

**FIREARM INJURY PREVENTION:
UNDERSTANDING FIREARM
POLICY DIFFUSION,
1993-2010**

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ABSTRACT

Annually firearms kill more than 30,000 individuals and injure more than 50,000 individuals, resulting in costs of \$45 million to over \$1 billion in the United States. Traditionally firearms were addressed as a criminal justice problem, but for more than 30 years, public health and injury prevention specialists have worked to address the problem of firearm injuries through surveillance, education, research, and laws. Firearm legislation is multijurisdictional across the federal, state, and local governments, but the majority of activity is at the state levels. Firearm injury prevention efforts must navigate a politically diverse arena dominated by social regulatory politics in order to affect change. This study presents newly analyzed data on seven firearms laws: child access prevention, minimum age to purchase/possess a handgun, stand your ground, large capacity ammunition limits, Saturday night specials and assault weapons bans. A goal of the study was to create a 50 states longitudinal dataset in order to investigate the relationship between internal state political and demographics characteristics and firearm policy diffusion. The study findings are presented across three manuscripts, which address the trends of enactment of the laws, the analysis of the six gun control laws, and an analysis of one permissive firearm law (stand your ground laws). A panel data set was created from publicly available sources for each state from 1993 to 2010. General Estimating Equations (GEE) were used to evaluate the impact of citizen pressures, lobby pressures, legislative characteristics, and demographic data on the adoption of the seven selected laws. Study findings identified waves of adoption of the firearm laws across politically and demographically similar states in the early study years (1993-94) and the later study years (2005-10). States with Democratic state governments were more likely

to pass gun control laws while states with Republican state governments were more likely to pass stand your ground laws. Poverty was also a statistically significant variable for the passage of the laws: states with lower poverty levels were more likely to pass gun control laws while states with higher poverty levels were more likely to pass stand your ground laws. However, aside from legislation to ensure consistency with federal law, most states are not responding to the public call for regulation as measured by the enactment of the selected laws. Instead, a trend of permissive firearms laws is rapidly spreading across the 50 states. Firearm injury prevention advocates should not be deterred by political environments. Rather, they should respond to cues to optimize change for injury prevention. Understanding mechanisms for firearm policy adoption, such as the role of legislative characteristics may help researchers and firearm injury prevention advocates focus limited resources to introduce bills in policy-friendly states. This dissertation contributes to the firearm injury prevention literature by applying policy diffusion theories and analysis techniques to firearm injury prevention efforts. Findings support the literature that internal state political and demographic characteristics guide the adoption of firearm laws.

This dissertation is dedicate to
My brother, Charles John McKelvey.

You left us too soon,

We never got to celebrate.

Thank you for always believing in me.

Memories of you helped to keep me going,
During the long nights of fretting and writing.
Please know that you are always in my heart.

Love, Your Big Sister

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CHAPTER 1

INTRODUCTION

Background

The United States is suffering from a firearm injury epidemic. The incidence of mass shootings (defined by the Federal Bureau of Investigation as four or more individuals killed in one setting, not including the shooter (Federal Bureau of Investigation, n.d.-a)) has tripled from an average of four in 2000, to 12 events in 2013 (The Associated Press State & Local Wire, 2013). Two of the deadliest mass shootings happened in 2012 - the “Batman” shooting in Aurora, Colorado (Brown, 2012) and the Sandy Hook Elementary School shootings in Newtown, Connecticut (Esposito, Smith, & Ng, 2013) claiming a total of 39 lives. A national debate on access to firearms captures the public’s attention, with pro-gun, gun control groups, and policymakers putting forth solutions to prevent the next crisis. However, these mass shootings only tell a small portion of the firearm injury story.

Each year, firearms fatally injure more than 30,000 people, and cause an additional 55,000 nonfatal injuries, with an estimated annual cost of \$45 billion dollars to society (Centers for Disease Control and Prevention National Center for Injury Prevention and Control, 2012). Suicide and homicide by firearms accounted for the fourth and fifth leading causes of death due to injury in the United States (Centers for Disease Control and Prevention National Center for Injury Prevention and Control, 2012). Handguns account for 80% of all firearm homicides and suicides and are also the

predominate firearm involved in accidental childhood shooting fatalities (Cook & Ludwig, 2004). The estimated civilian stockpile of firearms nationwide is 310 million, 114 million of which are handguns (Cook & Ludwig, 2004; Karp, 2007; Ludwig, 1998). Per capita, the civilian stockpile has roughly doubled since 1986, from one gun per every two people to one gun per person in 2010. Analyses of state household firearm ownership rates showed significantly higher rates of homicide victimization in homes with firearms (Kellermann et al., 1993; Miller, Hemenway, & Azrael, 2007) as well as significantly higher suicide rates (Kaplan & Geling, 1998; Miller, Azrael, & Hemenway, 2002a). And in states and regions with higher firearm prevalence, children (ages 5-14) have disproportionately higher rates of suicide, homicide, and unintentional firearm deaths (Miller, et al., 2002).

