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A Tale of Two States: Texas v. California Firearm Mortality, Legislation, and Policies to Reduce
Firearm-Related Violence in the United States

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**A Tale of Two States: Texas v. California Firearm Mortality, Legislation, and
Policies to Reduce Firearm-Related Violence in the United States**

BY

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DEDICATION

I dedicate this capstone to my family and friends for their continuous support and encouragement throughout the many years that I have spent in school.

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A Tale of Two States: Texas v. California Firearm Mortality, Legislation, and Policies to Reduce
Firearm-Related Violence in the United States

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ABSTRACT:

Ninety Americans die every day due to gun violence. This violence is a public health burden resulting in thousands of injuries and deaths every year. The age-adjusted firearm mortality rate per 100,000 from 2000-2015 ranges from 10.14-11.01 and is trending up. States address gun violence differently, either by strengthening or deregulating existing firearm legislation. In Texas, the legislature passed an open carry law, enacted on January 1, 2016. Conversely, California has stricter firearm legislation and no open carry. These differences prompted the comparison of Texas and California gun laws following the methods of Kalesan et al. I reviewed the literature and evaluated firearm legislation comparing gun laws and firearm-related mortality rates. The goal was to propose evidence-based recommendations aimed at reducing gun-related mortality. There was an association between stronger gun legislation and lower firearm-related mortality. The most supported and effective legislation for reducing gun-related deaths is expanding universal background checks to private sales to keep guns away from criminals, domestic abusers, and severely mentally ill people. This paper is focusing on three impact areas to address gun violence: research, legislation, and public health campaigns. First, removing Dickey restrictions on CDC and NIH budgets to fund gun violence research. Second, legislating universal background checks to stop unauthorized people from buying guns. Finally, creating public health campaigns targeting the gun culture, social and mental health issues to address gun violence.

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List of Abbreviations

ACA	Affordable Care Act
APA	American Psychological Association
APHA	American Public Health Association
ASK	Asking Saves Kids
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
BBC	British Broadcasting Company
CDC	Centers for Disease Control and Prevention
NRA	National Rifle Association
CHL	Concealed Handgun License
CJIS	Criminal Justice Information Services
CNN	Cable News Network
FBI	Federal Bureau of Investigation
FFL	Federal Firearm Licensees
FY	Fiscal Year
GAO	Government Accountability Office
GCA	Gun Control Act
GOP	Grand Old Party
GVA	Gun Violence Archive
MADD	Mothers Against Drunk Drivers
NCICP	National Center for Injury Control and Prevention
NEJM	New England Journal of Medicine
NFA	National Firearms Act
NHTSA	National Highway Traffic Safety Administration
NICS	National Instant Criminal Background Check System
NIH	National Institutes of Health
NTN	Transaction Number
NVDRS	National Violent Death Reporting System

POC	Point of Contact States
SCOTUS	Supreme Court of the United States
TDPS	Texas Department of Public Safety
USC	United States Code
VAF	Voluntary Appeal File
VPC	Violence Policy Center
WISQRS	Web-based Injury Statistics Query and Reporting System

Chapter 1 Introduction

WHAT IS THE SOCIETAL COST OF FIREARM-RELATED VIOLENCE?

On average, ninety Americans die every day due to firearm violence. Firearm-related violence has become a major public health crisis, resulting in thousands of deaths and injuries every year. The Centers for Disease Control and Prevention (CDC) reported 13,463 homicides, 22,018 suicides, and 84,258 non-fatal firearm-related injuries of undetermined intent (CDC, 2015). The age-adjusted firearm mortality rate per 100,000 from 2000-2015 ranges from 10.14-11.01 and is trending up (WISQARS Fatal Injury Data, 2015). Gun violence is a public health burden resulting in thousands of injuries and deaths every year (CDC, 2015). Firearm-related injuries create a significant economic burden on the American taxpayer and strain on the healthcare system. In 2010, the most recent analysis by the National Injury and Violence Prevention Resource Center and the Pacific Institute for Research Evaluation estimated the cost of gun violence to be \$174 billion dollars. To put this amount in perspective, if it were compared to the 2010 annual budget of twenty U.S. governmental departments, it ranked between the levels of spending of the Department of Agriculture and the Department of Labor (Lee et al., 2014). In 2015, the cost of gun violence in the U.S. increased to \$229 billion, or an average of \$700 per gun in America. This amount included work loss, medical and mental healthcare services, and emergency room transportation, as well as police and criminal justice activities, insurance claims processing, employer costs, and decreased quality of life (APHA, 2016). This societal cost is one of the top government expenditures and includes care for both fatal and nonfatal victims of gun violence, accounting for the medical and socioeconomic domains. Figure 1 shows the twenty U.S. government departments that spend the most. The societal cost of firearm injuries ranks eighth in the budget (Lee et al., 2014).

Government Spending in Billions of Dollars in 2010

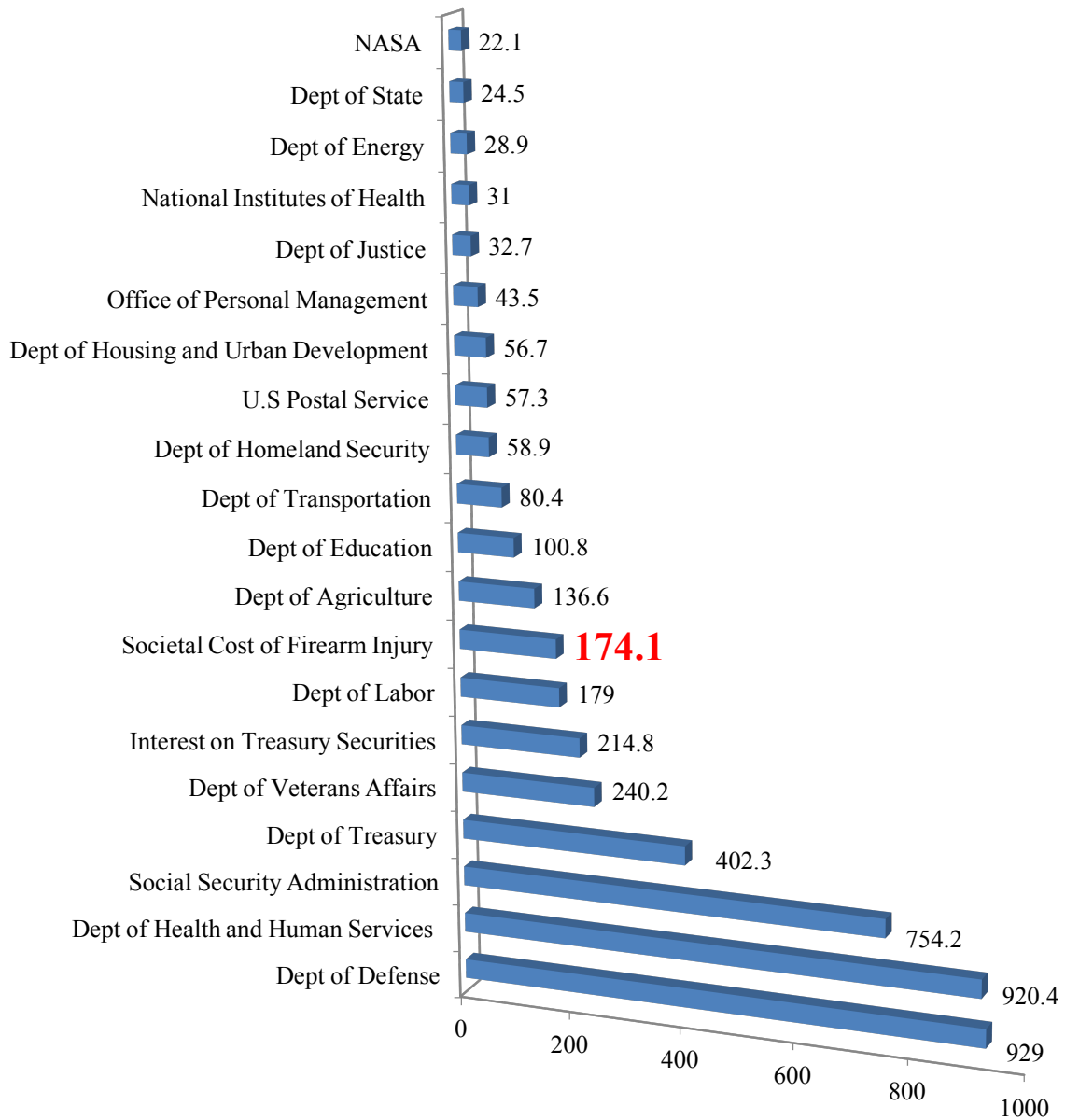


Figure 1: Rank of U.S. Government Expenditures in 2010 (Lee et al., 2014).

WHO IS STUDYING GUN VIOLENCE?

Although evidence indicates that gun violence is a major public health problem, there is limited research on firearm violence due to the federal funding freeze on gun research. This ban has lasted for over two decades, and it has been a long time concern in the public health community. This controversy can be traced back to 1993 when the New England Journal of Medicine (NEJM) published an article called “Gun Ownership as a Risk Factor for Homicide in the Home,” by Kellerman et al., which was funded by the CDC. The study asserted that having a gun at home was strongly and independently associated with an increased risk of homicide. In 1993, Kellerman et al. determined that rather than conferring protection, guns kept in the home increased the risk of homicide for a family member or intimate partner. Residents in homes with a firearm faced a 2.7-fold greater risk of homicide and a 4.8-fold greater risk of suicide. This article received substantial media attention and special interest groups like the National Rifle Association (NRA) labelled this work as anti-gun. Studies like this lead to the NRA lobbying Congress, accusing CDC researchers of promoting gun control using federal funds. Afterward, there was a concerted effort to eliminate the CDC’s National Center for Injury Control and Prevention (NCIPC) that funded the study. Despite the NCIPC surviving the scrutiny, Congress included language in the 1996 Omnibus Consolidated Appropriations Bill stating, “None of the funds available for injury prevention and control at the CDC may be used to advocate or promote gun control.” This clause in the Omnibus Bill is known as the Dickey Amendment after its author, former U.S. House Representative Jay Dickey (R-AR) (Jamieson, 2013). Jay Dickey was a Republican congressman, lifetime member of the NRA, and self-described as the “NRA point person in Congress” (Dickey, J., & Rosenberg, M., 2012). He represented Arkansas 4th congressional district in the U.S. House of Representatives from 1993 to 2000 (Dickey, J., & Rosenberg, M., 2012). During this time, the NRA spent \$41,965 in lobbying efforts for this member of Congress, along with its subsidiary the NRA Institute for Legislative Action that spent \$9,885 to target Rep. Dickey (The Center for Responsive Politics, 2017). The NRA has spent an average of \$2.4 million every year from 1998 to 2016 in lobbying efforts to members of Congress to influence legislation. In addition to targeting congressmen directly with campaign contributions, the NRA also spends an average of \$28 million dollars a year on independent political contributions to superPACS (independent-expenditure only committees) and affiliates including advertising paid for directly by the NRA to influence the general public. This massive

amount of money makes the NRA the tenth biggest spender on Capitol Hill when it comes to political influence. Figure 2 shows the lobbying power of the NRA by their annual spending of millions of dollars in direct campaign contributions to buy influence in Congress (The Center for Responsive Politics, 2017).

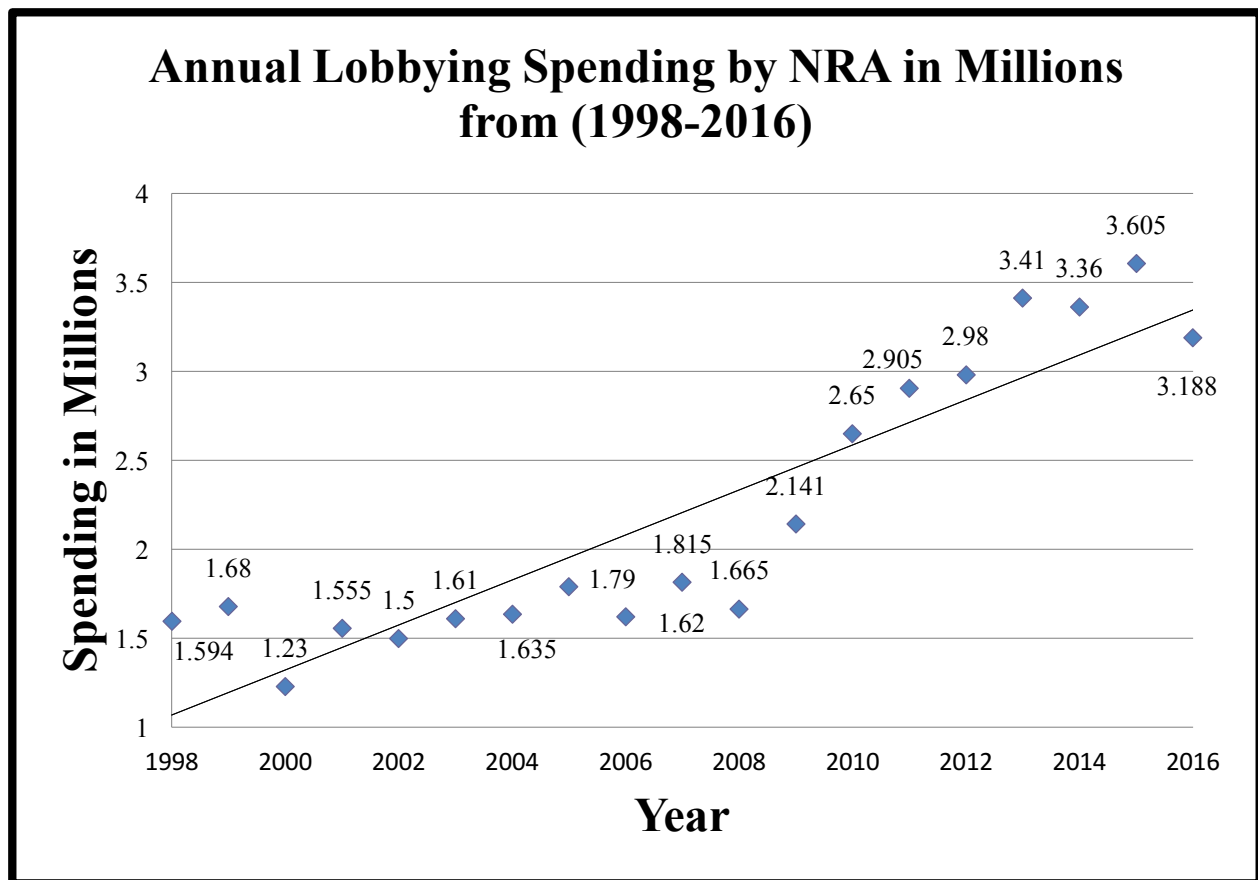


Figure 2: The Annual Lobbying Spending by the NRA from the Year 1998-2016 in Millions of Dollars in Direct Campaign Contributions to Congress (The Center for Responsive Politics, 2017).

The NRA successfully lobbied congressmen to cut the budget for the CDC by passing amendments discouraging gun research. Congressional amendments clearly state that money for research may not be used "to advocate or promote gun control." Gun researchers are strongly

warned that no funds may go to any activity designed to affect the passing of legislation that restricts or regulates firearms. The NRA has claimed credit for all of these actions, saying that federally funded research was biased against gun ownership. In 1995, the NRA executive vice president Wayne LaPierre said, "The problem that I see with what the CDC is doing is that they are not doing medicine, they're doing politics. And they shouldn't be doing politics. A gun is not a disease" (Bowers, 2013). The NRA's chief lobbyist said, "Our concern is not with legitimate medical science. Our concern is that they were promoting the idea that gun ownership was a disease that needed to be eradicated." He went on to said that they did not try to squelch genuine scientific inquiries, just politically slanted ones (Lou, 2011). Dr. Garen Wintemute, the director of the Violence Prevention Research Program at the University of California-Davis, had his CDC financing cut in 1996. He said, "For policy to be effective, it needs to be based on evidence, and the NRA and its allies in Congress have largely succeeded in choking off the development of evidence upon which that policy could be based" (Lou, 2011). Dr. Wintemute funds his research now, but that is not good enough for the NRA either, who considers privately funded gun research to be junk science with a political agenda. Simultaneously, the gun lobby and pro-gun advocates consistently work to undermine the efforts to retain data or spend any government money on gun violence research. They see these efforts to investigate gun violence as disguised, back-door attempts at instituting or facilitating gun control. On specific issues, including tobacco use, vaccines, man-made climate change, and firearms. It is safe to assume that for some people there will always be mistrust of scientific findings that challenge their convictions. Individuals who are on one side of the issue like the NRA will see that all the results that go against their interests as biased (Lou, 2011).

The Dickey amendment language of the Omnibus Bill did not ban research on gun violence outright, but Congress administratively dismantled the research program by reducing their budget. They appropriated \$2.6 million dollars from the NCIPC to study the prevention of traumatic brain injury instead of allocating that funding to study gun violence (Jamieson, 2013). One year after the Dickey amendment was introduced, in fiscal year (FY) 1997, the CDC funding for firearm injury prevention was reduced by 96% and is now just \$100,000 of the \$5.6 billion budget. In the CDC's guide for grants funded by the NCICP, there is a section called, "Prohibition on Use of CDC Funds for Certain Gun Control Activities." The CDC interprets the

Appropriations Act to mean that it cannot allocate any funds to political action or other activities that may affect the passage of specific federal, state, or local legislation intended to control or restrict the purchase or use of firearms. Figure 3 shows the diminishing budget for gun research from 1993–2012 of the National Center for Injury Prevention and Control (Mayors Against Illegal Guns, 2013).

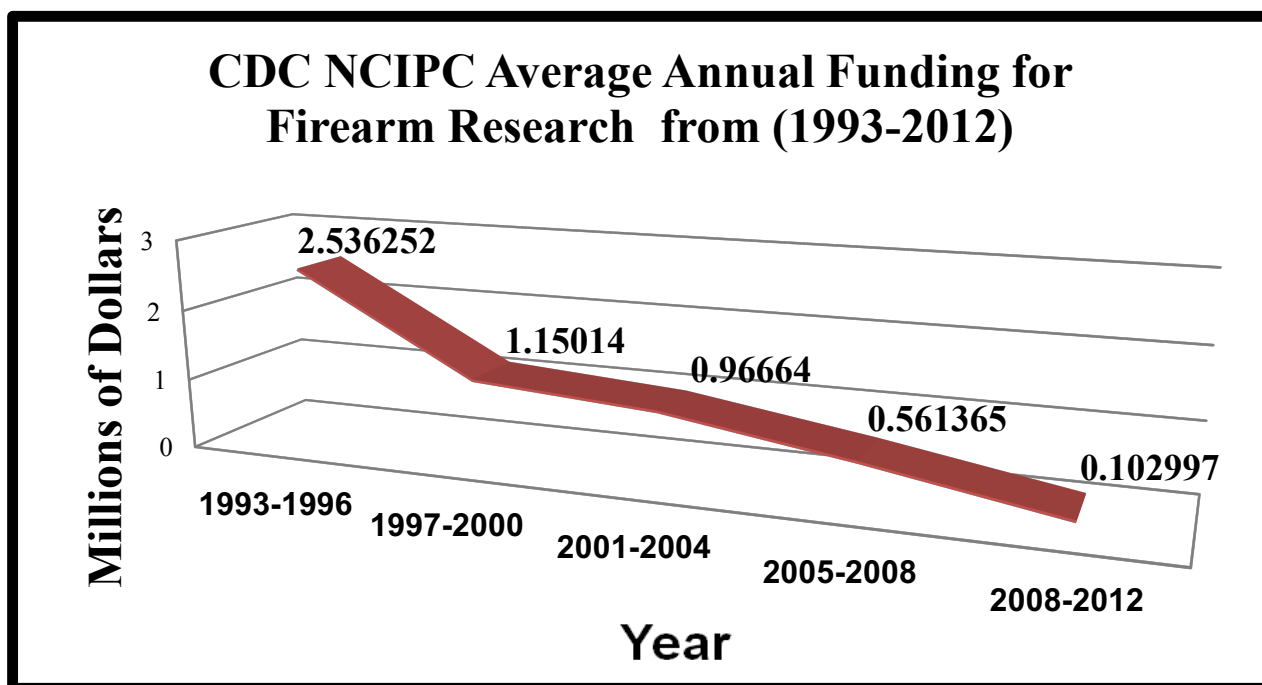


Figure 3. The CDC National Center for Injury Prevention and Control Average Annual Funding for Firearm Injury Prevention Research (Mayors Against Illegal Guns, 2013).

