,000 people die from gun shots[16]. These statistics are getting worse as the number of gun deaths increased 16% between 2014 and 2017[16].

Suicide and unintentional deaths related to firearms are part of the gun violence problem in the United States. Findings cited by the National Center for Health Statistics show a 33% increase in the U.S. suicide rate over the past two decades. According to the National Centers for Injury Prevention and Control's Web-based Injury Statistics Query and Reporting System (WISQARS), two-thirds of gun deaths are suicides and half of all suicides involve guns.

Having a firearm in the home increases risk of gun related injuries. The risk of death related to unintentional shooting is higher in homes with firearms[18]. Firearm deaths of young children occur mostly in their own homes[15]. In domestic violence cases, the risk of death of the victim is five times higher if the abuser has access to a gun[19]. Suicide death risk is three times higher if there is access to a firearm[3]. For child age suicide, the gun used to commit the act is most likely to come from the child's own home[15].

B. Characteristics of Firearm Ownership and Safe Firearm Storage

According to the small arms survey in 2007, Americans own more guns than citizens of any other democratic nation[14]. In the United States, a higher proportion of Non-Hispanic Whites have guns in their homes compared to Non-Hispanic Blacks and Hispanics[14, 22]. A higher proportion of males have guns in their homes than females[14, 22]. The proportion of households with children whose parents or guardians keep firearms in their homes is about the same or slightly lower than households without children, but who own firearms[14, 22]. Almost half (44-46.4%) of veterans keep a firearm in their home[14, 22].

There are studies that look at how education level, gender, race, income, geographic location, age, political ideology, or having children influence safe firearm storage practices. The results vary among studies and in many cases are contradictory, but in general there is no statistically significant difference in storage practices in most of the various categories of firearm owners[14,15,20,22]. Non-Hispanic Blacks are less likely to safely store firearms than members of other races. Veterans of the armed forces and females are slightly less likely to store firearms safely than non-veterans or males[14]. The factor found to be the biggest contributor to unsafe storage practices was owning a gun for protection[14,15,20]. Studies investigating how occupation influences safe firearm storage are virtually non-existent. There were no studies looking at the association of firearm storage practices by various occupations. There was one study focusing specifically on the firearm storage practices of peace officers in the south which found that most respondents stored firearms unlocked or loaded with nearly half storing firearms both unlocked and loaded[20].

C. Benefits of Safe Firearm Storage

Studies have shown a significant reduction in firearm related suicide or unintentional shootings if firearms are safely stored[5,6,7,8,9]. A study in 2004 found that those who safely stored firearms were less likely to commit suicide by firearm with reported odds ratio of 0.39[5]. A study of suicide in middle-aged

and older adults found that the odds ratio of committing suicide by firearm of gun owners who store their firearms unlocked was 9.52[7].

A simulation study from 2019 showed that a significant reduction in youth firearm suicides could be achieved with only a 20% improvement in safe storage practices. This means that if the proportion of homes with children and firearms practicing safe firearm storage would increase from 53.2% to 62.6% then up to 135 of the 2800 youth firearm fatalities could be prevented each year[23]. Achieving this same improvement in storage practices could prevent up to 323 youth related firearm shootings anually[23].

There have been numerous studies and programs implemented with the goal of increasing the safe storage of firearms. There has been a shift over the last several years in the approaches taken to address the issue of safe firearm storage. A decade ago, studies focused on using primary care settings to educate patients on how to properly lock up firearms[10]. A systematic review of randomized and quasi-experimental controlled studies of safe firearm storage interventions was conducted in 2015. The study found that two of the seven studies involved both counseling and providing a storage device, four of the seven involved only counseling, and one of the seven involved providing a device with no counseling. The results of the study showed that only one of the four counseling-only interventions was effective at increasing safe firearm storage of the participants. According to this same study, all the interventions that involved providing a safe storage device were effective at increasing safe firearm storage practices[10]. Building on studies that found education and distribution of firearm locking and storage devices to be effective in reducing unsafe practices, community-based as opposed to clinic-based interventions were implemented and tested[13]. Community based interventions were explored because they have the potential to reach a much larger audience and are a more efficient use of resources than office or clinic-based programs[11].

D. Community-Based Interventions

There are multiple reasons behind using large scale community-based interventions. Taking time to educate, demonstrate, and distribute storage devices can be difficult to adequately accomplish in the primary care setting[11, 12]. Community-based interventions may be able to reach larger audiences and provide many more devices than could be given in a primary care setting[13].

In 2018, an article was published by Simonetti et al. which assessed the effectiveness of a community-based firearm safety intervention and assess participants' preferences for firearm locking devices and their comfort with potential firearm safety counsellors. They found that nearly 90% of the participants preferred a gun storage device rather than a trigger lock. Analysis of the community-based interventions involved in this study showed a significant increase in the proportion of participants practicing safe firearm storage at follow-up[13].

E. Specific Aims

The specific aims for this study are:

Aim 1

To determine the association between safe firearm storage and occupations considered high skilled vs low skilled. Our working hypothesis is that occupations which are considered low skilled are

associated with lower levels of safe firearm storage based on a previous study that found that higher levels of education were more likely to safely store their firearms than lower levels of education[15].

Aim 2

To determine the association between safe firearm storage and working as a first responder. Our working hypothesis is that occupations which act as first responders, such as law enforcement or emergency medical technicians (EMT), are associated with lower levels of safe firearm storage based on recommendations from the International Association of Chiefs of Police encouraging law enforcement professionals to improve their practices of safe firearm storage and a published study that found that members of a law enforcement agency in the southern U.S. were less likely to safely store firearms[20]. There are reports and literature on the advantages and disadvantages of EMTs and firefighters carrying guns, but searches in published and grey literature failed to produce any meaningful data on whether EMTs or firefighters safely store their firearms.

Aim 3

To determine the association between perception of neighborhood safety and firearm storage practices. Our working hypothesis is that lower perceived neighborhood safety is associated with lower levels of safe firearm storage based on a previous study that found that people who own firearms for protection are less likely to safely store them[15].

The long-term goal of this study is to ultimately help increase effectiveness of safe firearm storage programs which will then decrease the number of gun related suicides and unintentional injuries. This study will build on previous studies by attempting to develop a model to predict the likelihood of safe firearm storage based on the occupation and environmental factors contained in the pre-intervention survey. This will help guide the focus of future policies or programs to the highest risk populations.

METHODS

A. Study Design, Survey Tool, and Study Subjects

In order to investigate the relationships between safe firearm storage, occupation, and perception of neighborhood crime and safety in participants wanting to receive a free firearm storage device at a TPCHD sponsored event, an analysis of cross-sectional survey data from a survey developed by TPCHD specifically for these events was performed.

1. Safe Firearm Storage Event and Survey

TPCHD received a grant to conduct three events in Pierce County, WA aimed at increasing safe firearm storage and mirroring a similar event completed by Seattle Children's Hospital in King County, WA. In order to engage more community stakeholders, TPCHD held these events at Sportco, a sporting goods and firearm retailer, and at the South Hills Mall, an indoor shopping mall. Both events were held within Pierce County, Washington. TPCHD set up a table and several signs at each event. The tables were covered with a tablecloth that had a large TPCHD logo on it. The first event was held on December 14th, 2019 at Sportco. This event was advertised in the local media and lined up with a special sales

event that Sportco was having on firearms that same day. The second two events were held on December 19th and 23rd, 2019 at the South Hills Mall. For these later events, TPCHD set up their table inside the mall near the immunization clinic with the hope that more participants with children who live in or visit the home would be recruited due to the proximity of the clinic. These last two events were advertised as well through social media, flyers, and local news media.