Solutions to the problem of firearm injuries vary widely and must respond to multiple competing obstacles. Traditionally, firearms have been seen as a criminal justice issue but, in the 1970s, the Centers for Disease Control and Prevention (CDC) declared firearm violence a threat to the public's health and began funding surveillance of firearm morbidity and mortality, coupled with research into violence prevention measures (US Department of Health Education and Welfare, 1979); this ended in 1996 with Congress' suspension of funding to the CDC's division on firearm injury prevention (Cagle & Martinez, 2004; Jamieson, 2013). Funding to the CDC for firearms research was reinstated in 2013, but a loss of knowledge and ability to properly evaluate policy in real-time are the ripple effects of this seventeen year gap. For example, in 2003, the CDC Task Force on Community Preventive Services issued "First Reports Evaluating the

Effectiveness of Strategies for Preventing Violence: Firearms Laws” [underlines added for emphasis]:

In summary, the Task Force found insufficient evidence to determine the effectiveness of any of the firearms laws reviewed for preventing violence....The Task Force's review of firearms laws found insufficient evidence to determine whether the laws reviewed reduce (or increase) specific violent outcomes. Much existing research suffers from problems with data, analytic methods, or both. Further high-quality research is required to establish the relationship between firearms laws and violent outcomes. (Hahn et al., 2003, 1)

Conclusions about policy effectiveness can be challenging to make due to insufficient data. Government agencies (e.g., the Centers for Disease Control and Prevention, the Federal Bureau of Investigation, and the Department of Justice), academics, and non-profits are working to collect accurate data within and across time periods. In addition to these efforts, state and local government agencies need to work together. Without a more comprehensive data set, economic, epidemiologic, and evaluation studies will be missing key variables. Researchers in injury prevention are therefore left to spend years creating validated proxy variables for basic surveillance questions, such as the number of gun owners (Cook, 1979). The information vacuum, along with the political polarization of the public debate on firearms has fostered an environment such that for two decades, federal and state firearms laws have been passed more based on politics than science and evidence. Since the 2000s, more permissive laws have become increasingly popular, and following mass shooting events like those at Virginia Polytechnic Institute and State University (Virginia Tech) and Sandy Hook Elementary School, a deeper divide has grown on the solution to firearm injury prevention.

In addition to multiple and competing interests, there are multiple and competing venues in which firearm injury prevention efforts occur: federal, state, and local levels. Firearms are addressed by each level of government, but the most activity occurs at the state-levels; and this is the focus of the current research project. A state-by-state study on firearm ownership concerns within the U.S. found that the majority of Americans feel less safe when others within their community are able to carry firearms; specific subgroups that feel less safe include “non-whites, urban dwellers, adults with children in the household, and people who do not own or carry guns” (Hemenway, Azrael, & Miller, 2001, 283). Despite the majority of public sentiment, gun control has significantly eroded over the years. Many attribute these changes to the increasing strength of the single-issue groups, and their ability to translate their members’ fervor into policy (Cigler & Loomis, 2012, 1983; Goss, 2010; Spitzer, 2011). The National Rifle Association (NRA) and other firearm owners groups have effectively used grass-roots efforts to mobilize their members on a moment’s notice.

Study Rationale

Despite the challenges to conducting firearm research, quality work exists. Much of that work focuses on the relationship between firearms and violence (Ayres & Donohue, 2003; Cook & Ludwig, 2004; Lott, 2010; Vizzard, 2000) or its role as a social regulatory policy (Spitzer, 2004). Many of the firearm policy adoption studies tend to be qualitative in nature (Vizzard, 2000; Janet Weiner et al., 2007; Wilson & Rozell, 1998), though quantitative studies do exist (Bruce & Wilcox, 1998; Carter, 1997; Grossman &

Lee, 2008; Tucker, Stoutenborough, & Beverlin, 2012). To date, much of the quantitative work has focused on the adoption of one law (Gimpel & Wolpert, 1998; Tucker et al., 2012), or the impact of special interest on federal firearm adoption (Goss, 2010), or the role of public opinion and gun laws (Wilson, 2013). Previous research has not explored the impact of specific political, demographic, and public health issues on the adoption of the selected firearms laws across all 50 states across nearly two decades. This study is an attempt to bridge the worlds of policy adoption research and injury prevention research to better understand factors that impact the adoption of firearm laws across the 50 states. Selecting known variables that impact policy adoption in general, and firearm policy adoption specifically, along with variables that are pertinent to the discussion of firearms in the U.S., specifically, injury and crime variables. Adding strength to the study is the longitudinal nature of the study design. A subset of firearms laws passed between 1993-2010, that were intended to prevent firearm injury within states, will be examined and tested. Its purpose is to serve as a first step to analyzing factors that could inform the injury prevention community on allocating scarce resources for the passage of effective, state-level firearm laws. This study is not intended to address or enter the debate on the impact of laws on firearm injury outcomes. A primary assumption guiding this study is that states learn from each other, rather than operating in a vacuum. It is the goal of this study to learn about factors that contribute to these influencing processes.

The Second Amendment

Unlike other areas of public health and injury prevention, firearms are afforded a special status in the U.S. Constitution via the Second Amendment, which states: “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” (*U.S. Constitution Amendment II*). The intention of this amendment and its impact on the ability to regulate a potentially lethal and highly transportable item has been debated for more than a century. This amendment affords protection to something that has an impact on crime and health that is not afforded to any other manufactured item. Two concerns with regard to the legal interpretation of this amendment are: 1) an individual’s right to own firearms and 2) conferring the amendment to the states not just the federal government.