In 2009, the National Institutes of Health (NIH) funded firearm research through the National Institute on Alcohol Abuse and Alcoholism and the American Journal of Public Health published an article called “Investigating the Link between Gun Possession and Gun Assault” by Branas et al. which concluded that there was a positive correlation between gun possession and gun assault. The NRA and other pro-gun lobbies took action, and through their lobbying efforts, more legislation was introduced to defund gun research. In Fiscal Year 2012, Congress introduced language similar to the Dickey Amendment and extended it to all U.S. Department of Health and Human Services divisions, including the NIH. The Consolidated Appropriations Act

of 2012 stated, “None of the funds available in this title may be used to advocate or promote gun control.” The NIH and CDC scaled down its research on gun violence not because it was legally prohibited but rather because Congress cut the CDC’s budget by an amount equal to what the CDC had spent on research into gun violence and threatened to impose further cuts if firearm research continued (Jamieson, 2013). The NCICP has limited discretionary funding dedicated to gun violence research and prevention. The president’s budget requests to Congress over the last three years (FY14–FY16) included \$10 million for the CDC to conduct research into the causes and prevention of gun violence. However, those funds were not included in CDC’s appropriation even though President Obama renewed this request for the FY 2017 budget sent to Congress (The White House, 2016). President Trump's budget request for Congress for FY 2018 for the Department of Human and Health Services that gives funding to the CDC and NIH is \$69 billion, a \$15.1 billion or 17.9% decrease from the 2017 budget continuous resolution annualized level. In this budget, there were no funds in the CDC's appropriations dedicated to gun violence research (The White House, 2017).

In 2011, there was a shooting in Tucson that injured the U.S. Representative from Arizona, Gabrielle Giffords (D-AZ). Accounts of this mass shooting incident state that a man fired his gun at a congressional event (Jamieson, 2013). Representative Giffords was shot in the head, and six other people, including a nine-year-old girl, were killed. After this incident, the New York Times reported that the CDC regularly asks the researchers it funds to alert them every time they are going to publish studies that have anything to do with firearms. The CDC relays this information to the NRA as a courtesy (Luo, 2011). The CDC routinely alerts stakeholder organizations when relevant articles are released, including associations like the NRA. In response to this, the Brady Center to Prevent Gun Violence sent a letter to the Secretary of Health and Human Services. The Brady Center voiced concern that the CDC was giving the NRA a “preferred position,” and urged them not to give the NRA the opportunity to exercise undue influence over the CDC’s firearms-related research (Jamieson, 2013). In 2012, Rosenberg and former Representative Dickey coauthored a Washington Post op-ed discussing their heated sixteen-year battle. Now, they are in strong agreement that gun research could help prevent firearm injuries and deaths without encroaching on the rights of law-abiding gun owners. Jay Dickey explained, “I have regrets. I wish we had started the proper research and kept it going all this time. If we had gotten

the research going, we could have somehow found a solution to the gun violence without there being any restrictions on the second amendment. We could have used that all these years to develop the equivalent of that little small fence" (Dickey, J., & Rosenberg, M., 2012). Dickey explains that his bill was misinterpreted by members of Congress and administrators leaving researchers unable to find out the root causes of gun violence in the United States. Gun research uses the same evidence-based approach that saves millions of people from motor-vehicle accidents, HIV/AIDS and smoking (Dickey, J., & Rosenberg, M., 2012). Gun research is crucial in reducing the toll of injuries and deaths from gun violence. It is imperative that we secure adequate funding for the CDC and the NIH to conduct research and determine the causes of gun violence. In addition to this, we must implement effective legislative efforts and public health policies to reduce firearm-related mortality and morbidity (Jamieson, 2013).

DO GUN LAWS WORK TO REDUCE GUN VIOLENCE?

In 2016, Kalesan et al. conducted a study to determine if there was an independent association between different gun laws and overall firearm mortality in cases of firearm homicide and suicide deaths across the United States. It was found that some states enacted gun laws to strengthen regulations while others worked to deregulate existing federal gun control laws.

First, they constructed a cross-sectional, state-level database from 2014–2015 using firearm-related deaths in each U.S. state for 2008–2010. Then, they stratified the data by intent into categories of homicide and suicide using the CDC's Web-based Injury Statistics Query and Reporting System (WISQARS). Next, they evaluated twenty-five firearm state laws implemented in 2009, gun ownership rates (2013), firearm export rates and non-firearm homicides rates (2009), and measure unemployment rates (2010). Their primary outcome measure was the overall firearm-related mortality per 100,000 people in the U.S. in 2010. For their statistical analysis, they used the Poisson regression with robust variances, adjusted for covariates (unemployment, non-firearm homicides, firearm ownership, firearm exports, and 2009 firearm mortality), to derive incidence rate ratios (IRRs) and 95% confidence intervals (CIs) (Kalesan et al., 2016).

Kalesan et al. determined that in the United States, the average overall firearm-related mortality was 10.1 per 100,000 individuals in 2010. After reviewing twenty-five state-specific firearm laws, they found that nine laws reduced firearm mortality. Another nine laws were related to increased firearm mortality. The last seven laws had an unclear association with firearm mortality. They adjusted for covariates. The following three state laws were most strongly associated with reduced overall firearm mortality:

- (1) universal background checks for firearm purchase (IRR = 0.39, 95%, CI = 0.23–0.67)
- (2) ammunition background checks (IRR= 0.18, 95%, CI= 0.09–0.36)
- (3) identification requirement for firearms (IRR= 0.16, 95%, CI=0.09–0.29)

Federal-level enforcement of universal background checks for firearm purchases could reduce overall firearm mortality from 10.35 to 4.46 deaths per 100,000 people. Additionally, the background checks for ammunition purchases could decrease this rate further to 1.99 per 100,000 individuals. Finally, the firearm identification requirement could diminish this rate to 1.81 for every 100,000 individuals. Kalesan et al. found that there were very few existing state-specific firearm laws associated with reduced firearm mortality. In light of the evidence, it is important to focus legislative efforts on useful firearm laws (Kalesan et al., 2016).

WHAT ARE THE DIFFERENCES BETWEEN TWO STATES WITH DIFFERENT GUN LAWS LIKE CALIFORNIA AND TEXAS?

Table 1 compares the states of California and Texas. Demographically, these states are similar by sex and race/ethnicity. However, California has an estimated gun ownership of 20.1% compared to Texas at 35.7%. The number laws regulating gun ownership also vary widely between the states (23 for California versus 3 for Texas). California with more laws and lower gun ownership has a lower firearm mortality rate, 7.4 per 100,000 compared to Texas 10.7 per 100,000.

DEMOGRAPHIC PROFILE		
VARIABLE	CALIFORNIA	TEXAS
Population	39,250,017 million	27,862,596 million
Sex	Males 49.7%, Females 50.3%	Males 49.6%, Females 50.4%
Race	White alone 72.9%, Black alone 6.5%, Asian 14.7%	White alone 79.7%, Black alone 12.5%, Asian 4.7%

Ethnicity	Hispanic or Latino 38.8%	Hispanic or Latino 38.8%
Estimated Gun Ownership rate	20.1%	35.7%
Number of laws regulating firearms	23 state laws regulating firearms	3 state laws regulating firearms
Firearm death rate	7.4 per 100,000	10.7 per 100,000
Sources: U.S. Census Bureau 2016, Kalesan et al. 2015, Kalesan et al., 2016, Henry J. Kaiser Family Foundation 2017.		

Table 1: Comparing California and Texas Demographic Information.

In the 84th regular legislative session, the Texas legislature passed new laws impacting handgun licensing. House Bill 910, which was effective January 1, 2016, authorized individuals to obtain a license to carry a gun openly in places that allow the licensed carrying of a concealed handgun, with some exceptions. Unconcealed loaded or unloaded guns must be carried in a shoulder or belt holster. Also, those who hold a valid Concealed Handgun License (CHL) require no separate permit to open carry. There is no additional training required to ensure secure carrying of openly carried handguns, and permit eligibility has not changed. There are a few exceptions. For instance, a license holder cannot openly carry a holstered handgun while on the premises of a public institution of higher education or a private or independent institution of higher education. However, this exception has changed since campus carry of handguns in academic institutions took effect on August 1, 2016 (Texas Department of Public Safety, 2016).

The enactment of the open carry and campus carry legislation prompted the comparison of Texas gun control laws with a state like California, which is ranked to have much stricter gun laws. Following the methods of Kalesan et al., I reviewed and evaluated the legislation and policies of both states. I compared firearm-related incidents in Texas and California. The goal of this evaluation was to provide evidence-based recommendations that can be used to encourage political will and actions aimed at reducing gun-related injuries and death.

In the twenty years since the introduction of the Dickey Amendment in 1996, federal funding for the CDC and the NIH regarding causes of gun violence has been almost non-existent. For this reason, we chose to focus on the 1996–2016 period for comparison of differences in legislative efforts, policies, and firearm-related mortality between California and Texas, leading to this question:

IN THE STATES OF TEXAS AND CALIFORNIA, HOW HAVE FIREARM LEGISLATION AND POLICIES INFLUENCED FIREARM-RELATED MORTALITY OVER THE PAST TWENTY YEARS (1996-2016) IN THE UNITED STATES?

SPECIFIC RESEARCH AIMS:

1. Establish gun violence as a public health burden in the United States.
2. Evaluate legislative actions on gun violence and firearm laws in two states, specifically Texas and California, and compare mortality rates for each.
3. Make evidence-based recommendations on how to reduce firearm-related mortality with research, legislation, and effective public health campaigns.

Chapter 2 Background

WHO HAS THE RIGHT TO KEEP AND BEAR ARMS?

The Second Amendment to the U.S. Constitution (part of the Bill of Rights) protects the right to keep and bear arms. It reads, “A well-regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear arms, shall not be infringed.” These words were enshrined in our Constitution in 1791. The text of this amendment begs the following questions: (1) What does the second amendment protect? and (2) Does the second amendment prevent any gun regulation? This amendment has remained an ideological battleground since the Supreme Court of the United States (SCOTUS) 2008 case, *District of Columbia v. Heller*. In a 5–4 decision, SCOTUS struck down the District of Columbia’s handgun ban and firearm storage law, stating for the first time that this amendment protects a law-abiding citizen’s right to possess an operable handgun at home for self-defense. The SCOTUS decision created a profound shift in the meaning of the second amendment, which was originally intended to protect the militia’s right to keep weapons, rather than a civilian’s right. Since the *Heller* decision, courts across the United States have made decisions regarding a variety of firearm regulations and found these laws constitutional because they prevent gun deaths, injuries, and crimes in communities across America (Law Center to Prevent Gun Violence, 2016). The *Heller* decision clarified that the second amendment protects limited rights and does not protect “the right to keep and carry any weapon whatsoever in any manner whatsoever and for whatever purpose”(Law Center to Prevent Gun Violence, 2016). The Supreme Court outlined constitutionally sound regulations, including those regarding commercial sales, forbidding firearm possession by felons and the mentally ill, and as well prohibiting guns in schools and government buildings. SCOTUS also noted that the Second Amendment is consistent with banning dangerous and unusual weapons and standardizing the storage of firearms to prevent accidents (Law Center to Prevent Gun Violence, 2016).

HOW MANY HANDGUNS ARE IN THE WORLD AND THE UNITED STATES?

In 2007, a small arms survey estimated that there are at least 875 million guns worldwide owned by civilians, law enforcement, and the military. This figure does not include rifles, semiautomatic weapons, and fully automatic weapons. Civilians alone own 650 million handguns, about 75% of the known total. The United States accounts for approximately 270 million (42% of the civilian guns worldwide).

WHERE ARE THE GUNS IN THE UNITED STATES BY REGION?

In the United States, gun ownership varies by geographical region. In 2015, a study estimated that the national gun ownership rate is 29.1%. Regionally, the rate of gun ownership is different. In the Northeast, it ranges from 5.8% to 28.8%. The Midwest varies from 19.6% to 47.9%. In the West, ownership ranges from 20.1% to 61.7%, and the South varies from 5.2% to 57% in gun ownership. Figure 4 shows the regional breakdown of gun ownership rates nationwide by region (Kalesan et al., 2015).

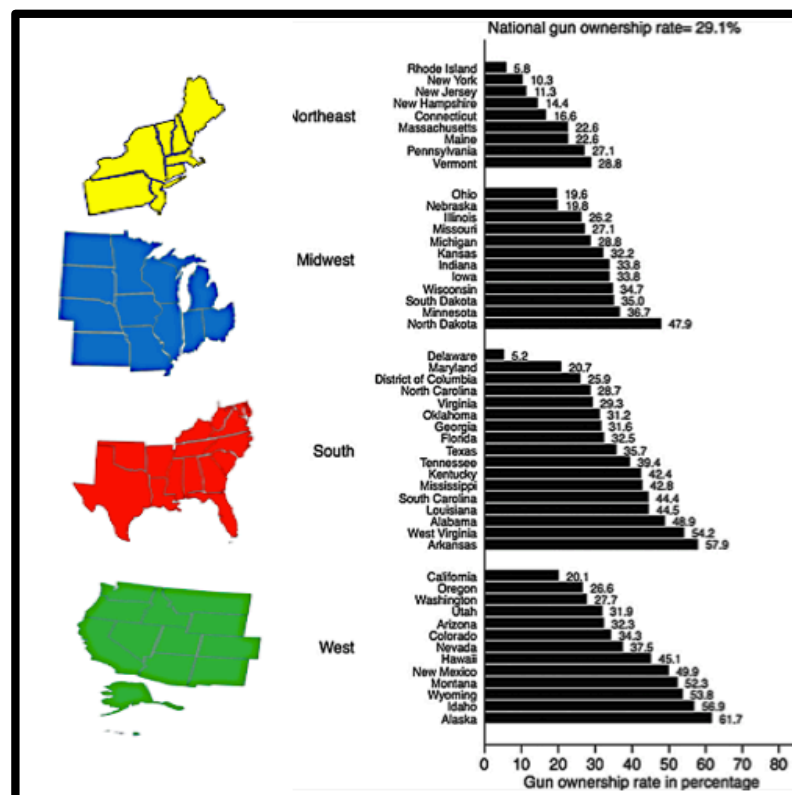


Figure 4: The National and Regional Gun Ownership Rates in America (Kalesan et al., 2015).

WHAT ARE THE DEMOGRAPHICS AND POLITICS OF GUN OWNERSHIP?

In 2014, the Pew Research Center American Trends Panel surveyed 3,243 adults, including 1,196 who disclosed that they or someone in their household owned a gun, pistol, or rifle. They conducted this study to examine the demographic and political characteristics of gun ownership in those households. They found that Americans with young children are just as likely to keep guns at home as other adults. They determined that on average one-third of Americans with children under 18 have a gun in the house. This number is about the same for childless adults or those with older kids (Morin, 2014).

The survey suggested a paradox because black people are significantly more likely than whites to be gun homicide victims. However, blacks are only one-half as likely as whites to have a gun at home (41% W vs. 19% B). Hispanic people are less likely than blacks to be gun homicide victims and one-half as likely as whites to have a gun (41% W vs. 20% H). The survey results showed the average gun ownership by region in the United States: Northeast 27%, Midwest 35%, West 34%, and South 38%. Regional differences become apparent when race factors into the analysis. White Southerners are disproportionately more likely to have a firearm in their household (47%) than other regional groups. Simultaneously, most black people live in the South, and they are only one-half as likely to have a gun at home than their white counterpart, which decreases the overall southern gun ownership rate to 38%, still the highest in the country (Morin, 2014).

The data confirm that rural residents and older adults are more likely than other Americans to own guns. In addition to this, Republicans are twice as likely as Democrats to be members of a gun-owning household. Similarly, Independents are more inclined than Democrats to have a firearm in their house. Americans who have a gun at home think of themselves as “a typical American” (72% R vs. 62% D). They view themselves as an “outdoor person” (68% R vs. 51% D) and feel that they “honor and have a duty to core values” (59% R vs. 48% D). Similarly, six out of ten firearm-owning household members (64%), say they “often feel proud to be American,” compared to 51% of the other adults who feel this way. Unsurprisingly, individuals in gun-owning households are more than twice as likely than other household individuals to identify as a “hunter, fisherman, or sportsman” (37% R vs. 16% D) (Morin, 2014).

WHAT IS THE RELATIONSHIP BETWEEN GUN OWNERSHIP AND GUN CULTURE?

In 2015, Kalesan discovered that gun ownership is sustained in the public mind by appeals to constitutionally enshrined social values “the right to keep and bear arms.” Gun advocates reinforced these values by constant appeals to the public and perceived outrage that the government is going to confiscate their weapons to limit the widespread availability of guns (Kalesan, 2015). There is a link between the high prevalence of gun ownership in the United States and the high burden of firearm-related injuries and deaths. Gun ownership and firearm use for recreational and self-defense purposes are interwoven into the American culture. Social norms are invisible behavioral cues and powerful predictors of intention and health outcomes. In many parts of the U.S., these social norms include participation in social activities that revolve around guns (like hunting). In 2016, Kalesan et al. compiled a nationally representative cohort and used surveys to assess the prevalence of gun ownership, determining whether exposure to the social gun culture increases gun ownership. They defined social gun culture with four questions that assessed if an individual's social circle would think less of him or her if he or she did not own a gun or if the subject's family would think less of him or her for not owning a gun. They also inquired whether the individual's family social life revolved around guns and if his or her social life with friends revolved around guns. They concluded that one-third of all U.S. citizens reported gun ownership, and exposure to social gun culture increased gun ownership by 2.25 fold. This link suggested that, despite the potential public health consequences of firearms injuries and mortality, social gun culture forces are likely drivers and powerful reinforcers of gun ownership. Many people justify owning weapons for the protection of their family and property but are unaware of the social pressure that drives them to purchase a firearm (Kalesan et al., 2016).

DO WE NEED GUNS FOR SELF-DEFENSE?

A mass shooting is defined as four or more people shot or killed in a single incident at the same time and location, not including the shooter. Mass shootings continue to break records. From 2014-2016 there were 992 mass shooting incidents (Gun Violence Archive, 2016). On the morning of Friday, December 14, 2012, twenty-seven people died when a gunman went to an elementary school and shot twenty children and six teachers using his mother's shotgun. The

event at Sandy Hook was the deadliest elementary school shooting in American history (Fowler et al., 2015). Another tragedy occurred in the early morning of Sunday, June 12, 2016. In this massacre, forty-nine people were gunned down, and fifty-three people were injured when a man opened fire in a gay nightclub in Orlando, Florida, using a 223 Remington AR-15 assault-type rifle and a 9 mm handgun. This horrific event was the worst mass shooting in United States history (Stack, 2016). These tragic stories have become routine in the American news media.

Besides, increases in mass shootings incidents, the firearm age-adjusted mortality rate has been increasing steadily over the past fifteen years. Figure 5 shows the firearm age-adjusted mortality rate per 100,000 individuals from 2000-2015 from all races including people of Hispanic origin, all sexes, and all age groups. The selected standardizing year for age-adjusting was the year 2000. This graph shows the firearm mortality rate trending up (WISQARS Fatal Injury Data, 2015).

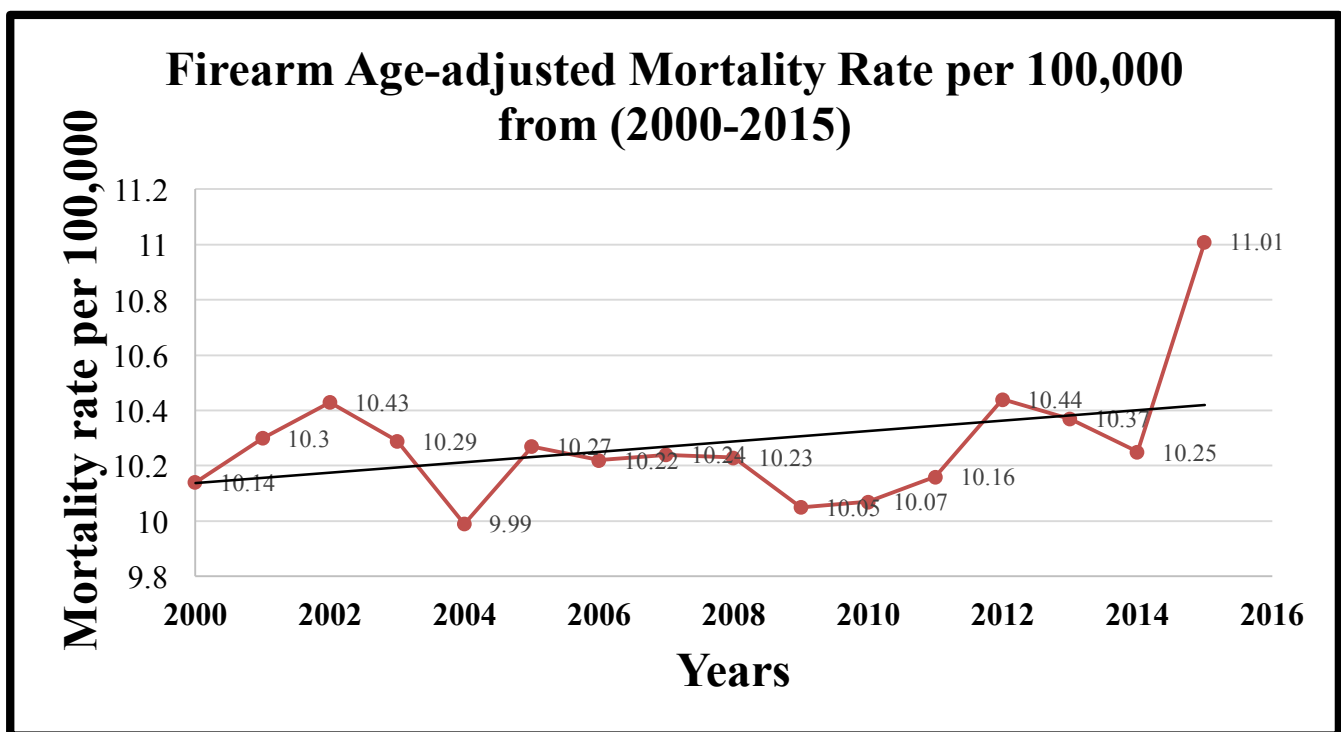


Figure 5. Firearm Age-adjusted Mortality Rate per 100,000 from the Years 2000-2015 (WISQARS Fatal Injury Data, 2015).