Participants in these events were asked to complete a liability waiver and be consented to complete a baseline event survey. Participants were consented for a follow-up survey by the TPCHD to be completed in the weeks to months following the events. The follow up survey has not been completed at this time. Participants received education on safe firearm storage, demonstration on how to properly use storage and locking devices, and then received a device of their choosing such as storage box vs trigger lock. Recruitment efforts for volunteers to conduct these events was done via intra and interagency email messaging at the TPCHD. Volunteer workers, but not subjects, received a small gift card for helping with the firearm safe storage events. Training prior to the events was conducted so that the volunteers providing the education and demonstrations were properly coordinated and provided a uniform message. The Survey used is found in Appendix A.

Participants in this study completed a survey that was developed by staff in the Environmental Health division of the TPCHD (See Appendix A). Due to time constraints, a pilot survey was not conducted. The questions on the survey were chosen by staff at the TPCHD and were based on survey questions from previous firearm safe storage events in Washington and similar questions found on nationwide surveys such as the 2017 American Housing Survey. There were questions on the survey intended to assist TPCHD in their planning and advertising of future events which asked, “How did you hear about this event?” and “What is the main reason you want a firearm locking device today?”. The demographic and occupation questions on the survey asked if children or teens live in or visit the home (“Yes” or “No”), age, employment status (“Full-time”, “Part-time”, Unemployed”, “Retired”), sex (“Female” or “Male”), whether they are a first responder (“First Responder (law enforcement, fire, EMT, etc.)” or “Other”, military service (“No military service”, “Current active duty”, “Current guard/reservist”, or “Prior service (veteran)”), housing type (“Single family”, “Apartment/condo”, “Other”), and if they rent vs own. The firearm related questions asked if they keep firearms at home (“Yes” or “No”) and if so, how they store them (“all locked up”, most locked up”, “some locked up”, “none locked up”, or “not sure”). There were questions at the end of the survey which asked the participants about their perception of their neighborhood and included good schools, petty crime, serious crime, and good access to transit services. The question regarding access to good transit was added to evaluate whether aspects of the built environment affect safe firearm storage practices. The answers to these perception questions were “Yes”, “No”, or “I don’t know”. The last question on the survey asked the participant how safe their neighborhood is and had them circle a number between 1 and 10. The surveys were stored together in a bin and the numbering system used did not make it possible to ascertain from which event each survey originated.

2. Exposures and outcomes

The outcome of interest in aims 1, 2, and 3 is safe firearm storage, defined as having a locking mechanism on all firearms within the home. This variable was created by dichotomizing responses to

how firearms are stored to either yes (“all locked up”) or no (“most locked up”, “some locked up”, “none locked up”, or “I don’t know”).

Occupation was used as the exposure variable in Aim 1. This variable was created by looking at the written answers to “Other” and categorizing them using the North American Industry Classification System (NAICS). Written responses fit into one of twenty different categories. Each category corresponds to a particular industry or business sector. It became evident early during the analysis of the survey results that we may not have enough responses to make any statistically significant conclusions. There was a study from the Lincoln Institute that grouped the NAICS codes into high skill vs low skill occupations for their research. We made a NAICS-skill variable using the scheme from the Lincoln Institute report. We initially planned a sub-aim looking at whether the study participant was a first responder or not, but based on the survey design and the responses, it was clear that having first responder as a separate aim was more appropriate. This first responder variable was already dichotomized as “first responder” or “other”, defined as working as a firefighter, EMT, or police officer.

Neighborhood safety was used as the exposure variable in Aim 3. This variable was created by dichotomizing the responses to how each participant rated the safety of their neighborhood into yes (“safe” = scores 6 and above) and no (“unsafe” = scores 5 and below). We wanted to control for perception of crime as it could relate to the participant’s grading of neighborhood safety. Therefore, we dichotomized the crime variable into yes (“yes”) and no (“no” and “not sure”).

3. Covariates

Covariates included in this study were age group, sex, children or teens living in or visiting the home, employment status, military service, housing type, perception of good schools, and perception of good public transit. These variables were derived from their respective survey questions. The age group variable was created by dividing age into four categories of “<30”, “30-40”, “41-50”, and “>50”. Sex was kept as a dichotomous variable with “Female” or “Male”. Children or teens living in or visiting the home was kept dichotomous with “Yes” or “No”. Preferred storage device and Reason for wanting a device were on the survey but were not analyzed as part of the univariate nor bivariate analyses.

Appendix B includes more in-depth descriptions of the variables used in this study.

B. Statistical Analysis

1. Descriptive Analysis

As part of our univariate analysis, the distributions of all variables were examined. Bivariate analysis was then performed to look at the relationship between each set of variables (Appendix C). Categorical variables were compared to each other using chi square tests. The Fisher Exact Test was used to assess the relationships whenever the expected values of at least one of the cells was less than five because the chi square test would not have been as meaningful in these instances.

We performed descriptive analysis, including calculating percentages, and then stratified the data by sex, children or teens living in or visiting the home, and perceived neighborhood crime. These are included in Appendix B.

2. Inferential Analysis

We used logistic regression to assess the relationship between exposures and outcomes. For both Aim 1 and Aim 2, an unadjusted logistic regression model was initially created, and further adjustments were made for minimally adjusted and fully adjusted models. We selected covariates a priori based on available literature. For Aims 1, 2, and 3 we minimally adjusted our model for only sex and then fully adjusted our model by adding children or teens living in or visiting the home and military service.

See Appendix E for further description of the models used in Aims 1, 2, and 3.

RESULTS

A. Descriptive Analysis

Table 1 shows the distribution of the variables from the survey results, stratified by sex. A slightly higher percentage of females reported safely storing their firearms compared to males (65.9% vs 60.5% respectively). The percentage of females working as first responders was more than 5 times that of males (8.1% vs 1.5%). A higher percentage of females reported working in low skill occupations than males (57.7% vs 37.5%). With regards to military service, a significantly higher percentage of females (28.6%) reported having some prior military service than males (6.3%) which may be partly explained for military families by the assumption that females end their military service before their spouse in order to take care of their children while the spouse continues on active duty.

Table 1. Distribution of variables, stratified by sex, N (%)

Variable	Female (N=223)	Male (N=150)	Total (N=373)
Safe Firearm Storage	223	147	370
Yes	147 (65.9%)	89 (60.5)	236 (63.8)
No	76 (34.1%)	58 (39.5)	134 (36.2)
Occupation	185	131	316
First Responder	15 (8.1%)	2 (1.5)	17 (5.4)
Other	170 (91.9%)	129 (98.5)	299 (94.6)
Occupation	156	96	252
Low Skill	90 (57.7%)	36 (37.5)	126 (50)
High Skill	66 (42.3%)	60 (62.5)	126 (50)
Perception of Crime	223	150	373
Yes	96 (43.0%)	84 (56)	180 (48.3)
No	127 (57.0%)	66 (44)	193 (51.7)
Perception of Safety	218	145	363
Yes	168 (77.1%)	111 (76.6)	279 (76.9)
No	50 (22.9%)	34 (23.4)	84 (23.1)
Age	220	150	370
•< 30	34 (15.5%)	28 (18.7)	62 (16.8)
•30-40	45 (20.5%)	42 (28)	87 (23.5)
•41-50	41 (18.6%)	22 (14.7)	63 (17)
•>50	100 (45.5%)	58 (38.7)	158 (42.7)
Children or Teens living in or visiting the Home	221	147	368
Yes	153 (69.2%)	113 (76.9)	266 (72.3)
No	68 (30.8%)	34 (23.1)	102 (27.7)
Employment	216	145	361
•Full-Time	140 (64.8%)	80 (55.2)	220 (60.9)
•Part-Time	11 (5.1%)	24 (16.6)	35 (9.7)
•Unemployed	13 (6.0%)	18 (12.4)	31 (8.6)
•Retired	52 (24.1%)	23 (15.9)	75 (20.8)
Military Service	206	126	332
•No Military Service	138 (67.0%)	116 (92.1)	254 (76.5)
•Prior Service (Veteran)	59 (28.6%)	8 (6.3)	67 (20.2)
•Current Active Duty	7 (3.4%)	1 (0.8)	8 (2.4)
•Current Guard/Reserve	2 (1.0%)	1 (0.8)	3 (0.9)
Housing Type	210	141	351
•Single Family	191 (91.0%)	131 (92.9)	322 (91.7)
•Apart/Condo	13 (6.2%)	9 (6.4)	22 (6.3)
•Other	6 (2.9%)	1 (0.7)	7 (2)
Perception of Good Schools	217	146	363
Yes	175 (80.6%)	115 (78.8)	290 (79.9)
No	42 (19.4%)	31 (21.2)	73 (20.1)
Perception of Good Transit	213	146	359
Yes	107 (50.2%)	72 (49.3)	179 (49.9)
No	106 (49.8%)	74 (50.7)	180 (50.1)