Two landmark U.S. Supreme Court rulings addressed these questions: 1) *Heller v the District of Columbia* (2008) and 2) *MacDonald v Chicago* (2010). In the Heller case, six residents of Washington, D.C. filed a lawsuit challenging the constitutionality of provisions of a local law, the Firearms Control Regulations Act of 1975, which restricted residents from owning handguns. Plaintiffs claimed this infringed upon their Second Amendment rights. Heller was the first ruling on the Second Amendment in over 70 years. The 5-4 decision stated that Second Amendment applied to federal enclaves and protects an individual’s right to possess a firearm, effectively striking down Washington, D.C.’s 32 year ban on handguns (Warren, 2008). The Heller decision left gun rights in relation to the state unclear. Four residents of Chicago sued the city over their ban on handguns. The 2010 McDonald 5-4 decision ruled that the Second Amendment does

apply to laws enacted by state and local governments. To date, lower courts are upholding most federal, state, and local gun laws that have been challenged since *Heller*, but disagreement on the constitutionality of laws regulating the ability to carry firearms in public are meeting challenges (Vernick, 2013). The impact of these decisions on injury prevention efforts and outcomes is still developing and may take many years to fully be understood (Vernick, Rutkow, Webster, & Teret, 2011b).

History of Federal Agencies and Laws

Federal firearms regulation is a 20th Century phenomena displaying a struggle between creating legislation for public safety and removing restrictions that infringe upon Second Amendment rights. The passage of the *National Firearms Act of 1934* (NFA) (*National Firearms Act, 1934*) and the *Federal Firearms Act of 1938* (FFA) (*The Federal Firearms Act of 1938, 1938*) created federal jurisdiction for intra- and interstate transactions of “gangster weapons” via taxation rather than the commerce clause, with oversight conducted by the Internal Revenue Service (IRS) (Zimring & Hawkins, 1992). Thirty years later, the *Gun Control Act of 1968* (GCA) passed, broadly regulating the firearms industry and firearms owners, focusing on interstate commerce (*Gun Control Act of 1968, Public Law 90-618, Title 18, United States Code – Firearms, 1968*). The increased responsibilities for firearm regulation taxed the IRS so the Department of Alcohol, Tobacco, and Firearms (ATF) was moved to the Department of Justice (DOJ) (Zimring & Hawkins, 1992). The GCA was revised in 1986 with the passage of the

Firearm Owners Protection Act (FOPA) (Firearm Owners' Protection Act of 1986, 1986), a bill supported by gun owners to curb the regulatory power of the ATF.

Violent crimes and homicides steadily climbed during the 1980s, with a sharp peak in the early 1990s. Cracks in the *Gun Control Act of 1968 (GCA)* were getting bigger as failures in the self-report background checks and the flood of domestic Saturday night specials, also known as junk guns, took their toll. Public and political demands for change were mounting, creating an environment ripe for change and once again a Democratic controlled government went to work on passing crime control bills (Spitzer, 2004). In 1993, the *Brady Handgun Violence Prevention Act (Brady Law) (The Brady Handgun Violence Prevention Act of 1993, 1993)* became law, establishing a five-day waiting periods on handgun purchases, and most importantly, creating a five-year time line to create a national instant criminal background check system (NICS) (Federal Bureau of Investigation, n.d.-b).

NICS focused on preventing convicted felons, drug users, the mentally ill, and illegal aliens from purchasing firearms. Challenges existed for the law. First, only authorized dealers had to perform background checks on handgun sales. Second, if a previous background check was completed, such as one for a permit to carry a concealed weapon, then a new background check was not required. Additionally, many states were able to by-pass the background check through laws, such as the conceal carry laws, or by instituting another background check system. Finally, identification of non-felons was a severe challenge for this, and any other law, because there was no national registry, nor

could there be, for this class of individuals due to patient privacy rights (Vernick and Teret, 1993).

Following closely on the heels of the Brady Bill, the *Violent Crime Control Act* (VCCA) (*Violent Crime Control and Law Enforcement Act of 1994*, 1994) became the largest crime prevention bill to-date. The VCCA greatly expanded the scope of the Brady Law and included the much controversial *Assault Weapons Ban* (*Violent Crime Control and Enforcement Act of 1994, Title XI*, 1994). The bill was dedicated to crime and law enforcement with two gun control components: expansion of restricted persons and the Assault Weapons Ban. Newly restricted persons included two difficult to capture groups: “mental defectives” and “perpetrators of domestic violence.” Neither group can be captured by the NICS system for felons, posing a challenge for implementation. The *Assault Weapons Ban* was controversial because “assault weapon” is a non-technical term used to define semi-automatic weapons. The ban included a list of 19 such weapons and dozens of copy-cat weapons, but opponents argued that the described features were similar to most standard hunting and sporting rifles.

Firearm laws have evolved throughout the decades from creating oversight, to strengthening that oversight. Federal firearm legislation has not been linear, though; there has been a tug-of-war between regulation and deregulation with efforts over the past two decades towards laws that will hamper injury prevention efforts. Federal firearm laws in the beginning of the 21st Century showed a slide in gun control laws, with a movement towards loosening restrictions. Examples include the 2004 sunset of the *Assault Weapons Ban* and the 2009 provision within the *Credit Card Accountability*

Responsibility and Disclosure Act of 2009 allowing guns in national parks. The laws discussed above are a sample of the history of firearms laws in the United States; Table 1 illustrates several legislative milestones that passed in the 20th and 21st Centuries.