Gun right advocates argue that handguns are needed for self-defense and to defend their family. They argue that armed persons can prevent mass shootings or at least minimize the loss of lives. However, using data from the National Crime Victimization Surveys, researchers found self-defense use is extremely rare. Victims used a gun to protect themselves in less than 1% of crimes in which they were involved. The national crime surveys showed no substantial evidence that having a gun for protection was useful in reducing the likelihood of injury. Also, the data did not show that having a gun was more beneficial than having any other weapon (e.g., a knife, bat, or wrench) in reducing the probability of loss of property (Hemenway et al., 2015). In addition to this, gun possession in adults was associated with a higher risk of being shot in an assault. Guns on average did not protect those who possess them from being shot in an assault. There are a few reasons why this seems to be the case. First, a firearm can falsely empower the possessor to overreact leading to the escalation of the incident and losing a tractable conflict with another person that is also armed. Second, gun owners may increase their risk of gun assault by entering dangerous environments that they would have typically avoided if they were not armed. Third, gun owners may bring a firearm into an otherwise gun-free conflict only to have the gun taken away by the aggressor and turned on them (Branas et al., 2009). It is important to understand that the social gun culture can contribute to the prevailing social values because of its co-occurrence with gun ownership. This pairing of gun culture and gun ownership suggests that public health professionals must consider gun culture an area that requires active intervention to decrease gun violence and develop effective prevention policies to reduce firearm-related mortality (Kalesan, 2015).

WHAT ARE THE TRENDS OF GUN-RELATED VIOLENCE?

In an average week, 645 people die due to intentional and accidental gun violence, and 1,565 people are treated in an emergency room for a firearm-related injury. The violent acts include unintentional injuries, homicide, suicide, legal intervention by law enforcement in the line of duty, and firearm-related injuries of undetermined intent. Firearm-related injuries are extremely lethal. They make up 7.1% of premature death or years of potential life lost before the age of 65. Firearm homicide is the second cause of injury among people ten to twenty-four years old. After drug overdoses and motor vehicle crashes, gun suicide is the third leading cause of death for

people age thirty-five and older. In the United States, a firearm injury is one of the five leading causes of death for people ages one to sixty-four, and all of these untimely deaths are preventable (Fowler et al., 2015).

Fatal and nonfatal firearm injury rates do not follow an equal distribution in the population. Disproportionately, males carry most of the burden of gun mortality, accounting for 86% of all victims of gun deaths. From 2010-2012, the annual rate of firearm death for males was 6.5 times higher than the rate for females (18.1M versus 2.8F per 100,000). At the same time, the firearm suicide rate of males to females was 7:1. In addition to that, the firearm homicide rate was about 5:1, male to female. The rate of unintentional firearm deaths was 6:1, male to female. These alarming figures indicate that firearm injury is overwhelmingly a male problem, accounting for 86% of the fatalities. Following these trends, young adults between the ages twenty-five and thirty-four had the highest rate of firearm injury (15.1 per 100,000) of all age groups, followed by ages fifteen to twenty-four. Children under fifteen years old had the lowest fatal firearm injury rate (0.6 per 100,000). However, these trends hide a significant pattern of intent. As age increased, the rate of suicide increased. The highest annual rate of firearm suicide was among people aged 65 years and older (10.9 per 100,000). The highest firearm homicide rates were among adolescents and young adults and tended to decrease with age. Regarding race and ethnicity, non-Hispanic blacks had the highest rate of firearm mortality overall (18.1 per 100,000). This discrepancy was due to differences between racial and ethnic groups in gun homicide, which was 10.3 times higher than the rate for non-Hispanic whites (1.4 per 100,000) (Fowler et al., 2015).

The distribution of firearm mortality in age and gender of the victims of fatal and nonfatal firearm injuries varies by region in the United States. From 2010 through 2012, nearly 50% of all firearm deaths occurred in the South, for an overall annual rate (12.6 per 100,000). After the South, the rate of firearm suicide was greater in the West compared to other areas at (7.6 per 100,000). The Midwest had a rate of (6.9 per 100,000), and the Northeast had the lowest percentage of 11% of all firearm deaths, a rate of (6.4 per 100,000). The classification by intent of the annual rate of firearm deaths was as follows for homicide (4.5 per 100,000), for gun suicide (8.8 per 100,000), and for unintentional firearm death (0.3 per 100,000). Each of these

intention rates was higher in the South than in other regions of the United States. Therefore, the largest burden of gun violence occurs in the Southern area of the U.S. (Fowler et al., 2015).

In summary, gun violence affects people of all age groups and races in the U.S., but it has a disproportionate impact on young males, who carry most of the burden of gun violence constituting approximately 86% of all victims of gun deaths, especially in racial and ethnic minorities. Blacks and Hispanics have higher gun homicide rates compared to Whites. The intent in gun violence varies by age, but fatal firearm injury occurs in all age groups and ranks among the top ten causes of death from infancy to sixty-five-plus years of age. The majority of gun violence takes place in the Southern region of the United States (Fowler et al., 2015). This information is not surprising because the South has the most guns per geographical location (about 38%) (Morin, 2014). Figure 6 shows a summary of the leading causes of death across all age groups (CDC, 2016).

10 Leading Causes of Death by Age Group, United States - 2014

Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 4,746	Unintentional Injury 1,216	Unintentional Injury 730	Unintentional Injury 750	Unintentional Injury 11,836	Unintentional Injury 17,357	Unintentional Injury 16,048	Malignant Neoplasms 44,834	Malignant Neoplasms 115,282	Heart Disease 489,722	Heart Disease 614,348
2	Short Gestation 4,173	Congenital Anomalies 399	Malignant Neoplasms 436	Suicide 425	Suicide 5,079	Suicide 6,569	Malignant Neoplasms 11,267	Heart Disease 34,791	Heart Disease 74,473	Malignant Neoplasms 413,885	Malignant Neoplasms 591,699
3	Maternal Pregnancy Comp. 1,574	Homicide 364	Congenital Anomalies 192	Malignant Neoplasms 416	Homicide 4,144	Homicide 4,159	Heart Disease 10,368	Unintentional Injury 20,610	Unintentional Injury 18,030	Chronic Low. Respiratory Disease 124,693	Chronic Low. Respiratory Disease 147,101
4	SIDS 1,545	Malignant Neoplasms 321	Homicide 123	Congenital Anomalies 156	Malignant Neoplasms 1,569	Malignant Neoplasms 3,624	Suicide 6,706	Suicide 8,767	Chronic Low. Respiratory Disease 16,492	Cerebro-vascular 113,308	Unintentional Injury 136,053
5	Unintentional Injury 1,161	Heart Disease 149	Heart Disease 69	Homicide 156	Heart Disease 953	Heart Disease 3,341	Homicide 2,588	Liver Disease 8,627	Diabetes Mellitus 13,342	Alzheimer's Disease 92,604	Cerebro-vascular 133,103
6	Placenta Cord. Membranes 965	Influenza & Pneumonia 109	Chronic Low. Respiratory Disease 68	Heart Disease 122	Congenital Anomalies 377	Liver Disease 725	Liver Disease 2,582	Diabetes Mellitus 6,062	Liver Disease 12,792	Diabetes Mellitus 54,161	Alzheimer's Disease 93,541
7	Bacterial Sepsis 544	Chronic Low Respiratory Disease 53	Influenza & Pneumonia 57	Chronic Low Respiratory Disease 71	Influenza & Pneumonia 199	Diabetes Mellitus 709	Diabetes Mellitus 1,999	Cerebro-vascular 5,349	Cerebro-vascular 11,727	Unintentional Injury 48,295	Diabetes Mellitus 76,488
8	Respiratory Distress 460	Septicemia 53	Cerebro-vascular 45	Cerebro-vascular 43	Diabetes Mellitus 181	HIV 583	Cerebro-vascular 1,745	Chronic Low. Respiratory Disease 4,402	Suicide 7,527	Influenza & Pneumonia 44,836	Influenza & Pneumonia 55,227
9	Circulatory System Disease 444	Benign Neoplasms 38	Benign Neoplasms 36	Influenza & Pneumonia 41	Chronic Low Respiratory Disease 178	Cerebro-vascular 579	HIV 1,174	Influenza & Pneumonia 2,731	Septicemia 5,709	Nephritis 39,957	Nephritis 48,146
10	Neonatal Hemorrhage 441	Perinatal Period 38	Septicemia 33	Benign Neoplasms 38	Cerebro-vascular 177	Influenza & Pneumonia 549	Influenza & Pneumonia 1,125	Septicemia 2,514	Influenza & Pneumonia 5,390	Septicemia 29,124	Suicide 42,773

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.



Figure 3: The Ten Leading Causes of Death by Age Group, for 0-65+ Years, in 2014 (CDC, 2016)

WHAT ARE THE FEDERAL FIREARMS LAWS OF THE UNITED STATES?

Two major federal acts regulate the commerce and possession of firearms, the 1934 National Firearms Act (NFA) and the 1968 Gun Control Act (GCA). Numerous states have firearms laws that are stricter than the federal laws. For instance, states like California require permits to obtain guns and impose a waiting period for firearm transfers. However, Texas and other states have less restrictive state laws, although they cannot preempt federal law. In America, the federal law is the minimum standard. Originally, the NFA was designed to limit obtaining firearms that were especially lethal, such as machine guns and short-barreled long guns. The NFA regulates firearms but not handguns and revolvers that can be concealed on a person (e.g., pen, cane, and belt buckle guns). The NFA taxes all aspects of the manufacturing and distribution of these weapons. Also, the NFA mandates the disclosure of production and the system of distribution, from the manufacturer to the buyer (Krouse, 2012).

In 1968, in response to the murders of President John F. Kennedy, Martin Luther King, Malcolm X, and Robert F. Kennedy, President Johnson signed the Gun Control Act (GCA) (FBI, 2014). The purpose of this act was to assist federal, state, and local law enforcement in the continuous effort to reduce crime and violence. However, Congress declared that the purpose of this law was not to place unnecessary burdens on law-abiding citizens when it came to lawful acquisition, possession, or use of firearms for self-defense, target practice, trapshooting, hunting, or other legal activities. The main GCA restrictions are about the domestic commerce of handguns and ammunition. The GCA requires all manufacturers that import and sell firearms to be federally licensed. Also, the GCA prohibits the mail-order sale or interstate sale of handguns and sets limits on the people who can acquire firearms and ammunition. Additionally, the GCA restricts purchase under a specified age. It also authorizes the U.S. Attorney General to restrict the importation of non-sporting guns, and it requires gun dealers to keep records of all commercial sales. The GCA established penalties for the use of firearms in federal drug trafficking offenses or violent crimes (Krouse, 2012).

After the assassination attempt of President Reagan and seven years of extensive public debate, Congress passed the Brady Handgun Violence Prevention Act as an amendment to the Gun Control Act (Krouse, 2012). In 1993, Bill Clinton signed the Brady Handgun Violence

Prevention Act, named after James Brady, who suffered an almost fatal head injury during the attempted murder of Reagan. The Brady Law requires federal firearms licensees (FFLs) to obtain a background check on anyone wanting to buy a gun. FFLs are licensed gun dealers who can manufacture, import, and sell firearms. They can also ship, receive, and transport firearms for interstate or foreign commerce (FBI, 2014). In 1994, The Public Safety and Recreational Firearms Use Protection Act banned assault weapons. This law banned the manufacture, sale, transfer and possession of specific semiautomatic weapons and large-capacity ammunition magazines. Semiautomatic weapons can fire bullets each time the trigger is squeezed loading the next round after each shot leading to mass casualties and are usually used only in military combat. The semiautomatic weapons that were already in possession at the time that this law was enacted were grandfathered. This law expired in 2004, and no attempts at the federal level have been made to renew it (Santaella-Tenorio et al., 2016). In 1998, under the Brady Act permanent provisions, the U.S. Attorney General was required to institute the National Instant Criminal Background Check System (NICS). FFLs contact NICS by phone or other electronic means. NICS databases have information provided by local, state, tribal, and federal agencies to people prohibited from purchasing firearms under federal or state law. The NICS matches the subject of the background check with a potential state or federal prohibition record containing a similar name or similar descriptive features, including name, date of birth, place of birth, race, sex, the state of residence, social security number, height, and weight. They immediately provide information about whether or not transferring a firearm would be a violation of Section 922 (g) or (n) or (d) of Title 18, United States Code, or of a state law (FBI, 2014).

WHO CANNOT GET A FIREARM?

The Gun Control Act (GCA), 18 U.S.C. Section 922(g), makes it illegal for certain people to transport, ship, receive or possess any firearm or ammunition. Table 2 summarizes the U.S. code that describes the prohibitions to possess a firearm (ATF, 2016).

SUMMARY OF THE GUN CONTROL ACT PROVISIONS	
UNITED STATES CODE	DESCRIPTION OF PROHIBITIONS
18 U.S.C. §922 (g) (1)	A person convicted in any court of a crime punishable by incarceration for a term exceeding one year
18 U.S.C. §922 (g) (2)	An individual who is a fugitive from justice
18 U.S.C. §922 (g) (3)	A person who unlawfully uses or who is addicted to a controlled substance
18 U.S.C. §922 (g) (4)	An individual adjudicated as mentally defective or a person committed to any mental institution
18 U.S.C. §922 (g) (5)	A person who is an illegal alien
18 U.S.C. §922 (g) (6)	Someone who was dishonorably discharged from the Armed Forces
18 U.S.C. §922 (g) (7)	A person who renounced his or her United States citizenship
18 U.S.C. §922 (g) (8)	An individual who has had a restraining order from the court for threatening, harassing, or stalking an intimate partner or the child of the intimate partner
18 U.S.C. §922 (g) (9)	A person convicted of a misdemeanor crime of domestic violence
18 U.S.C. §922 (n)	An individual currently under indictment for a crime punishable by imprisonment for a term exceeding one year
18 U.S.C. § 922 (d)	A person who sells or disposes of firearms or ammunition to an individual prohibited from transporting, shipping, receiving, or possessing firearms or ammunition
SOURCES: The United State Code 18 section 922, ATF 2016	

Table 2: Summary of the Gun Control Act Prohibitions (ATF, 2016)

HOW DOES THE BACKGROUND SYSTEM WORK AND HOW FAST CAN I GET THE RESULTS?

NICS is a national system that runs through all the available records on an individual requesting the transfer of a firearm to determine if that person is not authorized to purchase firearms. The Federal Bureau of Investigation (FBI) designed NICS in conjunction with the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) and collaborated with local and state law enforcement agencies. The NICS computerized background check system responds instantly to most background check inquiries from FFLs. All NICS and NICS E-Check answered call requests in a matter of seconds providing a quick response to all requests (FBI, 2014).

WHO RUNS THE BACKGROUND CHECKS?

Under the law, each state has to make the decision to act as a liaison for NICS. States whose governments host NICS are called point of contact (POC) states. If a state is a POC, the background check is done in that state (this is the case for California). If the state is not a POC (as for Texas) the FFL has to contact the FBI to initiate background checks on individuals possessing or receiving guns. NICS is under the jurisdiction of the FBI's Criminal Justice Information Services (CJIS) Division in Clarksburg, West Virginia. The NICS Section runs the background checks for FFLs in states that have refused to serve as POC liaisons for NICS. FFLs in these non-POC states contact NICS by phone, through contracted call centers, or by NICS E-Check online. Figure 7 shows a U.S. map with the point of contact status of each state in the union (FBI, 2014).

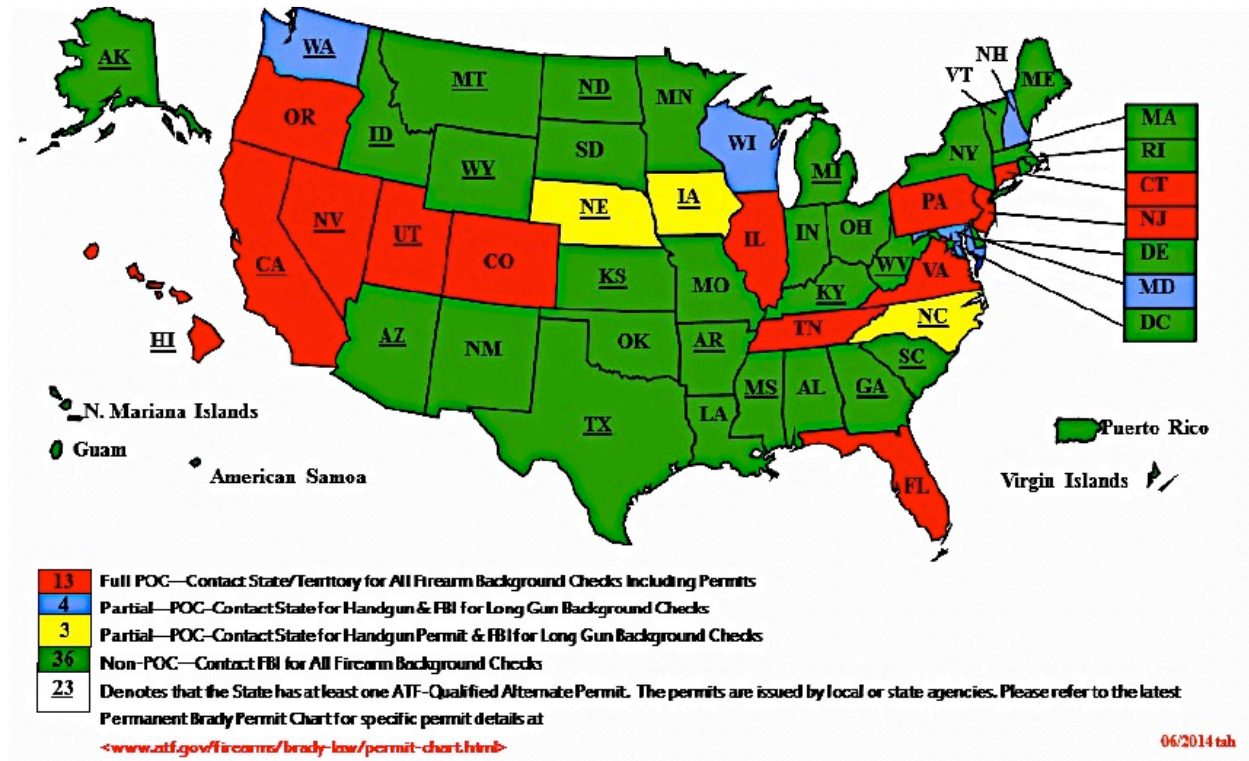


Figure 7: Map of the United States Showing the National Instant Criminal Background Check System (NICS) Point of Contact (POC) Status in each State (FBI, 2014).

WHAT DO THE FEDERALLY LICENSED GUN DEALERS HAVE TO DO TO SELL A FIREARM?

FFLs have three methods of doing business and conducting the background check. First, in POC states, the state carries out the NICS check and determines whether or not the firearm transfer violates state or federal law. Second, non-POC states send all background check requests to the NICS Section in West Virginia. The FBI runs the background check and determines whether or not the firearm transfer violates state or federal law. Third, in states with partial-POC status, (for example, Wisconsin) where the state government has agreed to serve as POC for a handgun, but not long gun purchases. FFLs contact the state to carry out background checks for handguns, and for long gun purchases, FFLs communicate with the NICS Section in West Virginia. To run the background check, the FFLs provide descriptive information requested on ATF Form 4473. By law, the ATF form must be completed and signed for every prospective gun transfer. NICS sends

a response to FFL to proceed with or delay the transfer based on the results of the background check. If NICS finds no matching records in any of the databases, the transaction proceeds automatically. If NICS returns a match on the person from the databases, the transaction is delayed. While the FFL is on the phone, the call is transferred to the NICS Section in Clarksburg, West Virginia. Then, there is a quick review and evaluation by an NICS examiner. If NICS returns a valid match to the descriptive information of the person, the NICS examiners review the information to determine if any state or federal firearm prohibition criteria exist. If the information matched by NICS is not valid or if no prohibitions exist, the NICS examiner tells the FFL to proceed with the firearm transaction. Then, the FFL must record the NICS transaction number on the ATF Form 4473 and retain the record. On the other hand, if the NICS examiner determines that the prohibitive criteria exist, the NICS examiner tells the FFL to deny the firearm transaction. In the few cases in which there is not enough available information to determine if restrictive criteria exist, the NICS examiner tells the FFL to delay the firearm transaction. NICS gives the FFL the NICS transaction number and indicates that if the FFL does not receive a final response from NICS, the Brady Law does not prohibit the transfer after a set date. The NICS examiner provides the FFL with the date and time. After three business days have elapsed, if the FFL has not received a final determination from NICS, it is up to the FFL whether or not to transfer the firearm, if state law permits it. If the FFL decides to proceed with the transaction, then the FFL must mark on ATF Form 4473 that NICS provided no resolution after three business days. In the case of a delayed transaction in which the NICS examiner does extensive research on the prohibition criteria and determines the final status within three business days, the FFL is given a proceed or deny transaction decision regarding the firearm purchase. States that choose to be POC are liaisons for NICS. These states use their local or state laws and their enforcement agency services to run background checks for the FFL instead of the NICS Section in West Virginia. The local and state agencies perform the background checks more quickly and make decisions about whether or not a person can possess a firearm. They notify the FFL about whether to proceed with or deny the firearm transaction (FBI, 2014).