Table 2 shows the distribution of the variables from the survey, stratified by having children live in or visit the home (children in home or no children at home). There was essentially no difference in percentage of people reporting safe firearm storage among people with no children at home vs children at home (64.3% vs 64.6%). The results were similar for respondents working as first responders (6.4% vs 5.4%). Participants with no children living or visiting the home reported a slightly higher percentage of working in high skill occupations than participants with children living in or visiting the home (55.7% vs 47.1%). With regards to housing type, participants with no children in the home reported apartment or condo living almost three times higher than people with children in the home (12.3% vs 4.2%).

Table 2. Distribution of variables, stratified by children living in or visiting the home, N (%)

Variable	**No Child (N=112)**	**Child at home (N=281)**	**Total (N=393)**
Safe Firearm Storage	112	277	389
Yes	72 (64.3)	179 (64.6)	251 (64.5)
No	40 (35.7)	98 (35.4)	138 (35.5)
Occupation	94	241	335
First Responder	6 (6.4)	13 (5.4)	19 (5.7)
Other	88(93.6)	228 (94.6)	316 (94.3)
Occupation	79	189	268
Low Skill	35 (44.3)	100 (52.9)	135 (50.4)
High Skill	44(55.7)	89 (47.1)	133 (49.6)
Perception of Crime	112	281	393
Yes	44 (39.3)	149 (53.0)	193 (49.1)
No	68 (60.7)	132 (88.6)	200 (50.9)
Perception of Safety	111	272	381
Yes	83 (74.8)	211 (77.6)	294 (77.2)
No	28 (25.2)	61 (22.4)	87 (22.8)
Age	108	275	389
•< 30	20 (18.5)	44 (16.0)	64 (16.5)
•30-40	13 (12.0)	81 (29.5)	94 (24.2)
•41-50	17 (15.7)	47 (17.1)	64 (16.5)
•>50	58 (53.7)	103 (37.5)	167 (42.9)
Sex	102	266	368
Female	68 (66.7)	153 (57.5)	221 (60.1)
Male	34 (33.3)	113 (42.5)	147 (39.9)
Employment	131	271	381
•Full-Time	65 (49.6)	168 (62.0)	233 (61.2)
•Part-Time	8 (6.1)	27 (10.0)	35 (9.2)
•Unemployed	4 (3.1)	26 (9.6)	30 (7.9)
•Retired	33 (26.7)	50 (18.5)	83 (21.8)
Military Service	100	251	351
•No Military Service	74 (74.0)	195 (77.7)	269 (76.6)
•Prior Service (Veteran)	25 (25.0)	46 (18.3)	71 (20.2)
•Current Active Duty	1 (1.0)	7 (2.8)	8 (2.3)
•Current Guard/Reserve	0 (0)	3 (1.2)	3 (0.9)
Housing Type	106	265	371
•Single Family	93 (87.7)	247 (93.2)	340 (91.6)
•Apart/Condo	13 (12.3)	11 (4.2)	24 (6.5)
•Other	0 (0)	7 (2.6)	7 (1.9)
Perception of Good Schools	110	273	383
Yes	85 (77.3)	223 (81.7)	308 (80.4)
No	25 (22.7)	50 (18.3)	75 (19.6)
Perception of Good Transit	106	272	378
Yes	56 (52.8)	138 (50.7)	194 (51.3)
No	50 (47.2)	134 (49.3)	184 (48.7)

Table 3 shows the distribution of the variables from the survey, stratified by perception of neighborhood crime (no crime vs crime). The percentage of people reporting safely storing their

firearms was about the same for those reporting perceptions of no crime in their neighborhood vs people having a perception of crime in their neighborhood (65% vs 63.9% respectively). As expected, a higher percentage of participants with perception of no crime in their neighborhoods reported having a perception of neighborhood safety than participants who had a perception of crime (84.7% vs 69.5%). A slightly higher percentage of females reported no crime than males (65.8% vs 53.3%). Perceptions of neighborhood crime did not seem to differ very much with regards to military service with prior service experience having a slightly higher percentage of no crime than no prior military service (22.2% vs 18.4%). Perception of good schools followed a similar pattern as perception of neighborhood safety in that a slightly higher percentage of participants perception of no crime reported good schools than those with perception of crime (85.7% vs 75.5%).

Table 3. Distribution of variables, stratified by crime, N (%)

Variable	**No Crime (N=203)**	**Crime (N=195)**	**Total (N=398)**
Safe Firearm Storage	200	194	394
Yes	130 (65)	124 (63.9)	254 (64.5)
No	70 (35)	70 (36.1)	140 (35.5)
Occupation	173	164	337
First Responder	12 (6.9)	7 (4.3)	19 (5.6)
Other	161 (93.1)	157 (95.7)	318 (94.4)
Occupation	135	135	270
Low Skill	75 (55.6)	60 (44.4)	135 (50)
High Skill	60 (44.4)	75 (55.6)	135 (50)
Children at home	200	193	393
Yes	132 (66)	149 (77.2)	281 (71.5)
No	68 (34)	44 (22.8)	112 (28.5)
Perception of Safety	196	190	386
Yes	166 (84.7)	132 (69.5)	298 (77.2)
No	30 (15.3)	58 (30.5)	88 (22.8)
Age	200	194	394
•< 30	37 (18.5)	27 (13.9)	64 (16.2)
•30-40	50 (25)	44 (22.7)	94 (23.9)
•41-50	34 (17)	31 (16.0)	65 (16.5)
•>50	79 (39.5)	92 (47.4)	171 (43.4)
Sex	193	180	373
Female	127 (65.8)	96 (53.3)	223 (59.8)
Male	66 (34.2)	84 (46.7)	150 (40.2)
Employment	194	191	385
•Full-Time	129 (66.5)	105 (55.0)	234 (60.8)
•Part-Time	11 (5.7)	24 (12.6)	35 (9.1)
•Unemployed	15 (7.7)	16 (8.4)	31 (8.1)
•Retired	39 (20.1)	46 (24.1)	85 (22.1)
Military Service	176	179	355
•No Military Service	131 (74.4)	141 (78.8)	272 (70.6)
•Prior Service (Veteran)	39 (22.2)	33 (18.4)	72 (20.3)
•Current Active Duty	4 (2.3)	4 (2.2)	8 (2.3)
•Current Guard/Reserve	2 (1.1)	1 (0.6)	3 (0.8)
Housing Type	193	183	376
•Single Family	178 (92.2)	167 (91.3)	345 (91.8)
•Apart/Condo	11 (5.7)	13 (7.1)	24 (6.4)
•Other	4 (2.1)	3 (1.6)	7 (1.9)
Perception of Good Schools	196	192	388
Yes	168 (85.7)	145 (75.5)	313 (80.7)
No	28 (14.3)	47 (24.5)	75 (19.3)
Perception of Good Transit	188	195	383
Yes	91 (48.4)	104 (53.3)	195 (50.9)
No	97 (51.6)	91 (46.7)	188 (49.1)