Table 1. Federal Firearm Legislation, 20th and 21st Century in the United States

Year Passed	Name of Legislation	Significance
1934	National Firearms Act	First significant modern national gun control law Regulation of “gangster weapons” Excise tax on the manufacture and transfer of certain firearms, mandates registration of those firearms
1938	Federal Firearms Act	Increased control over gun sales by establishing a system of gun dealer licensing
1968	Omnibus Crime Control and Safe Streets Act of 1968 (1968)	Prohibited interstate trade in handguns Increased minimum age to 21 for buying handguns Established a national licensing system
1968	Gun Control Act	Regulated interstate firearms commerce, prohibiting interstate firearms transfers except among licensed manufacturers, dealers and importers
1986	Firearm Owners Protection Act (1986)	Revised GCA Reduced or restricted federal regulations on gun sales and dealer inspections
1990	Gun-Free School Zones Act	Prohibited individuals from possessing a firearm in a known “school zone” Supreme Court ruled it unconstitutional; it was reworded in 1995
1993	Brady Handgun Violence Prevention Act	Required national background checks for handgun purchases, for a time required waiting period for prospective purchasers
1996	Omnibus Consolidation Appropriates Bill	Asserted that none of the funds made available for injury prevention and control at the CDC may be used to advocate or promote gun control
1994-2004	Federal Assault Weapons Ban	Subsection of the Violent Crime Control and Law Enforcement Act of 1994 Banned the manufacture and transfer of certain newly manufactured semi-automatic firearms and magazines
1996	Domestic Violence Offender Gun Ban (“the Lautenberg Amendment”)	Banned access to firearms by people convicted of crimes of domestic violence
2005	Protection of Lawful Commerce in Arms Act	Lawsuit protection to the gun industry
2009	Credit Card Accountability Responsibility and Disclosure Act	Allowed people to carry loaded firearms in national parks and wildlife refuges

Source: Bureau of Alcohol, Tobacco, Firearms and Explosives (<https://www.atf.gov/regulations-rulings/regulations/index.html>)

States and Firearm Laws

The power to regulate the sale, possession, and use of firearms lies with the states. The federal government does not have preemption over states with regards to firearm laws. Instead, federal and state governments are able to pass laws independently and the individual is then held to the strictest law. Individuals are not exclusively subject to the firearm laws of the states in which they reside; they also are subject to the laws of states in which they may be visitors. Some states can have reciprocity for laws. For example, conceal carry permits from one state can be recognized by another state (e.g. Idaho recognizes an Oregon permit, but Oregon does not recognize an Idaho permit). State and local police departments are not legally obligated to enforce federal gun laws though this does not confer immunity against prosecution for violations of federal laws. It is at the state level where the majority of the power for firearms regulation lies.

Great variation exists across and within states with regard to firearm laws as a result of efforts address the needs of both the state itself and the individuals living within it (Vernick & Teret, 1993). State solutions can range from minimal restrictions, such as no background checks on private sales and stand your ground laws, to targeted constraints, such as bans on specific types of weapons and restricting child access to firearms.

Selected Firearm Laws

It is not possible for a dissertation to examine all firearm legislation; therefore, this study focuses on a sample of laws that are frequently debated in public and discussed in the public health literature, child protection laws and firearm designs and bans. Protecting children from firearm injury was one of the goals of the CDC in 1979. There are many types of laws designed to protect children, this study selected three to examine closely: child access prevention (CAP), minimum age to possess a firearm, and minimum age to purchase a firearm. As standards, such as safety designs and tests also can reduce childhood injury and criminal misuse, “Saturday night special” bans also were selected for the study. Saturday night specials – also referred to as junk guns – are cheap to make, easy to conceal, and often misfire. In addition to the above-mentioned laws, assault weapons bans and limits on magazine capacity rounds were selected for the study. These laws are often discussed to limit the negative capabilities of firearms when they are used in mass shootings, such as those of Virginia Tech (CNN, 2007) or Sandy Hook Elementary School (Esposito et al., 2013). Opponents of gun control legislation assert that removing firearms from the hands of law abiding citizens actually places people in more danger (Lott, 2010). Following the Virginia Tech shootings, students protested by wearing empty holsters to class because they felt that an armed individual could have prevented the scale of the tragedy (Underwood, 2007). Such vocalized sentiment for reducing regulations is increasingly becoming popular; therefore, the study also includes “stand your ground” laws which expand the castle doctrine and remove the duty to retreat, this will be discussed further in the ensuing paragraphs.

CAP Laws

Protecting children from firearm injury was one of the goals of the CDC in 1979 (US Department of Health Education and Welfare, 1979). Millions of children live in homes with firearms; and many of these firearms are easily accessed by minors. In fact, approximately one in three handguns is kept loaded and unlocked. A 2006 study found that 73% of children under age 10 living in homes with guns reports knowing the location of their parents' firearm, with 36% admitting they had handled the weapon (Baxley & Miller, 2006). Children who access firearms are at greater risk of injury, specifically suicide; and the firearms used in these attempts were stored in the residence of the victim, a relative, or a friend (Grossman, Reay, & Baker, 1999; Kellermann et al., 1993). Studies of school shootings have found that in more than 65% of the cases, the attacker got the gun from his or her own home, or that of a relative (United States Secret Service, 2000). Child access prevention (CAP) laws impose criminal liability on adults who give children unsupervised access to firearms. CAP laws have been found to be effective in reducing unintentional firearm deaths among children. Studies have found that safe gun storage practices have a protective effect on reducing youth suicide and unintentional injury (Cummings, Grossman, Rivara, & Koepsell, 1997; Grossman et al., 1999; Webster, Vernick, Zeoli, & Manganello, 2004).