In addition to the NICS section and call centers, there is the NICS E-Check function that allows FFLs to start an unassisted NICS background check immediately using the Internet. The NICS Section monitors NICS E-Check security 24/7 for misuse or unauthorized access, and it denies

access to any person who does not have identification that is known to the system. If NICS E-Check finds no matching records of the person in all the databases, then the transaction proceeds automatically. If some prohibitive criteria exist that might disqualify a person, the NICS examiner delays the purchase and provides the date the requestor can transfer the gun if there is no resolution to the background check. In the meantime, the NICS examiner starts a comprehensive search for prohibitive criteria. Once NICS completes the search, the final status request goes to a proceed or deny decision. If the transaction is denied within three business days, the FFL is contacted by phone with the final status. Appendix A shows the algorithm of the NICS process to obtain a firearm (FBI, 2014).

WHO HAS ACCESS TO THE NICS DATABASE?

NICS databases are federal information. The FBI restricts access to this information to authorized agencies. The Bureau takes extensive measures to maintain the security and integrity of NICS. Under federal law, all background checks information and transactions that proceed must be destroyed. People denied a firearm purchase could request NICS or the state to provide reasons for the transaction denial. To appeal the decision, they must provide their NICS transaction number (NTN) or state transaction number (STN). If a person is experiencing extended delays or erroneous denials, they can place a voluntary appeal file (VAF) authorizing the NICS Section to retain their information; the appellant then needs to provide the necessary information to NICS to overturn the decision. Also, a complete NICS check is required for future purchases and will result in a denial if the prohibitive information is discovered. Figure 8 shows the breakdown of federal denials by prohibitive criteria from 1998 to 2014 (FBI, 2014).

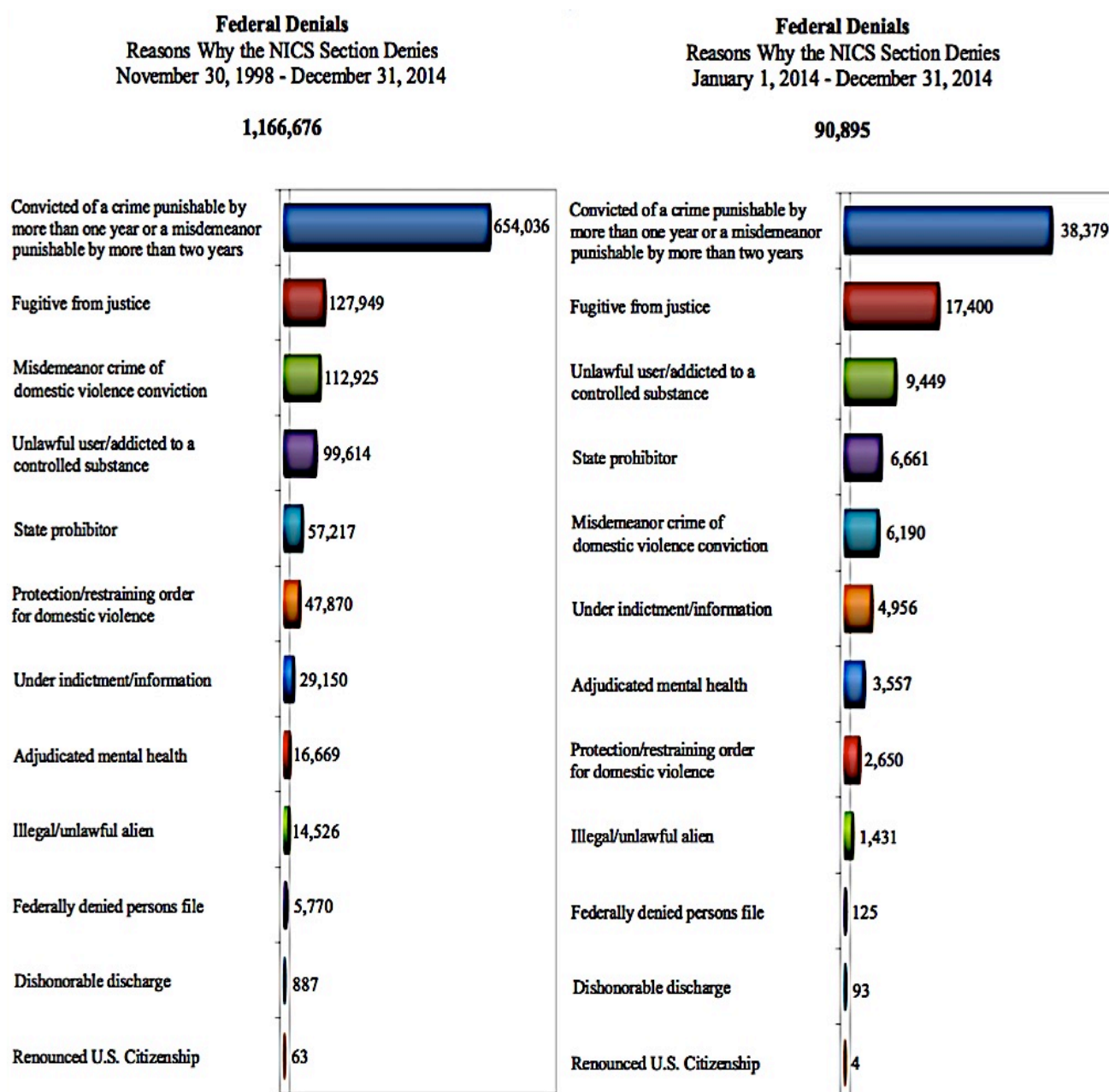


Figure 4: Bar Graph shows the Reason Why the NICS Section Issued Federal Denials by Prohibitive Criteria from 1998 to 2014 (FBI, 2014).

Chapter 3 Methods

I reviewed the literature in search of peer-reviewed articles published between 1996 and 2016 using the Medline database and PubMed search engine. I identified the relevant literature based on the research question and specific aims. In addition to this, I used government reports, state and local guides, and tools such as state scorecard reports, center reports, and other reputable websites and news media listed below. I took this approach because laws are enacted and implemented in social contexts and cannot always be controlled by the researchers in experimental or observational studies. I obtained the evidence of the consequences of the laws from observational studies that were cross-sectional or longitudinal. These types of studies have limitations such as confounding, the ambiguity of temporal sequence, and the variation in the laws and enforcement across states. Therefore, I relied on government reports and non-profit organization studies and scorecards like the Brady Campaign as an alternative when it was not feasible to use randomized control trials for policy interventions.

I chose to focus on the 1996–2016 post-Dickey era and compare differences in legislative efforts, policies, and firearm-related mortality between California and Texas. Similar to Kalesan et al., our outcome of interest was mortality. The inclusion criteria included systematic review studies, randomized controlled trials, observational ecological studies cross-sectional or longitudinal, comparative studies and other studies examining the association between firearms laws and firearm-related mortality (unintentional injuries, homicide, and suicide).

I searched PubMed to capture evidence from studies in diverse fields including government reports, from social, medical, political and criminology sciences. The search was conducted in the English language with a publication date from 01/01/1996 to 12/31/2016. I used keywords and medical subject heading terms for the searches that included a combination of the following:

1. Firearms or guns
2. Legislation (laws, jurisprudence, legislation as a topic, legislation in nursing or medical)
3. Mortality (cause of death, death or sudden death, unintentional death, homicide or suicide).

I excluded studies that did not include information about firearm legislation and firearm-related mortality in the United States. I used the search query below and found a total of 106 articles based on the research question and aims with filters and limits. From these 106 articles, 64 were included, and 42 were excluded based on the criteria. Figure 9 shows a diagram of the literature search and the process of selecting the studies.

Medline (PubMed) Search Query

Search (((("Legislation"[Publication Type] OR "Legislation as Topic"[Mesh] OR "Legislation, Nursing"[Mesh] OR "Legislation, Medical"[Mesh] OR "Legislation, Hospital"[Mesh] OR "legislation and jurisprudence"[Subheading] OR legislation OR laws))) AND (((("Cause of Death"[Mesh]) OR "Death, Sudden"[Mesh]) OR (((("Death"[Mesh]) OR "Mortality"[Mesh]) OR (mortality OR death OR suicide)))) AND ((("Firearms"[Mesh] OR gun OR firearm)) Filters: Systematic Reviews; Review; Research Support, U.S. Government; Research Support, U.S. Gov't, P.H.S.; Research Support, U.S. Gov't, Non-P.H.S.; Research Support, Non-U.S. Gov't; Research Support, N.I.H., Intramural; Research Support, N.I.H., Extramural; Randomized Controlled Trial; Research Support, American Recovery and Reinvestment Act; Legislation; Legal Cases; Government Publications; Controlled Clinical Trial; Consensus Development Conference, NIH; Consensus Development Conference; Congresses; Comparative Study; Clinical Trial, Phase IV; Clinical Trial, Phase III; Clinical Trial, Phase II; Clinical Trial, Phase I; Clinical Trial; Clinical Study; Publication date from 1996/01/01 to 2016/12/31; English.

Filters Activated

Systematic Reviews, Review, Research Support, U.S. Government, Research Support, U.S. Gov't, P.H.S., Research Support, U.S. Gov't, Non-P.H.S., Research Support, Non-U.S. Gov't, Research Support, N.I.H., Intramural, Research Support, N.I.H., Extramural, Randomized Controlled Trial, Research Support, American Recovery and Reinvestment Act, Legislation, Legal Cases, Government Publications, Controlled Clinical Trial, Consensus Development Conference, NIH, Consensus Development Conference, Congresses, Comparative Study, Clinical Trial, Phase IV, Clinical Trial, Phase III, Clinical Trial, Phase II, Clinical Trial, Phase I, Clinical Trial, Clinical Study.

Limits

- Publication Date from 01/01/1996 to 12/31/2016
- English

Total articles found by search query

106 based on research question with filters and limits

Articles excluded

42 articles

Exclusion criteria

- Articles that did not include information about the United States firearm-related mortality.
- Articles that did not include information about firearm legislation in the United States.

Articles included

64 articles

Organizational websites reviewed using Google search engine

- American Psychological Association (APA)
- American Public Health Association (APHA)
- Brady Campaign to Prevent Gun Violence
- British Broadcasting Company (BBC)
- Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)
- Cable News Network (CNN)
- Centers for Disease Control and Prevention (CDC)
- Federal Bureau of Investigations (FBI)
- Gun Violence Archive (GVA)
- Harvard Injury Control Research Center

- Law Center to Prevent Gun Violence
- National Gun Violence Research Center
- National Instant Criminal Background Check System (NICS)
- NBC News
- New York Times
- NRA Institute of Legislative Action (NRA-ILA)
- Pew Research Center
- PolitiFact
- Small Arms Survey
- Texas Department of Public Safety (TDPS)
- The Violence Policy Center (VPC)
- The Washington Post

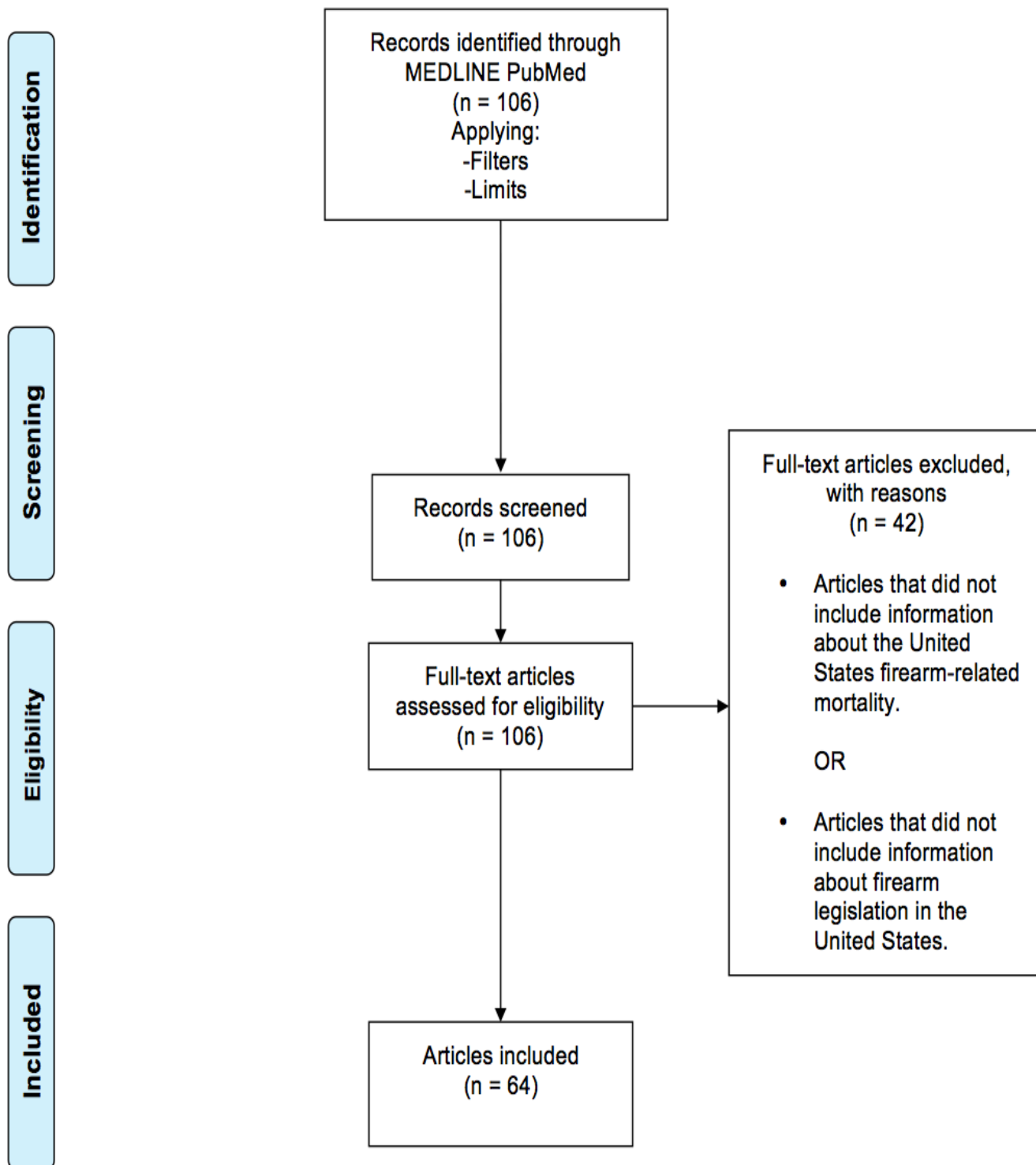


Figure 9: Diagram of Literature Search Query and Data Extraction.

Chapter 4 Results

Based on the literature results, I found sixty-four articles that examined gun legislation and firearm-related mortality in the United States. Also, I used information from the FBI, NRA Institute for Legislative Action, the ATF, the Law Center to Prevent Gun Violence, and the Brady Campaign to Prevent Gun Violence to outline and evaluate the laws related to gun violence.

WHAT ARE THE FIREARM LAWS AT THE STATE LEVEL IN CALIFORNIA AND TEXAS?

SUMMARY OF FIREARMS LAWS AT THE STATE LEVEL		
FIREARM LAWS	CALIFORNIA	TEXAS
Permit to Purchase	Rifles and Shotguns- YES Handguns- YES (Since Jan 2015 a firearm safety certificate is required for purchase)	Rifles and Shotguns- NO Handguns- NO
Registration of Firearms	Rifles and Shotguns- YES Handguns- YES (Department of Justice keeps record of all purchases from dealers. Residents moving into California have 60 days to register weapons)	Rifles and Shotguns- NO Handguns- NO
Permit to Possess Registered Assault Weapons	Rifles and Shotguns- NO Handguns- NO	Rifles and Shotguns- YES Handguns- YES
Licensing of Owner	Rifles and Shotguns- NO Handguns- NO	Rifles and Shotguns- NO Handguns- NO
Permit to Carry	Rifles and Shotguns- NO Handguns- YES (only in certain areas and must be concealed)	Rifles and Shotguns- NO Handguns- YES, Statewide
Castle Doctrine or “Stand your ground”	NO	YES. A person has protections and immunities and no duty to retreat in the use of deadly force against intruders in home, yard or private office or even inside personal vehicles.

No-Net Loss	NO. This law maintains public wetlands and it is used to maintain or expand the available public hunting land.	NO
Right to Carry Confidentially	NO	YES with provisions enacted.
Right to Carry in Restaurants	Partial Ban	Partial Ban
Right to Carry Laws	Restricted Very Limited Issue	Shall Issue
Right to Carry Reciprocity and Recognition	NO	Conditional Recognition
Right to Keep and Bear Arms State Constitutional Provisions	NO	YES with Provisions. "Every citizen shall have the right to keep and bear arms in the lawful defense of himself or the State; but the Legislature shall have power, by law, to regulate the wearing of arms, with a view to prevent crime" (State constitutional provision. Article 1, Section 23)
Antiques and Replicas Provisions	Firearms manufactured in or before 1898 using fixed ammunition are no longer manufactured in the U.S. and there are not readily available in ordinary channels of commerce	Antique or curio guns manufactured before 1899 and replicas that do not use rim fire or center fire ammunition are not included in the definition of "firearm" as it is used in Texas Penal Code Title 10, Chapter 46, which governs weapons.
Assault Weapons 0.50 Caliber BMG Rifles and Magazines	NO. Unlawful to manufacture, sale, give or lend any assault weapons or 0.50 caliber BMG rifle.	YES

Carrying and Transportation in Vehicles	NO. Unlawful to carry loaded rifle, shotgun or handguns in any public place or in the public street or incorporated areas where firearms are prohibited. No open carry or any handgun loaded or unloaded in incorporated areas that have banned firearms.	YES. An individual commits an offense of unlawfully carrying a weapon if the person intentionally, knowingly or recklessly carries a handgun on or about his person unless the person is on one's own premise or inside or en route to a motor vehicle that is owned by the person under the person's control.
Machine Guns and Other Firearms	NO. Unlawful to possess or transport.	NO. Unlawful to possess, manufacture, transport, repair or sell a machine gun, explosive weapon, short-barrel firearm or silencer. However, federal registration of machine guns under the National Firearm Act is a defense to this prohibition.
Purchase	All firearm sales, transfers including private transactions and sales at gun shows must go through a California licensed firearms dealer.	A Texas resident not precluded by law can purchase rifles and shotguns, ammunition, reloading components or firearms accessories in contiguous states.
Possession	Unlawful for anyone convicted of a felony, or who is a drug addict, present or former mental patient, ever committed for mental observation, or acquitted by reason of insanity to own or possess any firearm. People with certain misdemeanor convictions involving force or violence may not possess a firearm within 10 years of conviction. A person who has been adjudged a ward of the juvenile court for certain offenses may not own or possess any firearm until age 30. A minor cannot possess a handgun except with written permission and under the supervision of a parent or guardian.	No state license is required to possess a rifle, shotgun or handgun. There are restrictions on possession by a person. Restrictions if convicted of a felony or a Class A misdemeanor involving a person's family or household or subject to certain orders issued under the Family Code or Code of Criminal Procedures.

Pre-emption	All regulations pertaining to firearm registration or licensing is reserved to the state legislature.	A municipality may not adult regulations relating to the transfer, private ownership, keeping, transportation, licensing or registration of firearms, ammunition. Or firearm supplies. (Texas Local Government Code Section 222.001)
Range Protection	YES. Protected against civil or criminal prosecution in matters alleging noise if the range is operating in compliance with all ordinances at the time the range was constructed.	NO restrictions
Miscellaneous Provisions	No license or permit is required to possess, keep, or carry a handgun openly or concealed in one's home or place of business.	Violation of the state's firearm laws that occurs 300 feet of a school or on premises where a school function is taking place results in an increased punishment.
Sources: California Department of Justice, Bureau of Firearms, California Penal Code Section 16000, Texas State Constitution, Texas Penal Code Title 10, Chapter 26, Texas Local Government Code Section 222.001, NRA Institute for Legislative Action, 2017.		

Table 3. Summary of State-Level Firearm Legislation in California and Texas.