B. Inferential Analysis

1. Aim 1

Aim 1 addressed the hypothesis that low occupation skill level is associated with lower levels of safe firearm storage. Table 4 shows the results of the logistic regression analyses of the association between occupation skill level and safe firearm storage. After adjusting for sex (minimally adjusted), low skill vs high skill occupations were associated with 1.74 (95% CI 1.02, 2.99) times the odds of safe firearm storage. In the non-adjusted model, the results of the logistical regression were suggestive of low skill occupations having an association of 1.6 (95% CI 0.98, 2. 7) times the odds of safe firearm storage. Adjusting the model further for children in home and military service, in addition to sex, the association was no longer statistically significant. The way to interpret the reported odds ratios of each variable in the following tables is the odds of the stated variable compared to its reference of safely storing firearms. There are differences between odds ratios in each model and among variables because of statistical adjustments utilized by R studio with the glm function. We expected high skill occupations to be associated with higher levels of safe firearm storage because of previous research that showed increased safe firearm storage with increased levels of education above high school. One study showed that having education less than a high school degree or with education of a bachelor's degree or higher were the two categories more likely to store firearms safely and least likely to store them unsafely. Our assumption was that most of the survey participants would have completed at least a high school degree. If our assumption was false, then our results, though unexpected, were consistent with findings from other studies[14,15].

Table 4. Odds Ratio (95% Confidence Intervals) of Safe Firearm Storage by Occupation Skill Level

	Non-adjusted	**Minimally Adjusted**	**Adjusted Model**
Low Skill (*ref: High*)	1.6 (0.98 , 2.7)*	1.74 (1.02 , 2.99)**	1.7 (0.92, 2.98)*
Male (*ref: Female*)		0.78 (0.45 , 1.35)	0.74 (0.4, 1.4)
Children in home (*ref: no children in home)*			1.1 (0.59, 2.06)
Military service (*ref: no prior service)* • Prior Service (vet) • Current active duty • Current guard/reservist			 0.79 (0.37, 1.7) 0.53 (0.06, 4.7) 0.53 (0.02, 13.96)

*= p-value <0.1 **= p-value <0.05

2. Aim 2

Aim 2 addressed the hypothesis that working as a first responder was associated with lower levels of safe firearm storage. Table 5 shows the results of the logistic regression analyses of the association between first responder status and safe firearm storage. All three of our models consisting of non-adjusted, minimally adjusted (sex only), and adjusted (sex, children in home, and military service) failed to show an association between first responder status and safe firearm storage. In the adjusted

model, being male was suggestive of slightly worse safe storage practices with 0.63 (95% CI 0.41, 1.12) times the odds of safe firearm storage.

Table 5. Odds Ratio (95% Confidence Intervals) of Safe Firearm Storage by First Responder Status

	Non-adjusted	**Minimally Adjusted**	**Adjusted Model**
First Responder (ref: other)	0.88 (0.34, 2.43)	0.66 (0.24, 1.88)	0.73 (0.25, 2.22)
Male (*ref: Female*)		0.7 (0.43, 1.13)	0.63 (0.37, 1.08)*
Children in home (*ref: No children in home)*			1.32 (0.76, 2.3)
Military service (*ref: no prior service*) • Prior Service (vet) • Current active duty • Current guard/reservist			 0.74 (0.38, 1.47) 0.40 (0.09, 1.81) 0.88 (0.08, 19.5)

*=p-value <0.1

3. Aim 3

Aim 3 addressed the hypothesis that lower levels of perception of neighborhood safety are associated with lower levels of safe firearm storage. Table 6 shows the results of the logistic regression analyses of the association between perception of neighborhood safety and safe firearm storage. All three of our models including non-adjusted, minimally adjusted (sex only), and adjusted (sex, children in home, and military service) failed to show an association between perception of neighborhood safety and safe firearm storage.

Table 6. Odds Ratio (95% Confidence Interval) of Safe Firearm Storage by Neighborhood Safety

	Non-adjusted	**Minimally Adjusted**	**Adjusted Model**
Safe (*ref: Not Safe*)	0.97 (0.58, 1.59)	0.95 (0.56, 1.58)	0.89 (0.50, 1.55)
Male (ref: Female)		0.82 (0.53, 1.26)	0.68 (0.41, 1.12)
Children in home (*ref: No children in home)*			1.18 (0.70, 1.97)
Military service (*ref: no prior service*) • Prior Service (vet) • Current active duty • Current guard/reservist			 0.59 (0.33, 1.07) 0.41 (0.09, 1.81) 0.91 (0.08, 19.9)

DISCUSSION AND CONCLUSION

In this cross-sectional survey study of participants in a safe firearm storage device event, low skill occupations were associated with higher levels of safe firearm storage after controlling for sex. We speculate that a possible explanation for the finding of low skill occupations being associated with higher levels of safe firearm storage is that people of lower income level may be more protective of their

individual high value possessions in general due to a relative lack of physical security such as alarm system or neighborhood gates and that their behavior is not specifically focused on gun safety. No other statistically significant associations were seen between the exposures of perception of neighborhood safety or first responder status and safe firearm storage. An interesting association that was not part of our data analysis plan but was done out of curiosity was between safe firearm storage and renting versus owning a home. We found that owning a home was associated with 0.87 times the odds of safely storing a firearm. In other words, renting a home was associated with higher levels of safe firearm storage than owning a home. After looking at the bivariate analysis, there was a strong relationship between safety and crime, so crime was dropped from the model to avoid multicollinearity. To our knowledge, it is the first study to look at how environmental factors such as perception of neighborhood safety might influence safe firearm storage practices. Our plan of looking at each individual occupation category according to NAICS is novel and could provide interesting and potentially useful information.

Before beginning this study, we expected some possible selection bias due to the close proximity of a large military base. The original concern was that Joint Base Lewis-McChord lies within Pierce County which might have some effect on the number of military related participants. The Sportco event was thought to perhaps have a larger proportion of males because it is a sporting goods and firearm retailer and males are more likely to own firearms. The South Hill Mall events were thought to perhaps see a larger proportion of females than males because of the number of shops catering to that demographic such as home furnishing, clothing, and beauty supply stores. The location of the last two events was chosen specifically to increase the foot traffic and recruitment of participants with children living in the home which was thought to possible affect the demographic makeup of respondents. Results of descriptive analysis show that only a very small number of active duty military members participated in these events. More participants were female than male, and more participants had children or teens living in or visiting their homes.

This study has many limitations that may have contributed to the lack of meaningful associations between the exposures and safe firearm storage. A major limitation to this study is the fact that it was self-reported information via an unvalidated survey. The survey used for this study contained a combination of questions obtained from existing, validated surveys, as well as questions developed by TPCHD specifically for their purposes with these safe firearm storage device events. Due to the fact that some of these questions had not been previously validated, especially the occupational and the perceived environmental factors questions, there is some concern that the data is not a good representation of reality. The layout of the survey question regarding occupation made it easy for the participants to check “other” without writing in their occupation. The wording of the first responder question, as selected by TPCHD, did not allow for much flexibility in grouping the responses. There may also have been some confusion as to how retired persons should answer.

Another limitation for this study to assess the associations between occupation and environmental factors and safe firearm storage was the low number of responses to questions. Though this study had close to 400 participants who kept a firearm in their home, about 60 of them did not answer the question regarding occupation. The number of participants reporting to work as first responders was 19 for the entire survey. The low number of responses may have hindered the study’s ability to find any meaningful associations between occupation and safe firearm storage. It is likely that confusion related to the phrasing of the questions and design of the survey contributed to some of the retirees choosing not to answer the question regarding occupation.