Minimum Age to Purchase/Possess Laws

Minimum age requirements are also intended to decrease access to firearms by young people and correspondingly, decrease the number of suicides, homicides, and

unintentional shootings affecting youth. Federal law prohibits dealers from selling or delivering handguns and ammunition for those firearms to any person under the age of 21, but a loophole exists because unlicensed dealers are allowed to sell handguns and their ammunition to persons aged 18 or older. A survey of convicted gun offenders in 13 states found that nearly a quarter of them would have been prohibited from obtaining firearms at the time of the crime if the minimum legal age for possessing any type of firearm was 21 years (Vittes, Vernick, & Webster, 2012).

Junk Guns

Federal law imposes no design safety standards on domestically produced firearms. As a result, many firearms are manufactured and sold in the U.S. without completing appropriate safety testing and without including certain basic safety features. Poorly constructed guns can fire even when the trigger has not been pulled, or they do not fire when the trigger has been pulled. Firearms of this kind are commonly referred to as “junk guns” or “Saturday night specials.” These low-quality handguns often are composed of inferior metals or plastic and designed in ways to unreasonably reduce manufacturing costs. Broadly speaking, these handguns are cheap, easily concealed, and more likely to misfire or malfunction than other firearms.

Half of the firearms most frequently traced by the ATF in 2000 were manufactured by companies known to produce low-quality firearms (Dahl, 2004). Poorly constructed firearms play a significant role in unintentional shootings and are disproportionately associated with criminal misuse, especially by juveniles and young

adults. Between 2005 and 2010, more than 42,000 people under the age of 25 were injured or killed by unintentional shootings (Centers for Disease Control and Prevention National Center for Injury Prevention and Control, 2012). While unintentional or accidental shootings account for a small share of firearm related mortality and morbidity, these deaths and injuries are highly preventable through proper firearm design. Evidence supports the ban on the sale of these types of firearms. A 2002 study of Maryland's ban demonstrated an 8.6% decrease in firearm homicides over an eight-year period (Vernick, Webster, & Hepburn, 1999).

Assault Weapons & Large Capacity Magazines

Following mass shootings, weapons bans are often discussed as a way to prevent or reduce firearm injuries. Large capacity magazines and assault style semi-automatic weapons have increased in popularity since the 1980s, growing from 32% of the weapons produced to 74% (Violence Policy Center, 2011). Certain classes of weapons, specifically those classified as assault weapons, are found to be involved in more shootings than other types of weapons; and their use has more deadly outcomes. Incidents where assault weapons, or large capacity ammunition magazines, were involved resulted in 135% more people shot and 57% more people killed, when compared to other mass shootings (Mayors Against Illegal Guns, 2013). Definitions vary, though general consensus defines a magazine holder of more than 10 rounds as large capacity. Some magazines have the ability to hold upwards of 100 rounds of ammunition, increasing the shooter's ability to injure and kill more people quickly. Large types of magazines were

used in many of the high-profile shootings over the past twenty years, including Columbine and the Aurora Batman shootings (Violence Policy Center, n.d.). Large capacity magazines are often associated with assault weapons, though they can be attached to any weapon that accepts a detachable magazine clip. Large capacity ammunition bans have been found to reduce the lethality of both assault and non-assault weapons because they reduce the capacity of the weapon to fire multiple rounds (Koper, 2004). A 2012 survey found that 62% of respondents were in favor of these types of laws (CNN/ORC International Poll, 2012).

Stand Your Ground

Pro-gun groups propose increasing access to weapons and reducing burdens on firearm owners as ways to reduce crime (Lott, 2010). This paper does not enter the debate on whether these recommendations have academic merit; it does include discussion of “stand your ground” laws as examples of legislation that not only relax gun-control law, but also, in-effect, promote firearms by their increasing popularity at both the federal and state-levels.

“Stand your ground” laws, also referred to as “shoot first” laws, expand on self-defense laws making it permissible to respond with deadly force when an individual feels threatened. Each state provides its citizens with the right to defend themselves in their home and outside of the home, if they feel threatened and cannot reasonably escape the situation. Stand your ground laws expand on this principle allowing individuals to use deadly force in public spaces without the need to retreat as the first option. No studies

support the claim that these laws prevent injuries or crime, but they are growing in popularity and spreading across the country. The shooting of Trayvon Martin in 2012 captured national attention about these laws and called for a reexamination of their use (Weiner, 2014).

Where other areas of public health, such as tobacco use and motor vehicle safety, have worked to prevent undue burden resulting from products by instituting evidence-based strategies – including graduated driving licenses and minimum-age-to-purchase laws (Hemenway, 2004) – similar efforts by firearm injury prevention advocates are often met with political and constitutional challenges.

Firearms in the Literature

Firearms are the subject of studies from disciplines of public policy, economics, criminology, and public health. Research includes histories of weapons (Spitzer, 2011; Vizzard, 2000; Weir, 1997), the link between firearms and violence (Ayres & Donohue, 2003; Lott & Mustard, 1997; Vernick & Teret, 1993), types of firearms and firearms policies (Teret et al., 1998; Vernick et al., 1999; Weir, 1997), the link between firearms and crime or victimization (Ayres & Donohue, 2003; Cook & Ludwig, 2004; Moody & Marvell, 2008) and firearm policy adoption (Bruce & Wilcox, 1998; Grossman & Lee, 2008; Kleck, Gertz, & Bratton, 2009; Tucker et al., 2012). All of the research to date has laid the groundwork for understanding the context of firearms in American politics, crime, and public health.