HOW ARE GUN LAWS EVALUATED? CALIFORNIA AND TEXAS

The Law Center to Prevent Gun Violence analyzes the strength of firearm legislation in all fifty states and assigns them a letter grade each year. They compare the grades to the state's gun death rate using the CDC's Fatal Injury Report. Every year there is a robust negative correlation showing that the stronger the laws, the higher the rank and the lower the gun death rate per capita in that state. Recently, there has been a problem with interstate gun trafficking because states with weak gun laws are the source of most guns in states with more restrictive firearm laws. The Law Center are experts at tracking, analyzing, and evaluating gun laws for the past twenty years. They have developed a comprehensive point system to measure the strength of state gun laws. For instance, universal background checks receive the most points because they have the best potential to keep the guns out of dangerous hands in private sale firearm transactions. The states also earn points for prohibiting domestic abusers from accessing guns, limiting bulk gun purchases, and preventing people on the terrorist watch-list from buying weapons. Additionally,

states can lose points for weak public safety laws. For example, allowing concealed carry in public spaces without a permit, or guns in schools and bars, and "stand your ground" laws that remove accountability from deadly shootings. Also, there are states with dangerous legislation that prohibit local governments from passing gun ordinances. The law center tallies up the points, and the states are ranked according to their gun grades. Appendix B shows the methodology used to award points for gun legislation to determine the Brady score (Law Center to Prevent Gun Violence and Brady Campaign to Prevent Gun Violence, 2013). In 2013, The Brady Score for California was an A- and for Texas was an F. These grades are a measure of the toughness of the gun laws in each state and Wintemute found that having more laws on the books is associated with having lower rates of firearm-related homicide and suicide. However, the meaning of this result is not clear as there may be confounding by prevalence of gun ownership. States with a lower prevalence of gun ownership may be more likely to pass laws because there is less opposition (Wintemute, 2013).

Table 4 describes and compares the firearm laws of California with the firearm laws of Texas (Law Center to Prevent Gun Violence, 2015). Provisions in the laws that have been found to decrease firearm-related mortality are record keeping and retention, gun store security precautions, ballistic firearm identification, mandatory owner theft reporting, universal background checks, safety training, permit process through law enforcement, and permit requirements to purchase ammunition. Some provisions in the laws are associated with an increase in firearm-related mortality such as mandatory reporting of gun theft by dealers, bulk purchase limitations, extension of 3-day limit for background checks, integrated locks, and bans on assault weapons. The reasons why these provisions lead to an increase in firearm-related mortality are not well understood, and the effects on mortality is inconclusive for 16 (55.2%) of 29 provisions. This demonstrates the need for more research.

SUMMARY OF FIREARM LEGISLATION AND DESCRIPTION OF PROVISIONS ASSOCIATED WITH FIREARM-RELATED MORTALITY IN CALIFORNIA AND TEXAS				
PROVISIONS IN THE LAWS	DESCRIPTION OF PROVISIONS	CALIFORNIA	TEXAS	INCREASE, DECREASE, OR INCONCLUSIVE
Gun dealer license	State license required for gun dealers	YES	NO	INCONCLUSIVE
Record keeping and retention	Gun dealers are required to keep and retain records	YES	NO	DECREASE
Report records to state	Gun dealers are required to report record to the state for retention	YES	NO	INCONCLUSIVE
Mandatory theft reporting	Gun dealers are required to report gun theft	YES	NO	INCREASE
Gun store security precaution	Gun dealers are required to have at least one store security precaution	YES	NO	DECREASE
Police inspection	Inspections on gun stores are allowed	YES	NO	INCONCLUSIVE
Bulk purchase limitation	Handgun purchases limited to 1 per month with or without 1 or more exceptions	YES	NO	INCREASE
Firearm identification	Guns can be identified by ballistic fingerprinting and microstamping is required for semi-automatic handguns	YES	NO	DECREASE
Owner theft reporting	Firearm owners are required to report lost or stolen guns	NO	NO	DECREASE
Universal background check	Required for all firearms or for handguns only	YES (for all firearms)	NO	DECREASE
Fingerprinting	Fingerprinting required for	YES	NO	INCONCLUSIVE

	purchase of guns			
Safety training	Safety training or testing required for the purchase of firearms	YES	NO	DECREASE
Extension of background check limit	Extension of 3-day limit for background checks	YES	NO	INCREASE
Permit law involvement	Permit process involves law enforcement or local police	NO	NO	DECREASE
Closure of gun show loophole	Laws enforcing background checks or permits for purchase of all firearms, handguns or long guns (states with universal background checks on all firearms are not eligible for the gun show loophole)	N/A because of universal background check for all firearms.	NO	INCONCLUSIVE
Ammunition purchaser records	Ammunition purchaser records are kept or vendor license is required	YES	NO	INCONCLUSIVE
Ammunition Brady check	Ammunition Brady check or permit is required to purchase ammunition	NO	NO	DECREASE
Integrated locks	Integrated locks are sold on all handguns	NO	NO	INCREASE
External locks	External locks are sold with all handguns	YES	NO	INCONCLUSIVE
Standards for locks	Standards are present for all	YES	NO	INCONCLUSIVE

	external locks			
Child handgun restrictions	Only authorized users older than 16 years are able to operate new handguns	NO	NO	INCONCLUSIVE
Child access not permitted	Age restrictions are set for use of firearms	YES (17 years or younger)	NO	INCONCLUSIVE
Juveniles not permitted to purchase handguns	Must be at least 21 years old to purchase guns	YES	NO	INCONCLUSIVE
Assault weapons ban (Semi-automatic rifles and pistols)	Bans or restricts assault weapons and bans presence of one or two features	YES	NO	INCREASE
Large magazine ban	Bans placed on a specific number of rounds (15 or 10 and fewer)	YES (10 rounds or fewer)	NO	INCONCLUSIVE
Workplace restrictions	Employers are not forced to allow firearms in parking lots	YES	NO	INCONCLUSIVE
Stand your ground	Laws that remove the traditional “duty to retreat” from an area outside the home or before the use of deadly force in self-defense	NO	YES	INCONCLUSIVE
Open carry of concealed weapons (CCW) restriction	Law enforcement discretion is permitted in states when issuing CCW permits	YES	NO Enacted January 1 st 2016	INCONCLUSIVE

Campus carry restriction	Colleges and universities are not forced to allow firearms on campus	YES	NO enacted August 1 st 2016	INCONCLUSIVE
Sources: Law Center to Prevent Gun Violence 2016, Brady Campaign to Prevent Gun Violence 2016, Feegler et al., 2015, and Kalesan et al., 2016.				

Table 4: Firearm Legislation Provisions, Description, and Strength of Laws in California and Texas.

California has very restrictive gun laws and consistently receives the highest score out of all the states. In California, universal background checks are required for all gun transactions and transfers. California often takes swift and decisive action in passing firearm laws. For example, in the wake of the tragic rampage at the University of California at Santa Barbara (UCSB), the state passed a gun violence restraining order that allowed family members and law enforcement agents to petition the court to remove firearms from individuals who pose a danger to themselves and others temporarily. California continues to work to make the state and its communities safer. In 2016, California voters passed the “Safety for All” ballot initiative with a 63% of the vote. This law allows for the firearm relinquishment by convicted criminals. Also, it requires background checks for ammunition sales and prohibits possession of large-capacity ammunition magazines. It requires reporting of lost or stolen guns, and requires that background check records be submitted to the FBI. California also passed the AB 1135 and SB 880 initiatives to close a loophole in California’s assault weapons ban. This loophole allowed manufacturers to evade the law by producing assault weapons with detachable magazines. The SB 1446, and a provision of the Safety for All Initiative expands prohibitions of large capacity ammunition magazines to include possession. California is adamant about passing lifesaving policies to maintain its comparatively low gun death rate (Law Center to Prevent Gun Violence, 2016).

In 2015, Texas decided to pass a bill allowing the open carry of handguns and another law permitting firearms on college campuses. These laws were enacted in 2016, and Texas continues to expand the carrying of firearms in public spaces. Texas could reduce gun violence by requiring universal background checks on all gun sales, including those at gun shows and on the

Internet. Measures could also be taken to prohibit the open carry of guns in public and on college campuses.

WHAT ARE THE CALIFORNIA FIREARM LAW RANK AND GUN GRADE?

The estimated gun ownership rate in California is 20.1% (Kalesan et al., 2015). California has twenty-three state laws that regulate firearms (Kalesan et al., 2016). In 2015, the firearm death rate was 7.4 per 100,000 in California (Henry J. Kaiser Family Foundation, 2017). California's gun grade is A-. The gun law rank is 1, and the gun death rank is 47. California has the most restrictive gun legislation in the United States. California has a ban on assault rifles and the open carry of handguns (Law Center to Prevent Gun Violence, 2015).

State of California requirements and regulations:

- Requires processing of all gun sales through a licensed dealer with a mandatory background check.
- Requires a state license for all gun dealers.
- Bans the possession of most assault weapons and 0.50-caliber rifles.
- Prohibits the sale or transfer of large-capacity ammunition magazines.
- Requires all firearms buyers to pass a written test and to obtain a firearm safety certificate.
- Requires comprehensive regulation of gun shows purchases.
- Limits the purchase of handguns to one per person per month.
- Prohibits the sale of "unsafe handguns" not listed on the state's roster of approved handguns.
- Imposes a ten-day waiting period before the sale or transfer of a firearm.
- Maintains permanent records of all firearm sales.
- Gives local law enforcement discretion to deny a license to carry a concealed weapon.
- Gives discretion to local law enforcement to refuse a handgun permit.
- Gives the local government authority to regulate sales of firearms and ammunition. However, the California State Legislature removed this power in certain areas.

Other California legislative efforts:

- In 2007, California became the first in the nation to require handgun microstamping.

- In 2013, California had the ninth-lowest number of gun deaths per capita. California still suffered from 3,026 deaths related to firearm violence.
- In 2014, California was the first state to enact a gun violence restraining order law to keep guns out of the hands of dangerous and unstable individuals.
- In 2015, California introduced SB 707 a proactive measure to keep guns off school campuses. This law requires concealed carry licensees to obtain written permission from school officials before carrying firearms or ammunition on the grounds of K-12 schools or a university or college campus.
- In 2016, California passed the “Safety For All” initiative that closed loopholes in background check requirements. The state also closed loopholes in possession of assault rifles by expanding prohibitions of large capacity ammunition magazines to include possession.
- In the Mayors Against Illegal Guns report, California has the fifth-lowest rate of crime guns exported to other states. California is the fourth-largest supplier of crime guns to Mexico per capita. California supplies crime guns at less than one-third the rate of Arizona, which is the country's top supplier of crime guns to Mexico.
- Many municipalities across California have enacted a variety of gun violence prevention ordinances to address the epidemic of gun violence (Law Center to Prevent Gun Violence, 2016).

WHAT ARE THE TEXAS FIREARM LAW RANK AND GUN GRADE?

The estimated gun ownership rate in Texas is 35.7% (Kalesan et al., 2015). Texas has three state laws that regulate firearms (Kalesan et al., 2016). In 2015, the firearm death rate was 10.7 per 100,000 (Henry J. Kaiser Family Foundation, 2017). The gun grade of Texas is F. The gun law rank is 33, and the gun death rank is 31 (Law Center to Prevent Gun Violence, 2015).

State of Texas requirements and regulations:

- DO NOT Require gun dealers to obtain a state license.
- DO NOT Require a background check for the transfer of a firearm between unlicensed individuals.

- DO NOT Regulate the transfer or possession of assault rifles (e.g., 0.50-caliber rifles or large-capacity ammunition magazines).
- DO NOT Require gun owners to be licensed or to register their firearms.
- DO NOT Require gun owners to report stolen guns.
- DO NOT Limit the number of firearms purchases made at one time.
- DO NOT Regulate unsafe handguns such as "junk guns" or "Saturday night specials."
- DO NOT Restrict the purchase of ammunition.
- DO NOT Allow local governments to regulate firearms.
- DO NOT Give discretion to local law enforcement to deny a handgun permit.

Other Texas legislative efforts:

- In 2009, Mayors Against Illegal Guns reported that Texas exported the fourth largest number of crime guns to other states.
- Texas consistently supplies a significant number of crime guns to Mexico. In 2009, the U.S. government traced 40% of Mexican crime guns to Texas purchases.
- In 2013, Texas had the twentieth-lowest number of gun deaths per capita in all states. (Law Center to Prevent Gun Violence, 2015)
- In 2015, Texas introduced SB 11 allowing concealed carry permit holders to carry firearms on college and university campuses. This law allows school officials to regulate guns in some areas of campus. In addition to this, the HB 910 bill allowed people with concealed carry permits to carry loaded guns openly in public.
- In 2016, Texas enacted the open carry laws statewide including academic institutions. This law made it legal to carry a weapon openly with a permit. Figure 10 shows the national status of open carry laws (Texas Department of Public Safety, 2016).

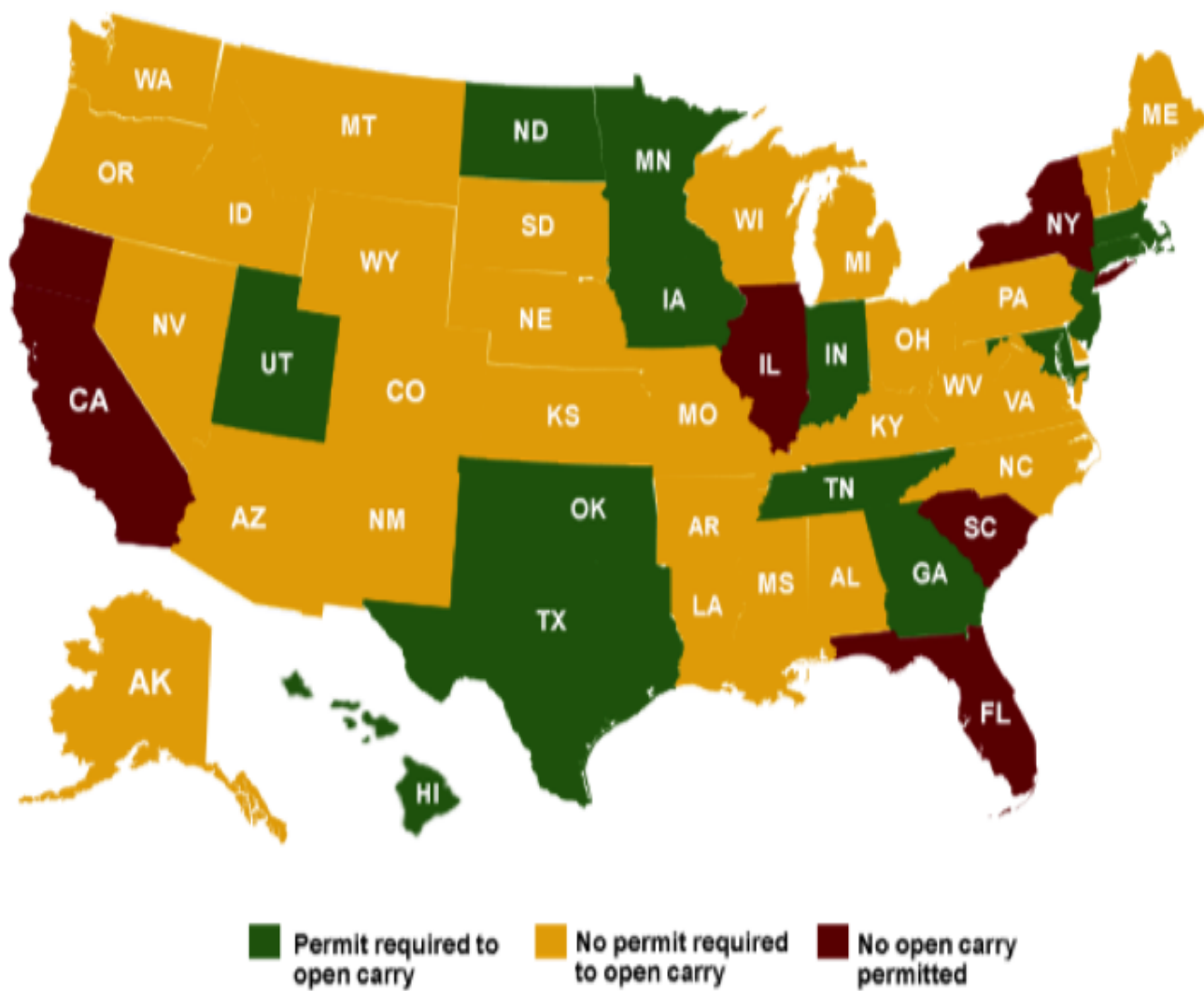


Figure 10. States that Allow Open Carry of Firearms (South Dakota Secretary of State, 2016)

WHAT OTHER APPROACHES CAN WE TAKE TO DECREASE GUN VIOLENCE?

There are many immediate steps that we must adopt to reduce gun-related violence. We can reinstate the federal ban on automatic or semi-automatic assault weapons and high-capacity ammunition magazines. This assault rifle ban expired in 2004. It must be reinstated since these assault rifles are used in military combat. These weapons have no place in our streets or homes. We also need to close the private sale loophole that exempts unlicensed private sellers of firearms from conducting a background check on buyers at gun shows and private sales. This gap in the federal law provides criminals, domestic abusers, dangerous mentally ill people, and others prohibited from owning firearms with access to weapons. We need to expand the collection and analysis of data related to gun violence and other violent causes of deaths to gain a better understanding of the causes. We have to ensure that state and local health departments have the resources they need to develop and implement appropriate measures and interventions that maintain the health and safety of their states and communities. We must urge Congress to ensure adequate funding of mental health services, which has been on the decline in recent years. The expansion of Medicaid coverage provides mental health benefits to millions of people that are currently uninsured. However, some people fall through the cracks, especially in several states that have no Affordable Care Act (ACA) Medicaid expansion, like Texas. Congress must ensure that the ACA provides comprehensive coverage for mental health and substance abuse disorder services as essential health benefits (APHA, 2016). Additionally, we need to target the three areas in which we can reduce mortality: unintentional firearm deaths, homicide, and suicide.

REDUCING UNINTENTIONAL FIREARM DEATHS

On average, one-third of American households with firearms have unsafely stored guns. About 1,500 children, aged seventeen and under, are taken to the ER every year for the treatment of unintentional firearm injuries, and more than 100 kids die every year by a mishap at their hands or the hands of a brother or a friend (Hemingway, 2013). Figure 11 shows unintentional firearm age-adjusted mortality rate per 100,000 individuals from 2000-2015 from all races including people of Hispanic origin, all sexes, and all age groups. The selected standardizing year for age-adjusting was the year 2000. This graph shows the firearm mortality rate decreasing across the

board. However, California has the most significant drop since 2006, followed by the United States and Texas (WISQARS Fatal Injury Data, 2015).

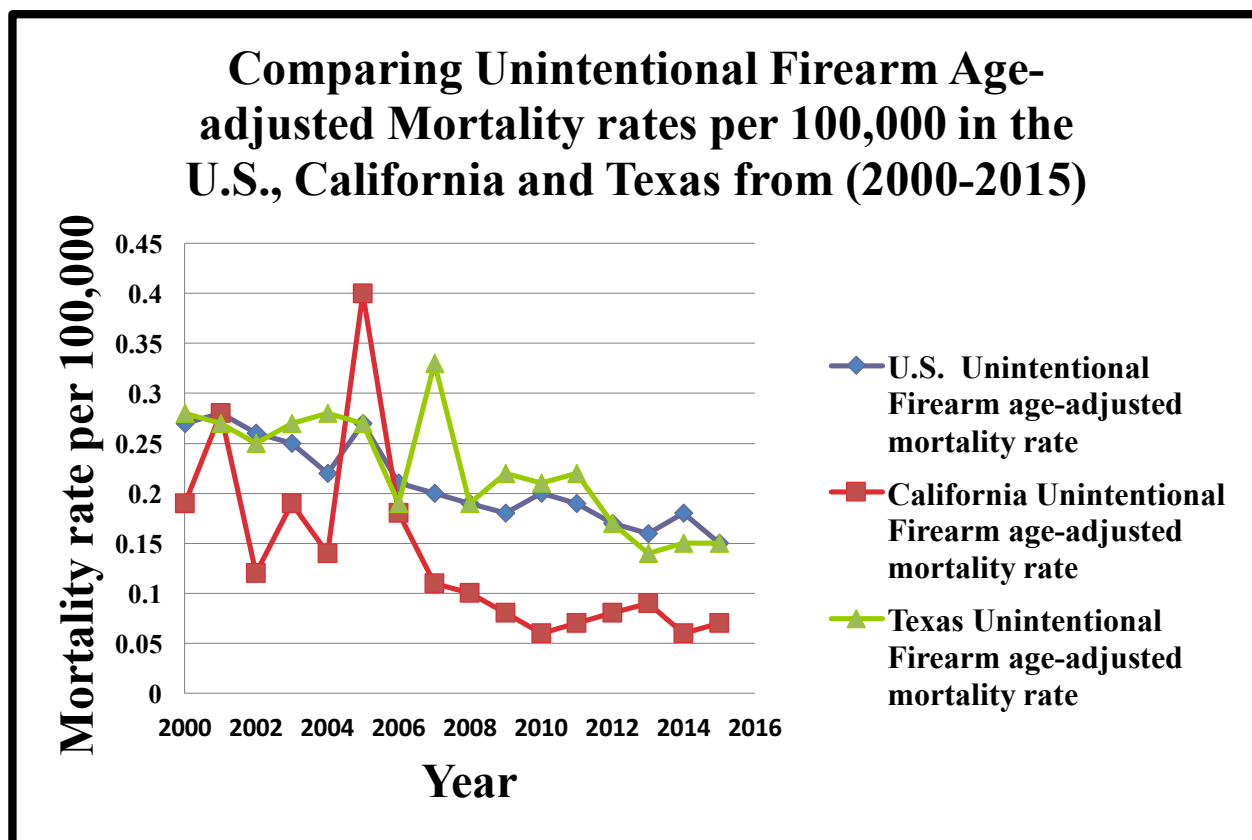


Figure 11. Compares Unintentional Firearm Age-adjusted Mortality Rates per 100,000 in the United States, California and Texas from the Year 2000-2015 (WISQARS Fatal Injury Data, 2015).