In all three of these events, we captured groups of people at brick and mortar retail locations which may have different demographics and firearm storage practices than the population who uses only online purchasing such as Amazon or other dot Com retailers. Information bias was a concern for this study. Recent legislation in Washington regarding firearms may have affected the responses. It is possible that given the current climate in America and sensitivity to the subject of firearms, participants did not want to admit to their true practices and answered in a way that they felt was most acceptable to societal expectations or laws. Volunteer bias was also a concern. People participating in these events were possibly a sign that they are interested in safe storage. This interest may not be reflective of the general population and hence may not reflect safe storage practices of the general population.

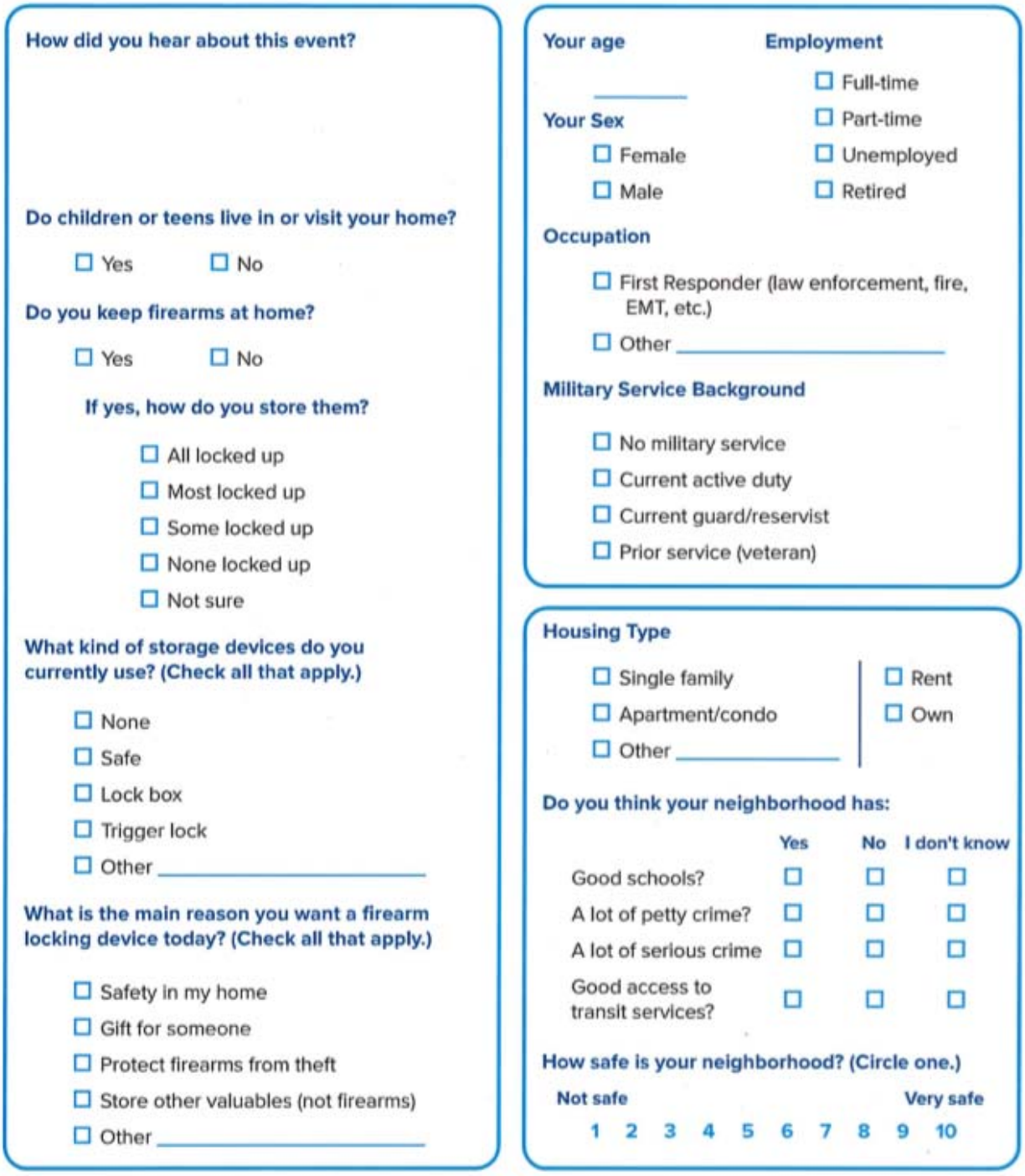
In future studies, I would ensure that there were other researchers available to perform quality control. There was the potential for errors when transcribing data from the surveys into an excel file. Extra sets of eyes to look over the accuracy of the transcription would have been ideal, but due to resource constraints I was not able to have any quality control.

Future research into how occupations or environmental factors may influence safe firearm storage practices should include larger sample sizes with better survey design. Though the plan of looking at each individual occupation category according to NAICS could provide interesting and potentially useful information, unfortunately our study did not have enough respondents to make meaningful conclusions. In order to look for associations between safe firearm storage and environmental factors, it would be useful to match the respondent's location to their survey. Due to security concerns getting the participant to share their street address may be difficult but being able to match the nine digit zip code to each survey would still allow for some great analyses. We could look for associations between how safely firearms are stored and the rates of crime, accidents, distances to public transit, sidewalks, green space, etc. of the neighborhood without having to rely on the perceptions of participants. Using a nationwide survey including data on participant location would also allow us to find possible associations between safe firearm storage practices and state and local firearm laws.

In conclusion, this study demonstrated an association between occupational skill level and safe firearm storage practices. The intent of this study was to help organizations better plan safe firearm storage events in the future by trying to predict which groups of participants might be at higher risk of not securely storing their firearms and therefor help determine where to focus resources. Further research looking at the association between various occupations and safe firearm storage practices is needed. Many industries and professions have their own organizations. If more was known about which occupations were less likely to safely store their firearms, then perhaps tailored approaches might produce better resource to positive outcome ratio leading to decreases in gun related injuries and deaths.

Appendix A.

Tacoma-Pierce County Health Department Survey Tool



How did you hear about this event?

Do children or teens live in or visit your home?

☐ Yes ☐ No

Do you keep firearms at home?

☐ Yes ☐ No

If yes, how do you store them?

☐ All locked up
☐ Most locked up
☐ Some locked up
☐ None locked up
☐ Not sure

What kind of storage devices do you currently use? (Check all that apply.)

☐ None
☐ Safe
☐ Lock box
☐ Trigger lock
☐ Other _____

What is the main reason you want a firearm locking device today? (Check all that apply.)

☐ Safety in my home
☐ Gift for someone
☐ Protect firearms from theft
☐ Store other valuables (not firearms)
☐ Other _____

Your age

_____

Your Sex

☐ Female
☐ Male

Employment

☐ Full-time
☐ Part-time
☐ Unemployed
☐ Retired

Occupation

☐ First Responder (law enforcement, fire, EMT, etc.)
☐ Other _____

Military Service Background

☐ No military service
☐ Current active duty
☐ Current guard/reservist
☐ Prior service (veteran)

Housing Type

☐ Single family
☐ Apartment/condo
☐ Other _____

☐ Rent
☐ Own

Do you think your neighborhood has:

	Yes	No	I don't know
Good schools?	☐	☐	☐
A lot of petty crime?	☐	☐	☐
A lot of serious crime	☐	☐	☐
Good access to transit services?	☐	☐	☐

How safe is your neighborhood? (Circle one.)

Not safe **Very safe**

1 2 3 4 5 6 7 8 9 10

Appendix B.