Injury prevention is an important field within public health, and like many other multifactorial problems within the field, identifying variables for influence is important. Existing research on firearms policies suggests that policy will be shaped by variables such as partisanship, geography, population density, geographic needs (or perceived needs) and demographic variables such as race, gender and age (Gimpel & Wolpert, 1998; Kleck et al., 2009; Spitzer, 2011; Tucker et al., 2012; Wilson, 2006). This research demonstrates the impact that any one of these variables potentially has on firearm perceptions and laws, but no study has combined them in a longitudinal manner. Understanding how these factors are interrelated to create an environment for policy adoption is unclear. The dissertation fills a gap in the research by testing the impact these variables can have on the adoption of specified firearms laws across the 50 states.

Diffusion Theory & Policy Adoption

Changes in firearm policy have been modeled in a variety of ways, including the “window of opportunity” model (Carter, 1997; Kingdon, 2002; Weir, 1997), punctuated equilibrium theory (Baumgartner & Jones, 1993; Bruce & Wilcox, 1998; Godwin & Schroedel, 1998), and several atheoretical “garbage can” models (Grossman & Lee, 2008). This study applies theory from the discipline of political science to the field of firearm injury prevention to better understand firearm policy adoption, building on concepts of internal state determinants of diffusion and applying them to firearm policy adoption.

Public health practitioners are familiar with diffusion theory; it is used to help spread programs, behavior changes and social norms (Oldenburg & Glanz, 2008; Rogers, 2003). In the policy world, diffusion implies that decision makers consider the policies of other cities or states in their deliberations for policies at home. Not unlike other theories, policy diffusion theory has evolved over decades of research, from a regional diffusion model to an internal determinants model. Theories testing adoption and diffusion have used these terms interchangeably; however, they are separate concepts and diffusion is but a piece of the adoption process. Internal state factors of diffusion are also factors that can impact the adoption of a law. This study is utilizing and building on theories, techniques, and methods from the internal determinants literature to understand how firearm laws are adopted. Findings will assist researchers in policy diffusion and adoption and injury prevention researchers. Due to this, the theories and methods for testing them overlap in many areas. The dissertation is specifically looking at adoption, but an understanding of the diffusion literature is necessary due to the close relationship of the two concepts, specifically when examining internal determinants which is what the dissertation will be testing. Methods of testing these theories have also evolved over the decades from factor analyses (Walker, 1969) to cross-sectional techniques (Crain, 1966) to surveys of state officials (Light, 1978) to the use of time series techniques (Berry & Berry, 1990).

Early diffusion theorists focused on regional diffusion models using geographic proximity as a means of explaining diffusion across the 50 states (Gray, 1973; Walker, 1969). Theory dictated that one state was prompted to adopt a policy based on the

adoption of that policy by a neighboring state. These assumptions were based on communications networks among policy makers, overlapping media markets, potential spillover effects, and possible cultural and demographic similarities of neighboring states. As communications networks and transportation technology improve, the geographic proximity argument has become less influential, and scholars argued for a national view on diffusion (Berry & Berry, 1990; Glick & Hays, 1991; Minitrom, 1997; Shipan & Volden, 2006).

Internal determinants models propose that states are motivated to innovate based upon political, economic and social characteristics of the state (Berry & Berry, 1990; Karch, 2007; Tucker et al., 2012). Arguments focus on the dynamic political processes of diffusion and adoption. Policymakers intentionally look to others for solutions to solve problems within their own state. Berry and Berry (1990) proposed that these two models were not entirely independent. They reasoned that the theories could work together to create a conceptually compatible theory of diffusion because it is unrealistic to assume that states do not look to each other for ideas and that the political makeup of the state does not determine outcomes (Berry and Berry, 1990). They were also the first to design studies using longitudinal data and time series quantitative methods, allowing them to examine change over time.

Internal determinants state that diffusion is driven by shared attributes of a state. Policy diffuses because officials think that another state shares a policy-relevant characteristic, such as ideology or similar resources. Neighboring states do not necessarily share these preconditions. Policy makers are looking to shortcuts to the policy

process by seeing how a policy has worked in a similar state. Policy spreads because policy makers are imitating, emulating or competing with colleagues who operate in similar political environments, not necessarily those who share a border with them.

The current study will fill a gap in the firearm injury prevention and political science literature by applying internal determinants theory and longitudinal methods to firearm law adoption. To date, no study has tested the theory of internal determinants of adoption using these seven firearms laws: child access prevention, minimum age to purchase/possess, Saturday night specials, assault weapons bans, large capacity ammunition, and stand your ground. Research coming from the disciplines of public health and injury prevention focus on firearm policy evaluation and the epidemiology of injury, and research in the field of political science tends to use specific laws to test theoretical and methodological questions. This study addresses an unmet need of applying theory from the political science literature on internal determinants to firearm law adoption with the expectation that injury prevention researchers and advocates alike will better understand the process and apply it to injury prevention research efforts.

Research Questions

The proposed study seeks to understand the factors for policy adoption of firearms laws across the 50 states between 1993 and 2010. Using a newly developed comprehensive database of selected state-level firearm laws for all 50 states across an eighteen year period (1993-2010), the analysis will determine which variables explain the adoption of firearms policy. The project will examine the role of key variables, including

special interest groups, legislative professionalism and state demographics in the process of firearm policy adoption.