The American Academy of Pediatrics determined that guns in the home are a safety hazard to children, and those families that have guns need to store them properly. There are efforts already in place to reduce this problem. The Center to Prevent Youth Violence working with the American Academy of Pediatrics created the Asking Saves Kids (ASK) Campaign. During the kid's visit to the doctor, parents are routinely asked about seatbelts and pool safety. The ASK campaign encourages doctors to ask parents about firearms and their accessibility, which can lead to education about the safe storage of guns and the prevention of unintentional firearm injuries and death of children. The state of Florida enacted a law prohibiting doctors from

determining the gun status in the home and prohibiting them from asking patients whether they own guns or how they store them. There are other states considering passing similar legislation (Hemenway, 2013). In addition to the ASK campaign, there is a growing public health concern about family firearm safety practices, accidental shootings involving young children has intensified the public and policy debate over the role of the government in restricting access to firearms and the effectiveness of gun laws. Some states like California have implemented Child Access Prevention (CAP) legislation that promotes safe firearm storage practices with families that have children. The CAP laws also make adults criminally liable for children's unsupervised use of firearms. The CAP laws safety standards are in line with the American Academy of Pediatrics's guidelines that parents who own firearms store them and lock them unloaded and that the ammunition must be locked separately from the guns. Researchers used the Early Childhood Study-Birth Cohort and followed participants from birth to 15 years old. Then, they examined how laws aimed at gun storage practices along with general state-level firearms laws are associated with firearm ownership and storage behaviors among families that have preschool children. They found that the effect of CAP laws has inconclusive results. In states (like California), that have very strict firearm laws and had a more comprehensive array of firearms restrictions targeting children's access to firearms, the CAP laws had a synergistic effect. This effect could arise because families who own firearms in states with a more robust gun legislation (like California); may have rigorous safety and storage behaviors due to the added requirements and longer processes of acquiring the firearm. For example, California law requires that all gun buyers have to pass a written test and must obtain a firearm safety certificate. These circumstances can act as potential deterrents of unsafe storage practices for parents who might otherwise have a more lax approach to safety. Conversely, in states that have less restrictive firearm laws (like Texas), there was no correlation. Researchers also found that CAP laws usually have more support from the public because they focus more on safety rather than ownership (Prickett et al., 2014).

REDUCING HOMICIDE DEATHS

Transformation of the view of cigarettes was the key to public health progress in smoking reduction. Cigarettes used to symbolize modernity, autonomy, power, and sexuality. Now, they

are a symbol of danger, addiction, and weakness. Figure 12 shows homicide firearm age-adjusted mortality rate per 100,000 individuals from 2000-2015 from all races including people of Hispanic origin, all sexes, and all age groups. The selected standardizing year for age-adjusting was the year 2000. This graph shows the firearm mortality rate decreasing across the board from 2006-2010. California has the most significant drop, followed by the United States and Texas. The homicide mortality rate starts increasing again from 2010-2015. The United States has the most significant increase followed by Texas and California (WISQARS Fatal Injury Data, 2015).

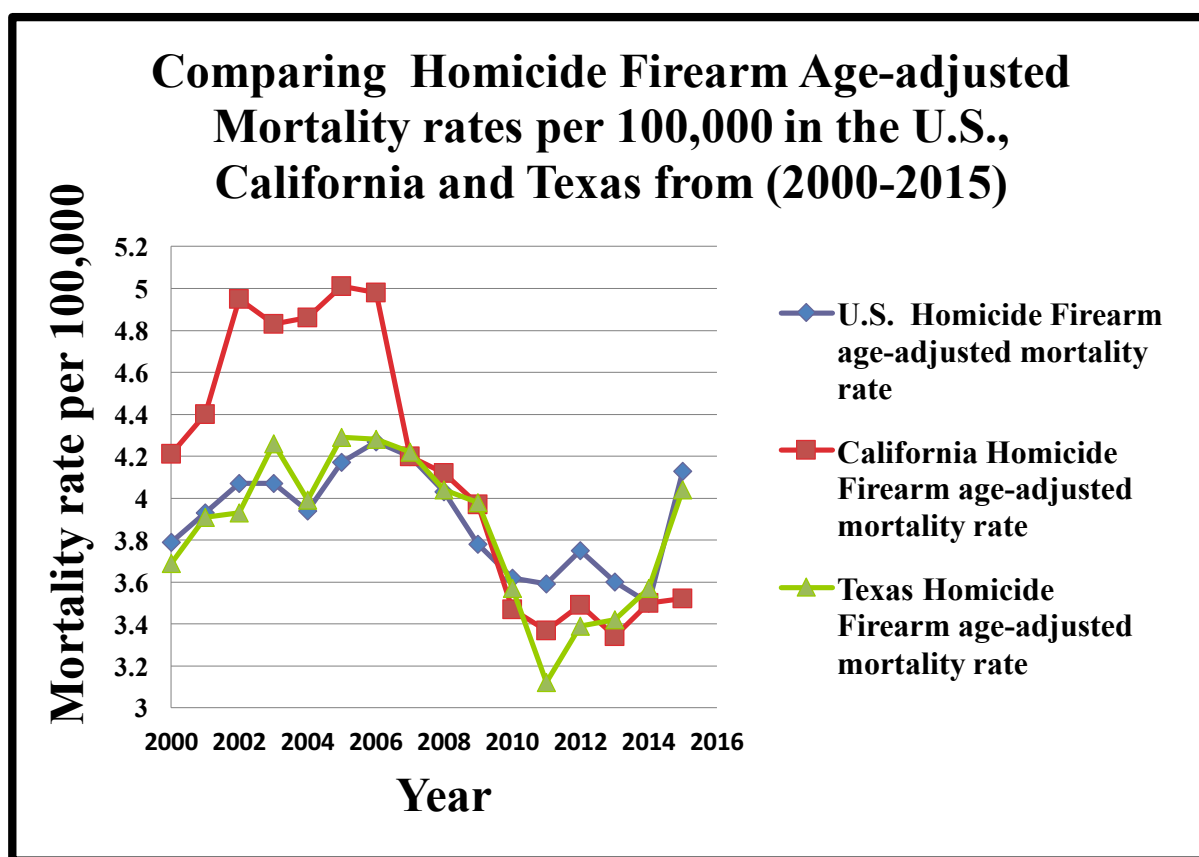


Figure 12. Compares Homicide Firearm Age-adjusted Mortality Rates per 100,000 in the United States, California and Texas from the Year 2000-2015 (WISQARS Fatal Injury Data, 2015).

Since the homicide rate is increasing in the United States, we need to reframe or change our social norms to prevent gun violence. For instance, the U.S. Air Force instituted a program to lessen the stigma of seeking professional help for mental health disorders. Since the implementation of this program, the numbers of suicides, family violence, and homicides have decreased. We need to ask for the support of many organizations (e.g., physicians, women's groups, gun owners) to reduce gun violence in the United States. These groups can help communities create common sense legislation, ensure effective enforcement of the laws, and reframe social norms to reduce gun violence (Hemenway, 2013). From the lens of public health, some social norms are beneficial, like washing hands, while others are not, like shaking hands and spreading germs that increase the risk of infection. We can reframe social norms to deal with gun violence. We must reduce the availability of guns and reduce homicides by focusing on efforts to reduce gun trafficking and restrict unauthorized access to firearms (Hemenway, 2013).

REDUCING GUN TRAFFICKING

The Iron Pipeline refers to the I-95 highway that connects New York City, which has strict gun laws, to Southern states that have laxer gun laws. Guns cross state lines as easily as cars, and there is a substantial financial incentive to transport these weapons to the states with strict gun laws and bypass state regulations and legislative efforts (Smith, 2016). Criminal gun trafficking entails the movement of firearms from legal to illegal markets. The Gun Control Act was designed to prevent interstate domestic gun trafficking. The ATF has developed strategies to avoid gun traffic by cracking down on specific activities:

- Straw purchases
- Traffic by corrupt federally licensed dealers
- Traffic by unlicensed dealers
- Stolen firearms
- Secondhand guns acquired from unlicensed individuals at gun shows, flea markets, and other private venues.

Almost all illegal firearms recovered from gun trafficking have been used in criminal activities and then integrated into the legal channels of commerce. The ATF focuses on reducing firearm-

related crimes in two ways, by regulating the industry and by conducting criminal investigations (Krouse, 2015). In 2015, the ATF recovered and traced 37,043 firearms in California, and 661 of these traced guns were used to commit homicides. Most of these firearms came from states adjacent to California, with less strict gun laws. Figure 13 shows that there is a pattern in the trafficking of firearms. Guns tend to move from states of low regulation, like Texas, to states that have much stricter gun laws, like California. The left side of the figure shows the source states of firearms with California recovery. It illustrates that most of the guns came from the South and went to the West. In the same year, the ATF recovered and traced 21,817 firearms in Texas, and 882 of these traced guns were used to commit homicides. The same figure on the right side also shows the source states of firearms with Texas recovery. The majority of these weapons came from states adjacent to Texas within the South with lax gun laws like Louisiana, Georgia and Florida (ATF, 2015).

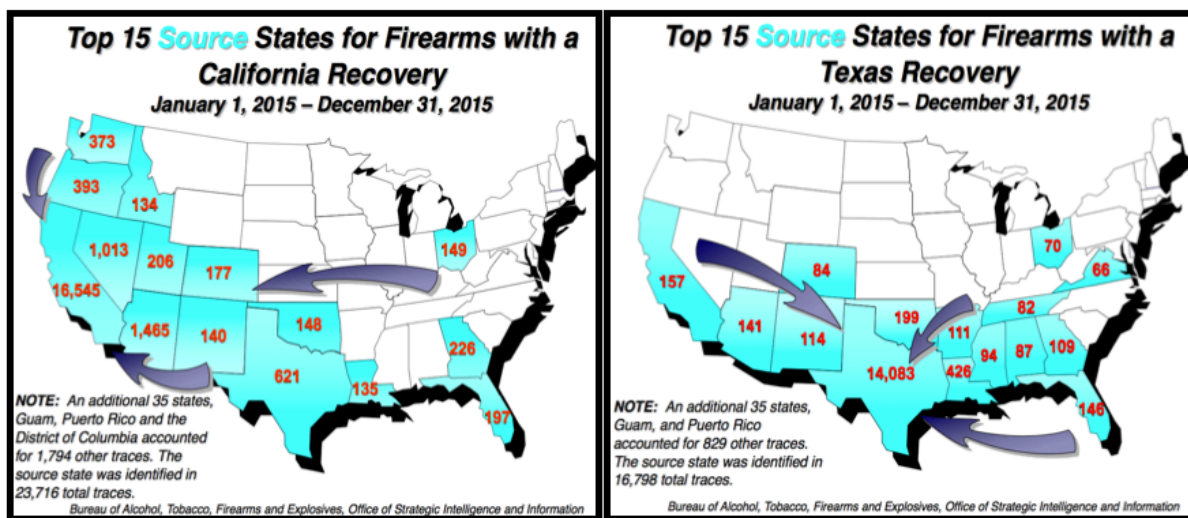


Figure 13. The 2015 top 15 Source States for Firearms with a California and a Texas Recovery (ATF, 2015).

To reduce gun violence, we have to be more aware of where guns come from and prevent people who cannot legally buy them from purchasing these weapons. For example, when the media reports a deadly car crash, they report on whether a seatbelt restrained the driver and if the driver was drunk or intoxicated. This reporting serves as a reminder of our social norms, and how these

norms have changed in the past twenty-five years. Now, we expect all drivers to wear a seatbelt and not to drive while drunk or intoxicated. A non-profit organization called Citizens for Safety is encouraging reporters and the general public to ask, whenever there is a street or mass shooting, "Where did the guns come from?" We need to know how the gun was obtained to create better policies and to prevent the illegal purchase of deadly weapons. The Where Did the Gun Come From? Campaign was designed to bring about awareness that goes beyond the shooter and victim and into the system of gun trafficking, where programs and policies can take root and make a difference. Focusing on the gun origin gives the community a purposeful way to reduce gun violence (Hemenway, 2013).

REDUCING SUICIDE DEATHS

Suicide is a serious public health issue, responsible for more deaths worldwide than war and homicide combined and accounting for approximately one million deaths around the world each year. In the United States, firearms are the most common means of suicide. The fatality rate of suicide attempts with guns is 91% (Lewiecki et al., 2013). Figure 14 shows suicide firearm age-adjusted mortality rate per 100,000 individuals from 2000-2015 from all races including people of Hispanic origin, all sexes, and all age groups. The selected standardizing year for age-adjusting was the year 2000. This graph shows the suicide firearm mortality rate decreasing in California. Conversely, the suicide firearm mortality rate is increasing the United States and Texas (WISQARS Fatal Injury Data, 2015).

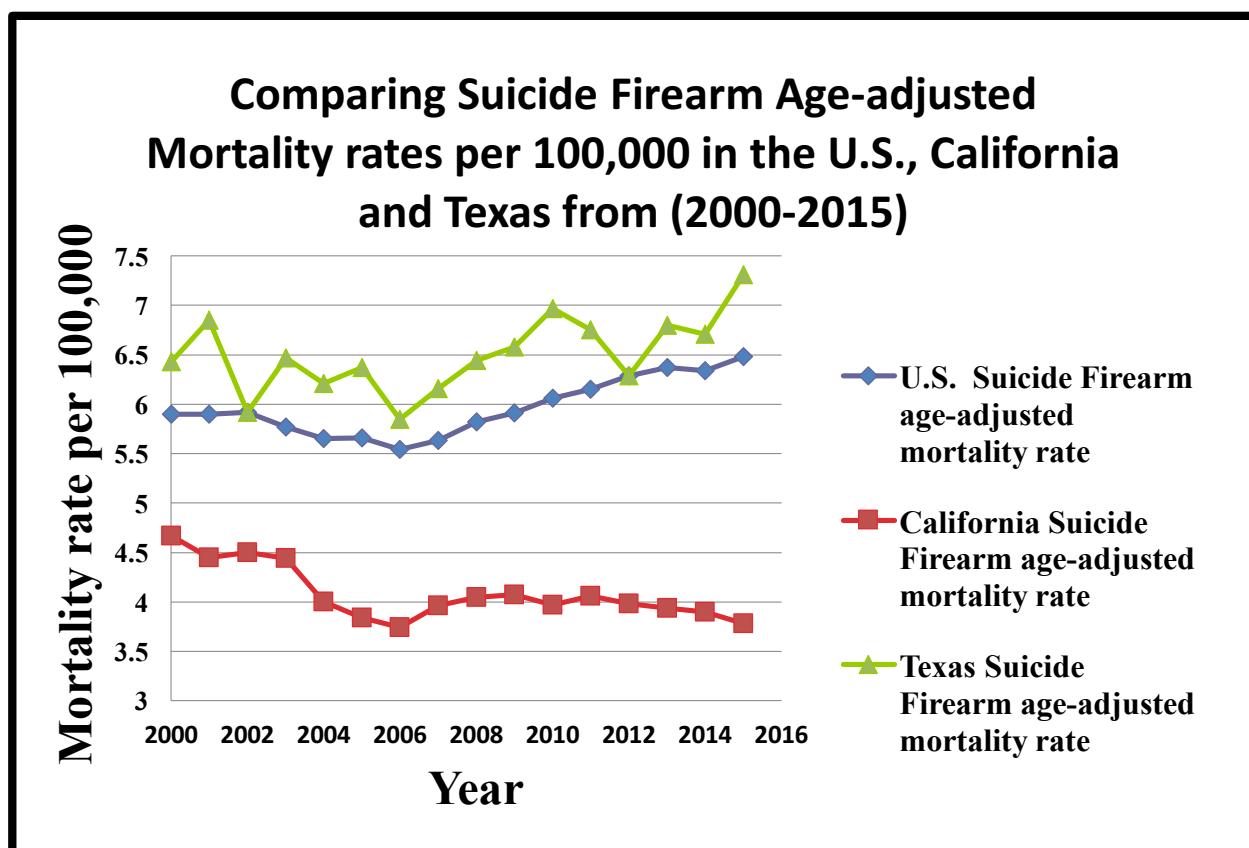


Figure 14. Compares Suicide Firearm Age-adjusted Mortality Rates per 100,000 in the United States, California and Texas from the Year 2000-2015 (WISQARS Fatal Injury Data, 2015).

The National Center for Health Statistics ranks suicide as the tenth leading cause of death in the United States. The rate of suicide is 13 per 100,000 people, and more than half of these deaths (6.7 in 100,000) occur with a firearm (CDC, 2016). Suicide prevention strategies involve identifying and modifying the risk factors. Some states restrict access to handguns by methods such as having a waiting period, requiring a permit for gun safety training, and safe storage of guns in the household. Several studies have suggested that more than two-thirds of suicide survivors consider suicide for less than one hour before an attempt. Therefore, one of the best methods of suicide prevention, supported by evidence, is limiting access to lethal methods. It is important to restrict highly lethal methods like guns by making them not easily available, forcing

people to use alternative methods like a drug overdose, which are less lethal and increase the chance of survival. The overall suicide rates are lower in states like California, which have restrictive firearm laws with waiting periods, safe storage requirements, and a minimum age of twenty-one for handgun purchases, compared to the suicide rates in states like Texas, which have none of those restrictions (Lewiecki et al., 2013).

Dozens of studies have found that having access to a gun is a strong factor for the completion of suicide. Gun owners are not more suicidal than other people, but having a gun makes it more likely that the attempt is successful. Suicide attempts often happen impulsively, with little planning or during a short-term crisis. Over 90% of people who survive a suicide attempt do not go on to die by suicide. The Harvard Injury Control Research Center designed a "Means Matter Campaign" to help mental health professionals talk about guns with suicidal patients. The campaign seeks out leaders in the community who own guns like gun shop owners to support suicide prevention. The program propagates the message that gun-owning families should be vigilant to the signs of crisis and suicidal thoughts in family members. If a family member is in danger of self-harm or harm to others, actionable steps should be taken to store guns away from home, temporarily for a short-term crisis or permanently if the problem persists and becomes chronic. There is also support available from the national suicide hotline, to learn other ways to help people in a crisis. Parents need to get the guns out of the house if their teenagers are suicidal. Likewise, when a friend knows that someone is going through a rough patch or is acting strangely, it is important to have the courage to ask if there are guns in the house. If so, one should persuade suicidal people to store the guns someplace else temporarily (Hemenway, 2013). As for unintentional deaths, proper handling and storage of unloaded guns in a locked place, while storing ammunition in a separate and locked place, has a protective effect against suicide among children, adolescents, and adults. Under the Brady Act, those prohibited from owning guns include people with severe mental illness with forced hospitalizations as well as domestic abusers who are at higher risk for suicide. The public health benefit of preventing deaths caused by impulsive suicidal behavior outweighs the minimal inconvenience of having to wait a while longer to get a firearm if the person has no intent to harm themselves or others (Lewiecki et al., 2013).

Chapter 5 Discussion and Policy Recommendations

WHAT IS THE PUBLIC PERCEPTION OF GUN VIOLENCE?

In order to create effective public health campaigns and to craft legislation it is important to understand the perception that Americans have on the issue of gun violence. The Pew Research Center tracks shifts in public opinion, and currently, there is 50% support for more gun control and 47% advocacy for gun rights. Gun ownership and the right to bear arms are part of American culture and imposing any regulation on firearms is difficult (Pew Research Center, 2015). In the U.S., the gun debate dominates the domestic political agenda more than in any other industrialized country. We need to tackle gun-related mortality and violence in the same way that we handled the tobacco, asbestos, and the automobile fatalities. The first step is to do more research on firearm violence. Even though research has been limited, we have gathered enough facts supporting the position that gun-related mortality is a public health crisis in this country. We need to find the causes of gun violence and thoroughly examine existing firearm laws to determine which ones are effective in reducing gun violence and firearm-related mortality. Similarly, we need to craft and implement public health campaigns that the public supports to deal with the gun violence issue and prevent deaths (Franco et al., 2015).

WHY IS THERE NOT ENOUGH DATA ABOUT GUN VIOLENCE?