Table of variables

Variable	Scientific Meaning	Use in Analysis	Measurement Units	Data Type	Other
Safe firearm storage	Measurement of outcome	Outcome variable	•Yes ("yes" to firearms in home and "All locked up") •No ("yes" to firearms in home and "Most locked up, some locked up, none locked up, not sure")	Binary	
Occupation	Measurement of exposure	Exposure variable	•First Responder •Other	Binary	
Occupation	Measurement of exposure	Exposure variable	•High Skill •Low Skill	Binary	
Perception of neighborhood crime	Measurement of exposure	Exposure variable	•Yes (If at least one crime question is answered with "yes") •No (if neither answer is "yes")	Binary	
Perception of neighborhood safety	Measurement of exposure	Exposure variable	•Safe (6 or higher) •Not Safe (5 or less)	Binary	
Age	Demographic	Variables that increase precision, possible confounder, or effect modifier	•< 30 •30-40 •41-50 •>50	Categorical	
Sex	Demographic	Variables that increase precision, possible confounder, or effect modifier	•Female •Male	Binary	
Children or teens living in or visiting the home	Demographic	Variables that increase precision, possible confounder, or effect modifier	•Yes •No	Binary	
Employment	Demographic	Variables that increase precision, possible confounder, or effect modifier	•Full-Time •Part-Time •Unemployed •Retired	Categorical	
Military Service	Demographic	Variables that increase precision, possible confounder, or effect modifier	•No military service •Prior service (Veteran) •Current active duty •Current guard/reservist	Categorical	
Housing Type	Demographic	Variables that increase precision, possible confounder, or effect modifier	•Single Family •Apt./Condo. •Other	Categorical	
Perception of good schools	Measurement of exposure	Variables that increase precision, possible confounder, or effect modifier	•Yes •No	Binary	
Perception of good access to public transit	Measurement of exposure	Variables that increase precision, possible confounder, or effect modifier	•Yes •No	Binary	

Appendix C.

Bivariate Analysis

	NAICS Skill Level	SEX	SAFE FIREARM STORAGE	FIRST RESPONDER	CRIME	SAFETY	AGE	CHILD	Employment	MILITARY	HOUSING	GOOD SCHOOLS	GOOD TRANSIT
NAICS Skill Level	x	X^2=8.9 df=1 p=0.0028	X^2=3.1 df=1 p=0.078	X^2=10.469 df=1 p=0.0012	X^2=2.9 df=1 p=0.0884	X^2=0.139 df=1 p=0.7097	X^2=3.974 df=3 p=0.2643	X^2=1.32 df=1 p=0.2498	X^2=6.54 df=3 p=0.088 ft=0.083	X^2=6.682 df=3 p=0.0828 ft=0.072	X^2=0.600 df=2 p=0.7408 ft=0.722	X^2=0.827 df=1 p=0.3632	X^2=0.644 df=1 p=0.4222
SEX	See above	x	X^2=0.888 df=1 p=0.3461	X^2=5.297 df=1 p=0.02136	X^2=5.516 df=1 p=0.01884	X^2=0 df=1 p=1	X^2=4.4965 df=3 p=0.2126	X^2=2.205 df=1 p=0.1376	X^2=20.023 df=3 p=0.0001679	X^2=27.903 df=3 p=3.807e-6 ft=1.76e-7	X^2=1.9917 df=2 p=0.3694 ft=0.4431	X^2=0.0925 df=1 p=0.761	X^2=0.0041 df=1 p=0.9492
SAFE FIREARM STORAGE	See above	See above	x	X^2=0.064 df=1 p=0.8003	X^2=0.0142 df=1 p=0.9051	X^2=9.385e-5 df=1 p=0.9923	X^2=6.2713 df=3 p=0.09913	X^2=0 df=1 p=1	X^2=6.8167 df=3 p=0.07797	X^2=2.1099 df=3 p=0.5499 ft=0.4857	X^2=0.6658 df=2 p=0.7169 ft=0.7642	X^2=0.10054 df=1 p=0.7512	X^2=0.88943 df=1 p=0.3456
FIRST RESPONDER	See above	See above	See above	x	X^2=0.6809 df=1 p=0.4093	X^2=0.0831 df=1 p=0.7732 ft=0.774	X^2=5.56 df=3 p=0.1351 ft=0.09	X^2=0.0079 df=1 p=0.9293	X^2=2.3835 df=3 p=0.4967 ft=0.5413	X^2=22.41 df=3 p=5.361e-5 ft=1.37e-4	X^2=0.9132 df=2 p=0.6334 ft=0.4989	X^2=0.0038 df=1 p=0.9507 ft=1	X^2=4.0621 df=1 p=0.04386
CRIME	See above	See above	See above	See above	x	X^2=110848 df=1 p=5.772e-4	X^2=2.9816 df=3 p=0.3945	X^2=5.5113 df=1 p=0.01889	X^2=7.8759 df=3 p=0.04865	X^2=1.1757 df=3 p=0.7588 ft=0.7428	X^2=0.39457 df=2 p=0.821 ft=0.8209	X^2=5.8257 df=1 p=0.01579	X^2=0.7438 df=1 p=0.3885
SAFETY	See above	See above	See above	See above	See above	x	X^2=2.511 df=3 p=0.4733	X^2=0.0272 df=1 p=0.8691	X^2=3.8947 df=3 p=0.2731	X^2=1.5294 df=3 p=0.6755 ft=0.7657	X^2=2.5969 df=2 p=0.273 ft=0.2768	X^2=41.236 df=1 p=1.349e-10	X^2=0.7073 df=1 p=0.4003
AGE	See above	See above	See above	See above	See above	See above	x	X^2=13.576 df=3 p=0.00354	X^2=123.44 df=9 p=<2.2e-16	X^2=36.474 df=9 p=3.265e-5 ft=1.78e-6	X^2=19.779 df=6 p=0.00303 ft=0.003	X^2=4.3122 df=3 p=0.2297	X^2=0.673 df=3 p=0.8796
CHILD	See above	See above	See above	See above	See above	See above	See above	x	X^2=9.0423 df=3 p=0.02873	X^2=3.9005 df=3 p=0.2724 ft=0.3457	X^2=10.752 df=2 p=0.004627 ft=.0062	X^2=0.70937 df=1 p=0.3997	X^2=0.0633 df=1 p=0.8014
Employment	See above	See above	See above	See above	See above	See above	See above	See above	x	X^2=46.72 df=9 p=0.4.426e-7 ft=9.22e-7	X^2=8.3577 df=6 p=0.2131 ft=0.1628	X^2=0.98654 df=3 p=0.8045	X^2=4.0376 df=3 p=0.2574
MILITARY	See above	See above	See above	See above	See above	See above	See above	See above	See above	x	X^2=1.754 df=6 p=0.9409 ft=0.5691	X^2=3.0624 df=3 p=0.3821 ft=0.389	X^2=7.6786 df=3 p=0.05314 ft=0.045
HOUSING	See above	See above	See above	See above	See above	See above	See above	See above	See above	See above	x	X^2=3.5047 df=2 p=0.1734 ft=0.1375	X^2=6.4338 df=2 p=0.04008 ft=0.0411
GOOD SCHOOLS	See above	See above	See above	See above	See above	See above	See above	See above	See above	See above	See above	x	X^2=0.0534 df=1 p=0.8172
GOOD TRANSIT	See above	See above	See above	See above	See above	See above	See above	See above	See above	See above	See above	See above	x

Appendix D.

Distribution of variables among participants stratified by sex.