In addition to responding to a very important and emerging research question, the study is innovative as it is building on both public health and political science literature and is the first of its kind in this content area. Findings have the potential to inform policy advocates as they work to reduce firearm injuries across the states. By understanding the factors for adoption, public health advocates will be able to identify opportunities for policy change, targeting limited resources for the most significant impact on firearms policies for the best health outcomes. Additionally, public health researchers will gain new theoretical and methodological tools for furthering research into firearms policy adoption. The study will accomplish these goals as follows:

Aim 1: Create a database of selected enacted state firearm laws from 1993-2010.

A database of enacted minimum age to possess and purchase a firearm, child access prevention, large capacity ammunition, Saturday night special bans, assault weapons bans, and stand your ground laws will be created.

Aim 2: Conduct a longitudinal analysis of the 50 states' selected firearms laws between the time period of 1993 to 2010 to determine the impact of political characteristics and citizen and producer pressures on the adoption of firearm policies. Variables will be included to operationalize the concepts of legislative characteristics, citizenship pressures, and lobby pressures.

- a) These data will be analyzed against the adoption of state firearms laws as measured by the *movement toward more restrictive* firearm laws.
- b) These data will be analyzed against the adoption of state firearm laws as measured by the *movement toward more permissive* firearms laws.

Research Question 1: Do citizen pressures, as measured by ideology and gun ownership rates, predict the creation of new firearm laws?

Research Question 2: Do legislative characteristics, defined by professional legislatures and legislative partisanship, predict the creation of new firearm laws?

Research Question 3: Do lobby pressures, as measured by gun producers, predict the creation of new firearm law?

Research Question 4: Do lobby pressures, citizen pressures and legislative characteristics interact to predict the creation of new firearm laws?

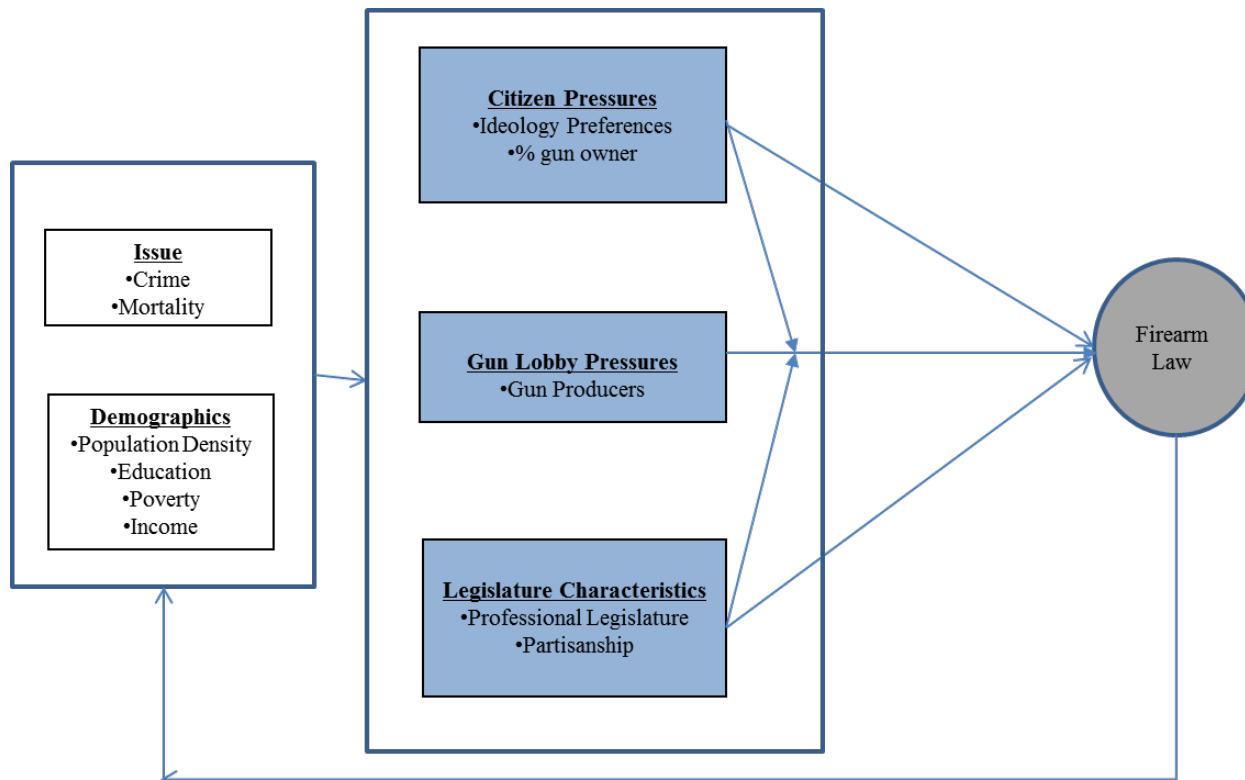
Firearm policy adoption can be influenced by many factors; however, legislative characteristics and citizen and lobby pressures are noted important influencers on the policy adoption process (Berry & Berry, 1990; Goss, 2010; Squire, 1992; Wilson, 2007). Additionally, state characteristics such as state economics, demographic makeup of the state, and issue content can also impact the pressures to adopt, or not adopt, specific firearm laws. The conceptual

diagram in Figure 1 depicts the hypothesized pathways of effects of state political and demographic characteristics on the diffusion of firearm laws within and across the 50 states. The model assumes a null effect of external factors, such as other state adoption and federal laws. Further discussion on the model variables will be discussed in the forthcoming sections.