Policy makers and public health professionals used to view gun injuries as accidents that were unpreventable. However, a group of CDC researchers had a different perspective and decided to study gun injuries. They realized that these injuries were predictable and preventable and tried to find ways to reduce them and prevent unnecessary deaths. Mark Rosenberg helped establish the CDC's National Center for Injury Prevention and Control (NCIPC) in part to study gun violence. Rosenberg recalls, "We said, two injuries are the leading cause of death in the U.S. right now: cars and guns. We spend hundreds of millions on cars, but we spend nothing on guns." NCIPC began collecting data on gun violence and started funding research on this subject, which produced very useful information. However, in doing this, NCIPC provoked the ire of the NRA. In 1994, the Republicans took control of Congress. The Republicans and the NRA had a laser-

like focus on the NCIPC, and there was an immediate effort to stop gun research and bury the NCIPC. The problem with gun violence is compounded by the fact that we have limited resources and methods for addressing this public health burden. We have a problem collecting basic data for analysis, evaluation and policy formation. The constraints on conducting gun violence research are politically motivated, and these obstacles make it more difficult to address the problem of firearm-related violence (Roth, 2013).

WHY DO WE NEED FACTS ABOUT GUN VIOLENCE TO COME UP WITH SOLUTIONS?

Public health policy efforts have reduced deaths from the top ten causes of deaths in car accidents and smoking. For many years, we did not think that infant car seats needed to be rear-facing, but we learned this by researching car seats and motor vehicle collisions. Research on car accidents and legislation saved thousands of lives without preventing people from driving. We have to apply this same approach to reducing gun violence and making our communities safer (APHA, 2016). We must know the facts and figures related to gun violence to make evidence-based recommendations for dealing with this issue. Public health policies in conjunction with legislation have been effective in addressing other public health challenges. For instance, in the last 100 years, biomedical and public health research have given us sanitation, food safety, and infectious disease control. Vaccinations have prevented fatal childhood and adult diseases, allowing people to live much longer productive lives. We learned that smoking cigarettes, asbestos exposure, and other occupational carcinogens cause many chronic diseases. We have used this knowledge to develop policies and strategies to control these diseases and continue extending people's lives. In all of these areas, in the beginning, there was tremendous pushback from the public and politicians. There are always conflicts of interest due to financial gains that lead to lawsuits and delayed action. Accordingly, tobacco, asbestos, and motor vehicle safety are the most notorious examples of how effective health policies can be delayed because of legal battles with industry stakeholders and lobbying efforts that persuade members of Congress to protect profit over people. Even with all these obstacles, public health policymaking has had an impact. Tobacco use has declined across populations. Many industries have banned the use of asbestos. Now, there are stricter occupational safety standards to protect workers from occupational exposure to harmful carcinogenic chemicals (Franco et al., 2015).

WHAT ARE THE SIMILARITIES BETWEEN MOTOR VEHICLE FATALITIES AND GUN DEATHS?

Motor vehicle accidents are one of the leading causes of deaths in the first thirty years of life. In 2009, over 33,000 people died in car crashes, and 2.2 million were injured. More than 50% of the people killed were unrestrained at the time of the accident. The direct cost of motor vehicle collision deaths and injuries to drivers and passengers was 70 billion dollars in medical and lost work costs (Franco et al., 2015). In 2009, about ninety people died in a car accident every day (NHTSA, 2009). In the beginning, seatbelt usage was extremely unpopular, and each state had the right to decide on its enforcement. Over several decades, research showed that after the seatbelt intervention many lives were saved, and popular opinion was swayed. Eventually, states implemented laws to enforce seatbelt use. Consequently, this lengthy public campaign won over the minds of many and saved millions of lives on the roadways (NHTSA, 2009). Efforts in education and technology have increased the use of seatbelts from 11% in 1981 to 85% in 2013, saving thousands of lives. Even today, about one in seven people do not use a seatbelt. The use of a seatbelt is the most effective way to prevent injury and death in a car crash (Franco et al., 2015). The passing of legislation targeting seatbelt use has had a tremendous impact on motor vehicle safety. State laws require the use of seatbelts in each state. However, the enforcement of those laws is different. Some states have primary enforcement legislation that allows police officers to pull over drivers and issue tickets because the drivers or the passengers of the vehicle are not wearing a seatbelt, whereas other states have secondary enforcement laws that only allow the police to issue tickets for seatbelt violations to drivers that are pulled over for another offense. Secondary enforcement laws limit the ability of the police to enforce seatbelt laws. In states with primary enforcement laws, the rates of seatbelt use are 9% higher than in states with secondary enforcement laws. If the use of seatbelts in states with secondary enforcement laws had been comparable to states with the primary laws, an additional 7.3 million adults would have buckled up in 2008. Consequently, increasing the number of states with primary enforcement seatbelt laws will increase seatbelt use and save lives. These seatbelt laws illustrate the power that effective legislation can have in preventing injuries and deaths (CDC, 2011).

Despite the fact that every year an average of 34,000 people die in car crashes, motor vehicle safety remains one of the most successful public health efforts to prevent injuries and fatalities.

In 1966, the National Highway Traffic Safety Administration (NHTSA) was formed to oversee motor vehicle safety. Since then, there have been many decades of long-term sustained efforts in injury prevention initiatives that have saved thousands of lives. Some of the new safety features have included head rests, energy-absorbing steering wheels, shatter-resistant windshields, and seatbelts. Additionally, highways and roads have been improved by better illumination, barriers separating oncoming traffic lanes, and guardrails. Also, we have enacted laws making seatbelt use mandatory and prohibited the use of alcohol while driving a vehicle. Organizations like Mothers Against Drunk Driving (MADD) changed the public's perception of the problem. The laws enacted increased the likelihood of punishment for intoxicated people driving drunk. In the years 1966 to 2000 the combined advocacy of organizations and governmental actions reduced the rate of death per 100,000 people by 43%, representing a 72% decrease in deaths per vehicle miles traveled. NHTSA continues to advocate for motor vehicle safety by pushing for new safety features, such as backup cameras, to further reduce the death toll. The improvements in motor vehicle health and safety regulations are a public health victory. As the result of many decades of extended public health efforts and prevention programs, motor vehicle deaths are still on the decline. Conversely, firearm deaths continue to rise as the direct result of failure by policy makers to acknowledge gun violence as a public health burden and act accordingly. In 2014, state-level data showed that gun-related deaths now surpass motor vehicle deaths in the District of Columbia and twenty-one states. If this trend continues, the number of states where gun deaths exceed motor vehicle deaths will continue to increase (Violence Policy Center, 2016). Figure 15 compares age-adjusted mortality rates per 100,000 between firearms and motor vehicle deaths from the year 2000-2015 from all races including people of Hispanic origin, all sexes, and all age groups. The selected standardizing year for age-adjusting was the year 2000. This graph shows a trend where firearm mortality rates are increasing while motor vehicle accidents are decreasing. If these trends continue firearm deaths will surpass motor vehicle deaths (WISQARS Fatal Injury Data, 2015).

Comparing Age-adjusted Mortality Rates per 100,000 between Firearms and Motor Vehicles from (2000-2015)

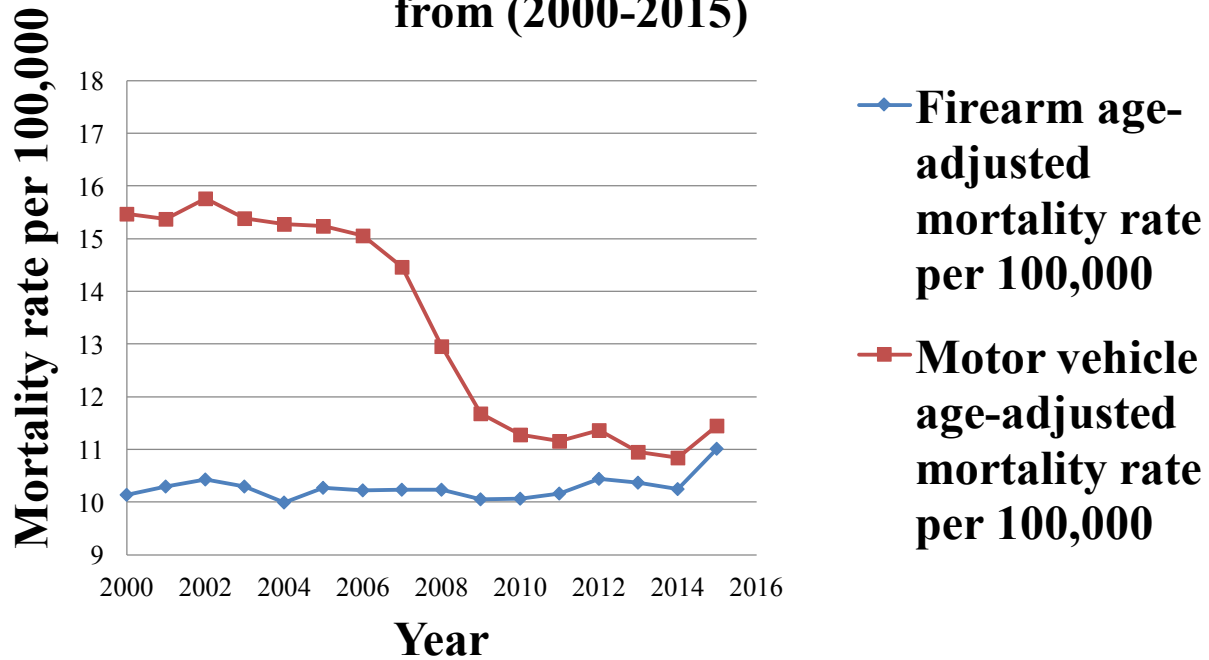


Figure 15. Compares Age-adjusted Mortality Rates per 100,000 between Firearms and Motor Vehicles from the Year 2000-2015 (WISQARS Fatal Injury Data, 2015).

HOW DO WE REGULATE GUNS AND GUN PURCHASES?

Guns are the last consumer product manufactured in the United States not subject to any federal health and safety regulations. The Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) is in charge of enforcing the very limited current gun laws. The ATF does not have the power to oversee the health and safety regulations of firearms in the way that other federal agencies do such as NHTSA. Americans spend more time using their cars than using their guns. However, per hour of exposure, guns are far more dangerous than cars. Nevertheless, we have many safety regulations concerning motor vehicle manufacturing and no safety regulations for domestic firearm manufacturers. Ninety percent of Americans have access to a car, and less than thirty-three percent of American households have access to a gun. America continues to take advantage of the benefits of decades of successful injury prevention strategies on highways and roads.

However, we are still paying a high, unacceptable, and preventable cost in lives lost every year due to gun violence. The problem with gun-related mortality is analogous to car-crash-related mortality. Common sense gun laws could be enacted gradually over time, showing people the benefits and swaying public opinion, as it has been the case with motor vehicle safety. We need to show people that motor vehicle safety did not take away any rights but rather has made the public sphere safer by decreasing mortality associated with unrestrained passengers in motor vehicle collisions (Violence Policy Center, 2016).

There is a direct association between the high rate of gun ownership in the United States and the increased rate of firearm-related mortality. Federal legislation and state laws can lead to a decrease in gun violence and can reduce firearm mortality. The most important thing we have done to address the problem of gun violence is to institute the Brady Handgun Violence Prevention Act. This bill is critical because it prevents dangerous and unauthorized people from getting a gun in the first place. The Brady law requires background checks for individuals before they can purchase a gun from a federally licensed dealer. The Brady Act took effect in 1994. Since then, this act has blocked more than 2.6 million gun sales to prohibited purchasers, including felons, domestic abusers, and dangerously mentally ill people. Despite its effectiveness, the Brady Act has one major flaw: some loopholes allow the sales of guns by unlicensed dealers. These no-questions-asked sales take place online, at gun shows, and through private dealers that do not conduct background checks using the FBI NICS background check system (Brady Campaign to Prevent Gun Violence, 2016).

WHAT PERCENTAGE OF GUN PURCHASES UNDERGOES BACKGROUND CHECKS?

When a person goes to a gun store to buy a firearm, the retailer has to run a background check for each gun purchase using the NICS system to determine if any prohibitive criteria exist that would prevent that person from buying the gun. Since 1994 the Brady checks have blocked more than 2.6 million gun sales to unauthorized people. Experts estimate that 60% of gun transactions are with federally licensed dealers that perform background checks. However, 40% of gun sales are private no-questions-asked transactions that take place at gun shows, at flea markets, or over the Internet. These types of sales do not require a background check. Private sales constitute a

dangerous loophole that allows the sale of thousands of guns to potentially dangerous people, including felons and those with severe mental illnesses (Law Center to Prevent Gun Violence, 2016).

WHAT ARE WE DOING ABOUT THE 40% OF GUN SALES NOT SUBJECTED TO BRADY BACKGROUND CHECKS?

Every single day there are unchecked gun sales at gun shows and over the Internet. However, there is pending legislation in the U.S. House of Representatives (H.R. 3411) that would solve this problem by expanding Brady checks to all guns sales, including sales over the Internet and at gun shows. Since 2013, six states have passed new laws expanding background checks to all gun sales. These actions may force Congress to act accordingly and stop ignoring this problem. Currently, eighteen states and the District of Columbia have expanded the background check requirement beyond federal law to some private sales. Eight states require universal background checks, including California, New York, Connecticut, Colorado, Delaware, Oregon, Rhode Island, Washington, and the District of Columbia. These states mandate a Brady check at the point of transfer on all gun sales, including all classes of firearms from licensed and unlicensed sellers, directly dealing with the private sale and gun show loopholes. Most recently, Washington and Oregon expanded Brady background checks to all gun sales. In 2016, Nevada also expanded Brady background checks. After Nevada, fourteen more states are willing to cast ballot initiatives to expand Brady background checks to all gun sales (Law Center to Prevent Gun Violence, 2016).

WHAT IS HOLDING US BACK FROM FIXING THIS GUN VIOLENCE PROBLEM?

In the United States, gun manufacturing is a very profitable business. This fact is an important consideration because lobbying efforts by gun manufacturers have blocked important legislation involving the sale and purchase of guns from being enacted. In 2013, America manufactured 10.8 million guns, a number higher than any previous year. In fact, the gun manufacturing industry is a vital component of the U.S. economy. The annual revenue of the gun and ammunition manufacturing industry stands at \$13.5 billion dollars. In America, there is a

tremendous amount of social and cultural pressure for gun ownership (BBC, 2015). Firearms will always be needed, as long as we have to defend ourselves against threats, both foreign and domestic. The firearms manufacturers will always exist, and they will continue to sell their weapons. The challenge for public health professionals is to find an adequate system for regulating the sale and possession of firearms, one that our society can accept (Franco et al., 2015). In 2013, a poll showed that more than 90% of Americans, 84% of gun owners, and 74% of NRA members supported universal background checks for the purchase of a firearm. Even with this overwhelming majority support for this legislation, it did not pass in the Senate. Public health professionals are extremely aware that the gun-related mortality has been increasing each year in the United States (Law Center to Prevent Gun Violence, 2016).

Even in the face of all these obstacles and roadblocks, there are reasons to remain optimistic. For example, most people who attempt suicide do not proceed to commit suicide. Also, many unintentional gun-related deaths are preventable. This information is good news and needs to be shared among the general population because 75% of Americans think that suicide is not preventable. It is a mistake to present gun violence as a single unit instead of breaking it down into categories because it gives people license not to learn about the different forms of gun violence and how to tackle each one independently (Soreson, 2015). In addition to public health efforts, strong legislation regulating the access, purchase, possession, and handling of firearms is constitutional and a critical component of reducing the epidemic of gun violence in America. Figure 16 shows the percentage of people that support universal background checks (Law Center to Prevent Gun Violence, 2016).

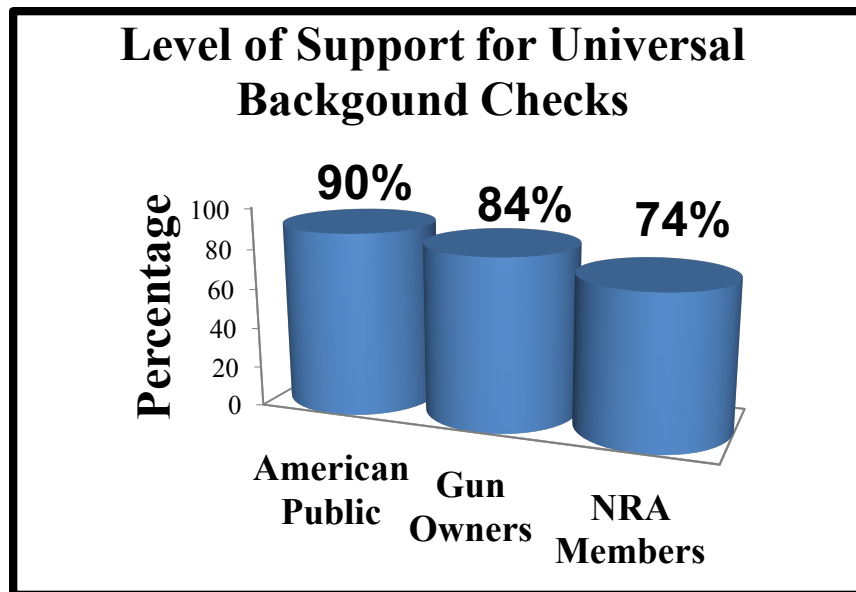


Figure 16. Support for Universal Background Checks by Different Groups (Law Center to Prevent Gun Violence, 2016).

WHAT ARE THE MOST SIGNIFICANT GUN LAWS TRENDS IN THE UNITED STATES, CALIFORNIA, AND TEXAS TO PREVENT GUN VIOLENCE AND REDUCE FIREARM-RELATED MORTALITY?

There are two main trends regarding firearm legislation. In states with strict gun laws (like California), the legislatures and ballot initiatives are trying to close the private sales loopholes and requiring the universal background checks. In states that have more lax gun laws (like Texas), there is a pushback, and the legislatures are trying to increase the carrying of firearms in public spaces, schools, and churches (Law Center to Prevent Gun Violence, 2016)

LIMITATIONS OF GUN LAWS STUDIES

Most of the studies that evaluate firearm legislation are observational ecological cross-sectional or longitudinal studies. In general, these studies have limitations related to confounding, the uncertainty of the temporal sequence and variations in the enforcement and implementation of firearm legislation. There are limitations to studies that evaluate gun laws. For instance, the cross-sectional studies evaluating gun laws provide only a snapshot in time and cannot tell us what effect laws are having over an extended period (Kalesan et al., 2016). In addition to this, investigators try to control for variables that might affect gun mortality (e.g., unemployment, firearm exports, and firearm ownership rates). However, there are other factors harder to control for that can affect firearm mortality rate (e.g., poverty, alcohol consumption, urban settings, and mental health issues) (Hemenway, 2016).

Also, ecological studies have found heterogeneity in firearm fatality rates among states within each level of the strength scores. For example, South Dakota has weak gun control laws by rank, but it also has low rates of firearm mortality because of its small population. Studies that compare different laws and try to rank them uniformly will have heterogeneity. This effect is to be expected when there are different laws in all fifty states. First of all, studies that evaluate laws by assigning legislative strength scores tallying a single point per law have not been validated. Also, dividing states into quartiles and ranks by legislative strength is essentially the same as using a scoring system, and this has not been validated either. Secondly, the majority of studies have examined only deaths by firearms and not nonfatal injuries. There are approximately 2.6 nonfatal firearm injuries treated for every firearm death. Additionally, most studies are not able to control for the implementation and enforcement of gun laws or the exploitation of loopholes, which vary among states. States with more legislation and lower fatality rates considered being safer. However, ecological studies cannot determine if the greater number of laws is the reason for the reduced fatalities. There could be confounders between firearm ownership rates and other factors not taken into account (Fleegler et al., 2013). High-quality research overcoming the limitations of the existing studies is needed to have a better understanding of what interventions are more likely to succeed in states and localities. This information can be extremely helpful

when developing policies aimed at reducing the burden of firearm-related violence in the specific context of unintentional injuries, homicide, and suicides (Kalesan et al., 2016).

The Dickey Amendment restricted federally funded research related to gun violence, and it has limited access to complete crime gun data. Congress should provide unrestricted funding to the CDC and the NIH for research into the causes of firearm violence. Presently, we do not have appropriate surveillance data on gun violence. The National Violent Death Reporting System (NVDRS) currently collects data from only thirty-two states, and these data is not an accurate national representation of the statistics. We need information on firearm fatalities from all fifty states and the District of Columbia to obtain a clear picture of the problem of gun violence in the United States. This surveillance data would provide invaluable information that would allow us to design targeted gun violence prevention strategies. We must move toward access to nationwide gun data. Congress increased the funding for the NVDRS program in 2014, allocating \$11.2 million dollars, which will allow progress toward the goal of fifty-state surveillance. However, we must secure \$23.5 million dollars for the nationwide NVDRS expansion. We need this critical information to fill gaps in our knowledge. For instance, there is almost no credible evidence that open carry laws increase or decrease violent crime. We have no empirical evidence to support many programs designed to reduce gun violence targeting children and the youth. There is also limited information about the effects of different gun safety technologies on violence and crimes. Even though currently there are specialized gun trigger locks and safes on the market, there is a limited investment and research into gun safety technology, which could prevent unauthorized gun access and misuse, including unintentional shootings. Also, we do not know if there is a link between firearm policy and suicidal behavior. It is imperative to expand data collection and conduct research related to gun violence to understand its causes better and to develop appropriate solutions (APHA, 2016).