Variable	Female (N=223)	Male (N=150)	Total (N=373)
Safe Firearm Storage	223	147	370
Yes	147 (65.9%)	89 (60.5)	236 (63.8)
No	76 (34.1%)	58 (39.5)	134 (36.2)
Occupation	185	131	316
First Responder	15 (8.1%)	2 (1.5)	17 (5.4)
Other	170 (91.9%)	129 (98.5)	299 (94.6)
Occupation	156	96	252
Low Skill	90 (57.7%)	36 (37.5)	126 (50)
High Skill	66 (42.3%)	60 (62.5)	126 (50)
Perception of Crime	223	150	373
Yes	96 (43.0%)	84 (56)	180 (48.3)
No	127 (57.0%)	66 (44)	193 (51.7)
Perception of Safety	218	145	363
Yes	168 (77.1%)	111 (76.6)	279 (76.9)
No	50 (22.9%)	34 (23.4)	84 (23.1)
Age	220	150	370
•< 30	34 (15.5%)	28 (18.7)	62 (16.8)
•30-40	45 (20.5%)	42 (28)	87 (23.5)
•41-50	41 (18.6%)	22 (14.7)	63 (17)
•>50	100 (45.5%)	58 (38.7)	158 (42.7)
Children or Teens living in or visiting the Home	221	147	368
Yes	153 (69.2%)	113 (76.9)	266 (72.3)
No	68 (30.8%)	34 (23.1)	102 (27.7)
Employment	216	145	361
•Full-Time	140 (64.8%)	80 (55.2)	220 (60.9)
•Part-Time	11 (5.1%)	24 (16.6)	35 (9.7)
•Unemployed	13 (6.0%)	18 (12.4)	31 (8.6)
•Retired	52 (24.1%)	23 (15.9)	75 (20.8)
Military Service	206	126	332
•No Military Service	138 (67.0%)	116 (92.1)	254 (76.5)
•Prior Service (Veteran)	59 (28.6%)	8 (6.3)	67 (20.2)
•Current Active Duty	7 (3.4%)	1 (0.8)	8 (2.4)
•Current Guard/Reserve	2 (1.0%)	1 (0.8)	3 (0.9)
Housing Type	210	141	351
•Single Family	191 (91.0%)	131 (92.9)	322 (91.7)
•Apart/Condo	13 (6.2%)	9 (6.4)	22 (6.3)
•Other	6 (2.9%)	1 (0.7)	7 (2)
Perception of Good Schools	217	146	363
Yes	175 (80.6%)	115 (78.8)	290 (79.9)
No	42 (19.4%)	31 (21.2)	73 (20.1)
Perception of Good Transit	213	146	359
Yes	107 (50.2%)	72 (49.3)	179 (49.9)
No	106 (49.8%)	74 (50.7)	180 (50.1)

Distribution of variables among participants stratified by child at home.

Variable	**No Child (N=112)**	**Child at home (N=281)**	**Total (N=393)**
Safe Firearm Storage	112	277	389
Yes	72 (64.3)	179 (64.6)	251 (64.5)
No	40 (35.7)	98 (35.4)	138 (35.5)
Occupation	94	241	335
First Responder	6 (6.4)	13 (5.4)	19 (5.7)
Other	88(93.6)	228 (94.6)	316 (94.3)
Occupation	79	189	268
Low Skill	35 (44.3)	100 (52.9)	135 (50.4)
High Skill	44(55.7)	89 (47.1)	133 (49.6)
Perception of Crime	112	281	393
Yes	44 (39.3)	149 (53.0)	193 (49.1)
No	68 (60.7)	132 (88.6)	200 (50.9)
Perception of Safety	111	272	381
Yes	83 (74.8)	211 (77.6)	294 (77.2)
No	28 (25.2)	61 (22.4)	87 (22.8)
Age	108	275	389
•< 30	20 (18.5)	44 (16.0)	64 (16.5)
•30-40	13 (12.0)	81 (29.5)	94 (24.2)
•41-50	17 (15.7)	47 (17.1)	64 (16.5)
•>50	58 (53.7)	103 (37.5)	167 (42.9)
Sex	102	266	368
Female	68 (66.7)	153 (57.5)	221 (60.1)
Male	34 (33.3)	113 (42.5)	147 (39.9)
Employment	131	271	381
•Full-Time	65 (49.6)	168 (62.0)	233 (61.2)
•Part-Time	8 (6.1)	27 (10.0)	35 (9.2)
•Unemployed	4 (3.1)	26 (9.6)	30 (7.9)
•Retired	33 (26.7)	50 (18.5)	83 (21.8)
Military Service	100	251	351
•No Military Service	74 (74.0)	195 (77.7)	269 (76.6)
•Prior Service (Veteran)	25 (25.0)	46 (18.3)	71 (20.2)
•Current Active Duty	1 (1.0)	7 (2.8)	8 (2.3)
•Current Guard/Reserve	0 (0)	3 (1.2)	3 (0.9)
Housing Type	106	265	371
•Single Family	93 (87.7)	247 (93.2)	340 (91.6)
•Apart/Condo	13 (12.3)	11 (4.2)	24 (6.5)
•Other	0 (0)	7 (2.6)	7 (1.9)
Perception of Good Schools	110	273	383
Yes	85 (77.3)	223 (81.7)	308 (80.4)
No	25 (22.7)	50 (18.3)	75 (19.6)
Perception of Good Transit	106	272	378
Yes	56 (52.8)	138 (50.7)	194 (51.3)
No	50 (47.2)	134 (49.3)	184 (48.7)

Distribution of variables among participants stratified by perception of neighborhood crime.

Variable	**No Crime (N=203)**	**Crime (N=195)**	**Total (N=398)**
Safe Firearm Storage	200	194	394
Yes	130 (65)	124 (63.9)	254 (64.5)
No	70 (35)	70 (36.1)	140 (35.5)
Occupation	173	164	337
First Responder	12 (6.9)	7 (4.3)	19 (5.6)
Other	161 (93.1)	157 (95.7)	318 (94.4)
Occupation	135	135	270
Low Skill	75 (55.6)	60 (44.4)	135 (50)
High Skill	60 (44.4)	75 (55.6)	135 (50)
Children or teens living in or visiting the home	200	193	393
Yes	132 (66)	149 (77.2)	281 (71.5)
No	68 (34)	44 (22.8)	112 (28.5)
Perception of Safety	196	190	386
Yes	166 (84.7)	132 (69.5)	298 (77.2)
No	30 (15.3)	58 (30.5)	88 (22.8)
Age	200	194	394
•< 30	37 (18.5)	27 (13.9)	64 (16.2)
•30-40	50 (25)	44 (22.7)	94 (23.9)
•41-50	34 (17)	31 (16.0)	65 (16.5)
•>50	79 (39.5)	92 (47.4)	171 (43.4)
Sex	193	180	373
Female	127 (65.8)	96 (53.3)	223 (59.8)
Male	66 (34.2)	84 (46.7)	150 (40.2)
Employment	194	191	385
•Full-Time	129 (66.5)	105 (55.0)	234 (60.8)
•Part-Time	11 (5.7)	24 (12.6)	35 (9.1)
•Unemployed	15 (7.7)	16 (8.4)	31 (8.1)
•Retired	39 (20.1)	46 (24.1)	85 (22.1)
Military Service	176	179	355
•No Military Service	131 (74.4)	141 (78.8)	272 (70.6)
•Prior Service (Veteran)	39 (22.2)	33 (18.4)	72 (20.3)
•Current Active Duty	4 (2.3)	4 (2.2)	8 (2.3)
•Current Guard/Reserve	2 (1.1)	1 (0.6)	3 (0.8)
Housing Type	193	183	376
•Single Family	178 (92.2)	167 (91.3)	345 (91.8)
•Apart/Condo	11 (5.7)	13 (7.1)	24 (6.4)
•Other	4 (2.1)	3 (1.6)	7 (1.9)
Perception of Good Schools	196	192	388
Yes	168 (85.7)	145 (75.5)	313 (80.7)
No	28 (14.3)	47 (24.5)	75 (19.3)
Perception of Good Transit	188	195	383
Yes	91 (48.4)	104 (53.3)	195 (50.9)
No	97 (51.6)	91 (46.7)	188 (49.1)

Appendix E.

Aim 1 Odds Ratio (95% Confidence Intervals) of Occupation Skill Level

	Non-adjusted	**Minimally Adjusted**	**Adjusted Model**
Low Skill (*ref: High*)	1.6 (0.98 , 2.7)*	1.74 (1.02 , 2.99)**	1.7 (0.92, 2.98)*
Male (*ref: Female*)		0.78 (0.45 , 1.35)	0.74 (0.4, 1.4)
Children or teens living in or visiting the home (*ref: no children in home)*			1.1 (0.59, 2.06)
Military service (*ref: no prior service)* • Prior Service (vet) • Current active duty • Current guard/reservist			 0.79 (0.37, 1.7) 0.53 (0.06, 4.7) 0.53 (0.02, 13.96)

*= p-value <0.1 **= p-value <0.05

Aim 2 Odds Ratio (95% Confidence Intervals) of First Responder Status

	Non-adjusted	**Minimally Adjusted**	**Adjusted Model**
First Responder (ref: other)	0.88 (0.34, 2.43)	0.66 (0.24, 1.88)	0.73 (0.25, 2.22)
Male (*ref: Female*)		0.7 (0.43, 1.13)	0.63 (0.37, 1.08)*
Children or teens living in or visiting the home (*ref: No children in home)*			1.32 (0.76, 2.3)
Military service (*ref: no prior service*) • Prior Service (vet) • Current active duty • Current guard/reservist			 0.74 (0.38, 1.47) 0.40 (0.09, 1.81) 0.88 (0.08, 19.5)

*=p-value <0.1

Aim 3 Odds Ratio (95% Confidence Interval) of Neighborhood Safety

	Non-adjusted	**Minimally Adjusted**	**Adjusted Model**
Safe (*ref: Not Safe*)	0.97 (0.58, 1.59)	0.95 (0.56, 1.58)	0.89 (0.50, 1.55)
Male (ref: Female)		0.82 (0.53, 1.26)	0.68 (0.41, 1.12)
Children or teens living in or visiting the home (*ref: No children in home)*			1.18 (0.70, 1.97)
Military service (*ref: no prior service*) • Prior Service (vet) • Current active duty • Current guard/reservist			 0.59 (0.33, 1.07) 0.41 (0.09, 1.81) 0.91 (0.08, 19.9)

References:

1. Centers for Disease Control and Prevention. “Suicide Mortality in the United States, 1999–2017”, NCHS Data Brief No. 330, November 2018

2. Centers for Disease Control and Prevention, Web-based Injury Statistics Query and Reporting System (WISQARS). “Fatal and Non-Fatal Injury Reports,” https://www.cdc.gov/injury/wisqars.

3. Anglemyer, Horvath, and Rutherford. “The Accessibility of Firearms and Risk for Suicide and Homicide Victimization among Household Members: A Systematic Review and Meta–analysis,” Annals of Internal Medicine 160, no. 2 (2014): 101–110.

4. Hemenway, Barber, and Miller. “Unintentional Firearm Deaths: A Comparison of Other–Inflicted and Self–Inflicted Shootings,” Accident Analysis & Prevention 42, no. 4 (2010): 1184–1188.

5. Shenassa, Rogers, Spalding, and Roberts. “Safer Storage of Firearms at Home and Risk of Suicide: A Study of Protective Factors in a Nationally Representative Sample,” The *Journal of Epidemiology & Community Health.* 58, no. 10 (2004): 841–848.

6. Grossman, Mueller, Riedy, et al. “Gun Storage Practices and Risk of Youth Suicide and Unintentional Firearm Injuries,” The Journal of the American Medical Association. 2005;293:707–14.

7. Conwell, Duberstein, Connor, et al. “Access to Firearms and Risk for Suicide in Middle-aged and Older Adults,” The American Journal of Geriatric Psychiatry. 2002;10:407–16.

8. Shenassa, Rogers, Spalding, et al. “Safer Storage of Firearms at Home and Risk of Suicide: A Study of Protective Factors in a Nationally Representative Sample,” Journal of Epidemiology and Community Health. 2004;58:841–8.

9. Kellermann, Rivara, Somes, et al. “Suicide in the Home in Relation to Gun Ownership,” The New England Journal of Medicine. 1992;327:467–72.

10. Rowhani-Rahbar, Simonetti, and Rivara. “Effectiveness of Interventions to Promote Safe Firearm Storage,” The Epidemiology Review. 2016;38:mxv006–124.

11. Tai-Seale, McGuire, and Zhang. “Time allocation in primary care office visits,” Health Services Research. 2007;42:1871–94.

12. Betz, Azrael, Barber, et al. “Public Opinion regarding Whether Speaking with Patients About Firearms is Appropriate: Results of a National Survey,” Annals of Internal Medicine. 2016;165:543–50.

13. Simonetti, Rowhani-Rahbar, King, Bennett, and Rivara. “Evaluation of a Community-based Safe Firearm and Ammunition Storage Intervention,” Injury Prevention. 2018;24:218–223. doi:10.1136/injuryprev-2016-042292

14. Hamilton, et al. “Who Owns Guns and How Do They Keep Them? The Influence of Household Characteristics on Firearms Ownership and Storage Practices in the United States,” Preventive Medicine. 2018. doi: 10.1016/j.ypmed.2018.07.013.

15. Azrael, et al. “Firearm Storage in Gun-Owning Households with Children: Results of a 2015 National Survey,” Journal of Urban Health. 2018. doi: 10.1007/s11524-018-0261-7.

16. Centers for Disease Control and Prevention, Web-based Injury Statistics Query and Reporting System (WISQARS), “Fatal Injury Reports,” https://www.cdc.gov/injury/wisqars.

17. Grinshteyn and Hemenway. “Violent Death Rates in the US Compared to Those of the Other High-Income Countries, 2015,” Preventive Medicine. 123, (2019): 20–26.

18. Wiebe. “Firearms in US Homes as a Risk Factor for Unintentional Gunshot Fatality,” Accident Analysis & Prevention. 35, no. 5 (2003): 711–716.

19. Campbell, et al. “Risk Factors for Femicide in Abusive Relationships: Results from a Multisite Case Control Study,” American Journal of Public Health. 93, no.7 (2003): 1089–1097.

20. Coyne-Beasley, Johnson, Charles, and Schoenbach. “Firearm Storage Practices of Officers in a Law Enforcement Agency in the South,” American Journal of Preventive Medicine. 2001 Aug;21(2):118-23.

21. Lok it up. “Firearm Locking Devices,” https://www.preventionlane.org/wp-content/uploads/2015/03/Firearm-Locking-Devices.pdf.

22. Azrael, et al. “The Stock and Flow of U.S. Firearms: Results from the 2015 National Firearms Survey,” The Russell Sage Foundation Journal of the Social Sciences. 2017 Oct; Vol. 3, No. 5.

23. Monuteaux, et al. “Association of Increased Safe Household Firearm Storage with Firearm Suicide and Unintentional Death Among US Youths,” The Journal of the American Medical Association Pediatrics. 173, no. 7 (2019): 657-662.

24. Fan and Sun. “Different Types of Spatial Mismatch: A U.S.-China Comparison of Poverty Concentration and Low-Skill Job Distribution,” Lincoln Institute of Land Policy Working Paper. 2012, https://www.lincolninst.edu/sites/default/files/pubfiles/2251_1588_Fan_WP13YF1.pdf