Chapter 6 Conclusion

Every day in America ninety people die due to gun violence (CDC, 2015). Even in light of this fact, the U.S. remains mired in a contentious debate over the public health burden of gun violence and what actions are necessary to address its impact on America's healthcare system (Lee et al., 2014). Gun violence costs the U.S. \$229 billion, or an average of \$700 per gun (APHA, 2016). Gun-related injuries and deaths, like motor vehicle fatalities, are preventable. We can significantly reduce firearm deaths just like we have reduced motor vehicle deaths. We need to take many steps to deal with the public health burden of gun violence even if it is a complicated and deeply rooted cultural issue (Kalesan, 2015). The most effective way to confront this problem is to break it down into three main parts: research, legislation, and public health policy.

RESEARCH

The Dickey Amendment restricted funding research that "advocates or promotes gun control," and the actions of Congress in cutting the budget had a dramatic effect on gun violence research. The combination of these two measures has stalled and stymied the gathering of critical data to inform prevention of gun violence strategies over the past twenty years (Jamieson, 2013). Research must target understanding financial, social, health, and disability-related issues to enhance our knowledge of gun violence and accelerate the development of interventions and policies to decrease the staggering medical and societal cost of gun violence (Lee et al., 2014). The moratorium placed on funding for the CDC and NIH has impeded progress toward evidence-based solutions to the issue of gun violence because an essential part of preventing future tragedies is conducting rigorous scientific studies. This approach has proven to be effective in the past with a reduction of fatalities from motor vehicle accidents. We have to fund the CDC and NIH to determine the causes of gun violence. President Obama renewed his \$10 million budget request to Congress for FY 2017 to fund gun violence research (The White House, 2016). President Trump's budget request for Congress for FY 2018 for the Department of Human and Health Services that gives funding to the CDC and NIH is \$69 billion, a \$15.1 billion or 17.9% decrease from 2017. In this budget, there are no funds in the CDC's appropriations dedicated to

gun violence research (The White House, 2017). We can sign petitions and call our house representatives and senators and pressure them to support firearm research. We can also support and donate our time and money to non-profit organizations like the Brady Campaign and the Law Center to Prevent Gun Violence.

LEGISLATION

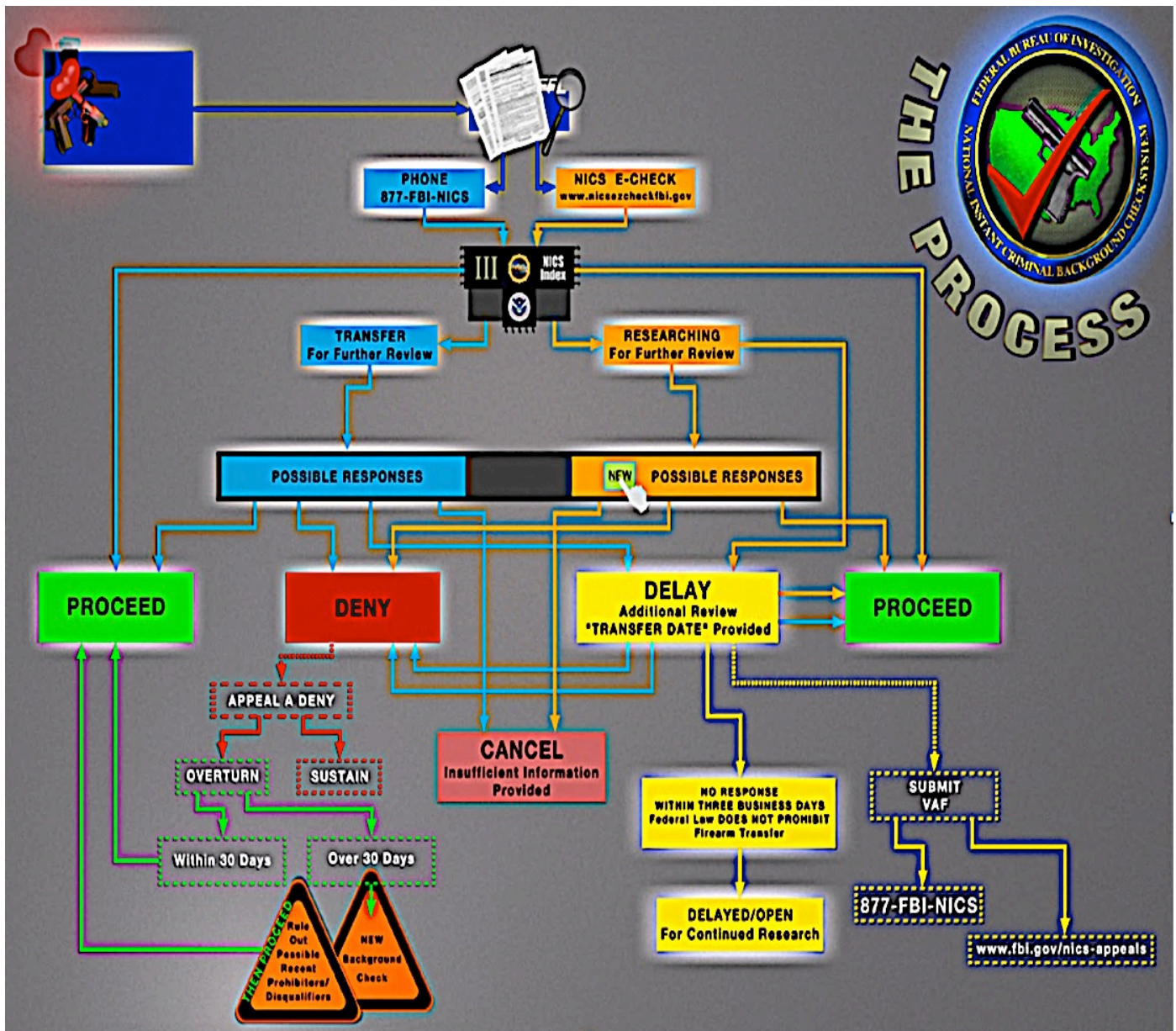
The societal cost of gun violence goes beyond the statistics and the death toll. Our failure to pass meaningful laws to control gun violence and to lift the restrictions on firearm research will continue to add to the unsustainability of our healthcare system (Lee et al., 2014). For this reason, the Brady Act is the most important piece of legislation that we have to decrease firearm mortality. It reduces gun violence significantly with the use of the National Instant Criminal Background Check System. Brady checks have the support of more than 90% of Americans, 84% of gun owners, and 74% of NRA members (Brady Campaign to Prevent Gun Violence, 2016). We need to expand the Brady Act to demand universal background checks for all firearm sales, including private sales, gun show purchases, and online sales. California has already adopted this measure. Other states, like Texas, need to make background checks universal to prevent guns from getting into the hands of criminals, fugitives, domestic abusers, and severely mentally ill people. We can write letters and call our representatives and urge them to co-sponsor bills that support the expansion of Brady background checks. In addition to this, states can pass other legislation to strengthen their gun laws and make their communities safer, preventing gun trafficking to other states and banning assault rifles (Brady Campaign to Prevent Gun Violence, 2016). Prevention does not require predicting the people who will act violently. For instance, aviation safety regulations make air travel safer for everyone by making a secure environment their goal. They work toward eliminating and reducing gaps in regulations that allow for lapses in safety that can lead to harm. We need to do the same by expanding background checks for all gun sales on all platforms and preventing unauthorized people from getting guns (APHA, 2016).

PUBLIC HEALTH POLICY

Gun violence is one of the leading causes of preventable death in our country. Public health professionals must take a comprehensive approach by connecting complex factors that result in violence, injuries, and fatalities including social, clinical and mental health issues, and environmental factors. We need to focus on improving three areas of gun-related violence: unintentional injury, suicide, and homicide. We can create campaigns that target social norms, mental health issues and stigma as well as the gun culture to impact these areas. We can decrease unintentional injuries by asking gun owners how they store their firearms and teaching them the best way to store them to prevent children from accessing the guns. We can prevent suicide by reducing the social stigma of mental illness and expanding access to mental health services in addition to removing guns from the home if someone is suicidal. We can reduce homicide with campaigns that tackle domestic violence and straw purchases of guns (Hemenway, 2013). Gun-related mortality is not different from motor vehicle mortality. We can implement policies and campaigns to prevent firearm deaths and make our communities safer and reduce the burden of gun violence to decrease firearm-related mortality.

Appendix A

The Algorithm of the National Instant Background Check System (FBI, 2014)



Appendix B

System Used to Award Points for Gun Laws to Determine Brady Scorecard (Law Center to Prevent Gun Violence and Brady Campaign to prevent Gun Violence, 2013).

Methodology for Awarding Points for Gun Laws Matter/Brady Scorecard

Policy and Description	Points ¹
Background Checks and Access to Firearms	23
1. Background Checks=11 Laws that regulate firearms sales by persons who are not licensed by the federal government (federal law requires only federally licensed dealers to conduct background checks and complete and maintain records of sales)	Require background checks for all unlicensed sales 11 – Require background checks for unlicensed sales of select firearms only or at gun shows only (6) – Require a permit to purchase that is valid for 30 days or less (3)
2. Mental Health Reporting=2 Laws requiring that relevant mental health records are sent to the F.B.I. for the purpose of firearm purchaser background checks	Require that records are sent to the F.B.I. for inclusion in the National Instant Criminal Background Check System 2
3. Categories of Prohibited People=5 Laws that establish categories of persons deemed ineligible to purchase or possess firearms	Prohibit violent and firearms-related misdemeanants 1 Prohibit individuals listed on terror watch list or “no fly” list 1 Prohibit drug or alcohol abusers 1 Prohibit juvenile offenders 1 Prohibit history of serious mental illness 1
4. Background Check Procedure=1 Laws that regulate the background check process used to identify persons who are not legally permitted to purchase or possess firearms	Point of contact state for all firearms 1 – Point of contact state for handguns only (.5)
5. Domestic Violence and Firearms=4 Laws intended to keep firearms out of the hands of domestic violence perpetrators	Require removal of firearms at DV scene 2 Require removal when protective order issued 2
Other Regulation of Sales and Transfers	24
6. Dealer Regulations=6 Laws that require firearms dealers to be licensed and/or laws that impose other requirements on dealers such as recordkeeping, security practices, or employee background checks	Require dealer license 6 – No license but other regulations on dealers (e.g. ban residential dealers, require employee background checks, security require sales and/or loss or theft reporting (3)
7. Maintaining Records of Gun Sales=6 Laws that require firearms sellers to send records to a centralized database where they are maintained by a government agency	Require records sent to law enforcement 6 – Handguns and some other firearms (3)
8. Purchases and Sales of Multiple Firearms=6 Laws that restrict the number of firearms that may be purchased by or sold to an individual within a given time frame	Restrict multiple purchase or sales 6

9. Waiting Periods=6 Laws that require that a specified number of days elapse between the time a firearm is purchased and the time it is physically transferred to the purchaser	Require waiting period of 3 days or more – Require 1-2 day waiting period or waiting period for select guns only	6 (3)
<i>Gun Owner Accountability</i>		18
10. Licensing of Gun Owners and Purchasers=6 Laws that require an individual to obtain a license or permit authorizing him or her to purchase and/or possess a firearm	Require license for purchase or possession of all firearms – Require license for select firearms only	6 (3)
11. Registration of Firearms=6 Laws that require gun owners to record the ownership of their firearms with a designated law enforcement agency	Require registration for all firearms – Require registration for select firearms only	6 (3)
12. Reporting Lost or Stolen Firearms=6 Laws that require individuals to report the loss or theft of their firearms within a specified period of time	Require reporting of lost or stolen firearms	6
<i>Firearms in Public Places</i>		6
13. Concealed Weapons Permitting=5 Laws that regulate the carrying of concealed firearms	Discretionary (“May issue”) permitting system “Shall issue” permitting system Allow concealed carry with no permit	5 0 (-3)
14. Openly Carrying=1 Laws that regulate the open carrying of firearms	Prohibit open carry of all firearms – Prohibit open carry of some firearms or require a permit	1 (.5)
15. Guns in Public Places Categories=-4 Laws that allow guns in bars, on school property and in other sensitive areas	Allow hidden guns in bars Allow hidden guns on campus and/or K-12 Allow hidden guns in state parks Allow hidden guns in houses of worship	-1 -1 -1 -1
16. Guns in Parking Areas=-2 Laws that require employers and/or other businesses to allow firearms to be stored in parking areas on private property	Require businesses to allow guns in vehicles in parking areas	-2
17. Shoot First Laws (“Stand Your Ground”)= -3 Laws that remove the traditional “duty to retreat” from an area outside the home prior to the use of deadly force in self-defense	Remove duty to retreat anywhere outside the home – Remove duty to retreat when in vehicle only	-3 (-1)
<i>Classes of Weapons and Ammunition/Magazines</i>		13
18. Assault Weapons=3 Laws that ban or regulate semi-automatic firearms designed with military features to allow rapid and accurate spray firing	Ban assault weapons – Regulate assault weapons or ban select assault weapons only	3 (1)
19. Large Capacity Ammunition Magazines=3 Laws that ban detachable magazines with a capacity to store a large number of rounds of ammunition (usually more than 10) for automatic	Ban large capacity ammunition magazines – Over 10 rounds – Over 15 rounds	3 (2)

and semi-automatic firearms	
20. Fifty Caliber Rifles=1 Laws that ban military firearms that combine long range, accuracy, and massive power	Ban fifty caliber rifles – Ban select fifty caliber rifles or regulate fifty caliber rifles 1 (.5)
21. Ammunition Regulation=6 Laws that regulate the transfer of firearm ammunition	Require license to purchase, sell or possess ammunition 6
Consumer and Child Safety	8
22. Minimum Age to Purchase and/or Possess=2 Laws that restrict possession and/or purchase of firearms to minors	Stronger than federal law for all firearms possession or purchase 2
23. Safe Storage (Locking Devices)=2 Laws that require the sale and/or use of a wide range of disabling devices designed to keep unauthorized users from gaining access to guns and to reduce the risk of suicide and unintentional death and injury	Require use of locking device – Require locking device with firearms sale 2 (1)
24. Personalized and Owner-Authorized Firearms=1 Laws that require firearms to be equipped with technology that allows them to be fired only by an authorized user	Personalized firearm law 1
25. Child Access Prevention=1 Laws that impose liability on adults who leave firearms accessible to children or otherwise allow children access to firearms	Negligence-based law – Knowing/intentional or recklessness-based law 1 (.5)
26. Design Safety Standards for Handguns =2 Laws that require firearms to meet design and construction standards to reduce the risk of unintentional death and injury	Require specific design and safety standards such as a chamber load indicator or magazine disconnect mechanism and/or allow only sale of approved guns listed on an official roster 2
Investigating Gun Crimes	2
27. Microstamping=2 Laws that require firearms to be equipped with technology that stamps a code on to the cartridge casing when the gun is fired. The code identifies the firearm that fired the round	Require firearms be equipped with microstamping technology 2
Local Authority to Regulate	6
28. Local Laws Allowed=6 Laws regulating the scope of local authority to regulate firearms	Allow broad local regulation – Allow substantial local regulation 6 (4)
Other	
29. Nullification of Federal Law=-1 Laws that declare firearms and/or ammunition made and kept in state exempt from federal law	Declare federal law inapplicable -1
30. Medical Gag Rule=-2 Laws that penalize medical providers for discussing firearm ownership and/or storage with patients	Penalize medical providers for discussing firearms with patients -2
Total	100

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Vita

Betsy Escobar was born in Chicago, Illinois, in 1988. She loves science and always wanted to help people at their most vulnerable when they are sick. Betsy studied biology and chemistry to pursue a career in medicine. In medical school, she loved learning about the diagnosis, treatment, and prevention of diseases and interacting with patients. During her studies, she became passionate about conducting research. Betsy mapped enzymatic active sites of G proteins to understand how bacterial cytotoxins, like cholera, hijack cellular pathways and cause permanent activation of enzymes, leading to diarrheal illness. She used nanotechnology to fabricate cost-effective carbon-based sensors to detect important biofluid components found in plasma during homeostatic states and in pathological diseases. While working in the hospital, Betsy encountered an AIDS patient with a rare presentation of GI histoplasmosis causing a tumor obstructing the duodenum. She published this case report to explore the causes of this rare phenomenon. Now, she is pursuing her Master in Public Health to strengthen her knowledge of statistics and epidemiology. Her vision for the future is to have an impact on public health through policy to improve people's health, wellness, and quality of life.

Education

University of Texas Medical Branch, Galveston, TX 2010-2017

- MD. MPH. with a concentration in Global and Bilingual Health and Epidemiology (exp. Summer 2017).

University of Houston-Downtown, Houston, TX 2006-2010

- B.S. Biology and Chemistry.
- Awards and Honors: Scholars Academy Honor Corp, Phi Beta Kappa, *Magna Cum Laude*.

Publications and Presentations

Publications

1. **Escobar B.**, Maldonado V., Ansari S., Sarria. J.C. (2014). *Antigen negative gastrointestinal histoplasmosis in an AIDS patient*. Am J Case Rep 2014; 15:90-93

Oral Presentations

1. **Escobar B.**, McColloster P. MD., McColloster L.,(2015, June 28-30). *The Medical Care of “Permanently Hospitalized” Undocumented Immigrants*. Oral presentation at the North American Primary Care Research Group PBRN Conference, Bethesda, MD.
2. **Escobar B.**, Jaggi, S., Hasan, S., Ochoa, T. MD. (2013, March 22-23). *El Comedor: An Intervention to Prevent Child Malnutrition and Diarrheal Diseases in Peru*. Poster presented at the Houston Global Health Collaborative Advance Global Health Conference, Houston, TX.
3. **Escobar B.**, Gottumukkala, S., Sadana, R. Ph.D., Dessauer, C. Ph.D. (2010, April 30). *Progress Towards Narrowing Down Inactive G-protein Binding Site on N-terminus of Adenylyl Cyclase*. Poster presented at the Student Research Conference Spring 2010, University of Houston-Downtown, Houston, TX.

Poster Presentations

1. **Escobar B.**, Mutambudzi M. Ph.D.MPH., Cooksley C. Dr.PH.MPH., Arcari, C. Ph.D.MPH. (2016, April 7). *A Tale of Two States: Texas v. California Firearm Mortality, Legislation and Policies to Reduce Firearm-related Violence in the United States*. Poster presented at the Preventive Medicine & Community Health Public Health Symposium, Galveston, TX.
2. **Escobar B.**, Faz A., Sodhi J., Soudah O., Mutambudzi M. Ph.D.MPH (2016, April 7). *The SNAP Challenge: Dealing with Chronic Diseases on a Low Budget and Food Insecurity*. Poster presented at the Preventive Medicine & Community Health Public Health Symposium, Galveston, TX.
3. **Escobar B.**, Jaggi, S., Hasan, S., Ochoa, T. MD. (2012, October 17). *El Comedor: An Intervention to Prevent Child Malnutrition and Diarrheal Diseases in Peru*. Poster presented at the Galveston National Lab, Global Health Education Symposium, Galveston, TX.
4. **Escobar B.**, Gottumukkala, S., Sadana, R. Ph.D., Dessauer, C. Ph.D. (2010, May 18). *Progress Towards Narrowing Down Inactive G-protein Binding Site on N-terminus of*

Adenylyl Cyclase. Poster presented at the Baylor College of Medicine, IRACDA Symposium, Houston, TX.

5. **Escobar B.**, Jiang, M. Ph.D. (2009, April 23). *New Nanotube Functional Sensor Material Based on Buckyballs Cluster-Aniline Composite*. Poster presented at the Student Research Conference Spring 2009, University of Houston-Downtown, Houston, TX.
6. **Escobar B.**, Gatica E., Jiang M. Ph.D. (2008, November 14-16). *Carbon Nanotube Embedded Composites as New Sensing Material for Conventional Biofluid Components*. Poster presented at the Sigma XI Research Conference, Washington D.C.
7. **Escobar B.**, Gatica E., Jiang M. Ph.D. (2008, November 4-8). *Sensory Accessibility of Embedded Carbon Powders toward Biofluid Components*. Poster presented at the Annual Biomedical Research Conference for Minority Students (ABRCMS), Orlando, FL.
8. **Escobar B.**, Gatica E., Jiang M. Ph.D. (2008, October 9-11). *Composite based thin films for sensor construction: Exploration of carbon and non-carbon sol-gel material*. Poster presented at the Society for Advancement of Chicanos and Native Americans (SACNAS) Research Conference, Salt Lake City, UT.
9. **Escobar B.**, Gatica E., Jiang M. Ph.D. (2008, October 9-11). *Sensory Accessibility of Embedded Carbon Powders toward Biofluid Components*. Poster presented at the Society for Advancement of Chicanos and Native Americans (SACNAS) Research Conference, Salt Lake City, UT.
10. **Escobar B.**, Gatica E., Jiang M. Ph.D. (2008, April 11). *Sensory Accessibility of Embedded Carbon Powders toward Biofluid Components*. Poster presented at the Student Research Conference Spring 2008, University of Houston-Downtown, Houston, TX.

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