Hypotheses

1. More restrictive firearm laws will be found in states with more liberal preferences.
2. More restrictive firearm laws will be found in states with fewer firearm owners.
3. More professional legislatures will enact more firearm laws.
4. More liberal state legislatures will enact more restrictive firearm laws.
5. States with more pro-gun control lobbies will produce more restrictive firearm laws.
6. Ideology and professional legislatures will interact – more liberally rated states with professional legislatures will seek and pass more restrictive firearm laws. Democratic states will pass more restrictive firearm laws and Republican states will pass less restrictive firearm laws.
7. More restrictive firearm laws will be found in ideologically liberal states that have professional legislatures because gun control special interest groups will work to lobby their policies. Less restrictive firearm laws will be found in more conservative states.

Figure 1. Theoretical Model of Internal State Determinants of Firearm Policy Adoption



Hypotheses:

1. Citizen Pressures– Citizen pressures will influence firearm laws.
2. Legislative Characteristics – Professional legislatures will produce more firearm laws.
3. Gun Lobby Pressures – Gun lobby pressures will influence legislative characteristics and citizen pressures with regards to firearm laws.
4. Interaction of legislative characteristics, gun lobby pressures and citizen pressures to produce firearm laws.

Research Design

A 50-state, longitudinal comparative analysis of selected enacted firearm laws between 1993 and 2010 was conducted to determine the factors for firearm policy adoption across the states. Data were collected using free and publicly available sources, a more detailed description of each variable is provided in the following sections.

Dependent Variables

It was not possible to examine the adoption of all firearm laws within the context of this dissertation; therefore, this study selected seven firearm laws to study: 1) minimum age of possession (handgun); 2) minimum age of purchase (handgun); 3) stand your ground; 4) assault weapons bans; 5) child access prevention; 6) Saturday night specials; and 7) bans on large capacity ammunition clips. These laws provide a sample of the range of the types of firearm laws intended to prevent firearm injuries: 1) protecting minors from firearm injury; 2) specific weapons bans to reduce injury; and 3) reducing restrictions on firearms. They were selected for inclusion in the study because experts in the field (such as Jon Vernick of Johns Hopkins University, Laura Cutalletta of the Law Center to Prevent Violence, and Brian Maly of the Brady Campaign to Prevent Gun Violence) confirmed that they were appropriate for public health research and because they were passing during the study time period and, therefore, provide a relevant point of analysis.

Internet queries in LexisNexis and Cornell Legal Information Institute databases; special interest websites, such as the National Rifle Association, the Brady Campaign,

and the Law Center to Prevent Gun Violence (LCPGV), previously known as the Legal Community Against Violence (LCAV); government websites, including the Department of Justice (DOJ), the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), and the Federal Bureau of Investigations (FBI); and individual states' websites were conducted using the following search terms: *gun, firearm, assault, child access, assault weapons ban, ammunition, purchase, possession, minimum age, junk guns, Saturday night specials, stand your ground, shoot to kill, shoot first, and castle doctrine.*

Researchers in the field also provided laws for the study that had previously been collected and verified from published research (Webster et al., 2004). After the laws were collected and reviewed, they were documented as being existent (1) or not in existence or meeting a minimum specified requirement (0) in that state. Table 2 provides the assignment criteria and sources for the dependent variables. Variables are assigned dichotomous values because the goal of the study is a higher-level exercise to test adoption theories; therefore, specificity at the level of state provisions was not necessary for this analysis but should be considered in future studies.

A time period of 18 years (1993-2010) was selected to capture the modern firearm injury prevention story. In 1993 the federal government enacted the Brady Law, followed by the VCCA, and this was just three years prior to the loss of CDC funding for firearm injury research in 1996 (Jamieson, 2013). It concludes with the *McDonald v Chicago* (2010) Supreme Court decision that upheld that the right of an individual to

“keep and bear arms” applied to the states. The McDonald decision whose implications on firearm injury prevention efforts at the state level are yet to be determined (Vernick, Rutkow, Webster, & Teret, 2011).

Table 2. State Firearm Laws Collected for the Study, 1993-2010

Law	Definition	Assignment	Data Source
Minimum age to purchase	The minimum legal age to purchase a firearm. If the age was different among handgun and long gun, the minimum age to purchase a handgun was used.	1 = passage of law restricting the age to 18 y.o. or older, 0 = under age 17, or no law	Webster, et. al. (2004), internet and database searches
Minimum age to possess	The minimum legal age to possess a firearm. If the age was different among handgun and long gun, the minimum age to possess a handgun was used.	1 = passage of law restricting the age to 18 y.o. or older, 0 = under age 17, or no law	Webster, et. al. (2004), internet and database searches
Stand your ground	Type of self-defense law that gives individuals the right to use deadly force to defend themselves without any requirement to evade or retreat from a dangerous situation. Differs from Castle Doctrine which states that a person has no duty to retreat when their home is attacked.	1 = passage of a law, 0 = no law	internet and database searches (LexisNexis and Cornell's Legal Information Institute)
Saturday night special bans	Slang for inexpensive handgun. Defined as compact, inexpensive, small-caliber handguns. Also known as "junk guns" by means of composition or materials strength. No federal definition exists.	1 = passage of a law banning these types of guns, 0 = no law	internet and database searches (LexisNexis and Cornell's Legal Information Institute)
Assault weapons ban	Generally, but not exclusively, refers to semi-automatic firearms sold on the civilian market. Semiautomatic rifles with detachable magazines and "military" features like pistol grips, flash suppressors and collapsible or folding stocks.	1 = passage of law restricting assault weapons, 0 = no passage	internet and database searches (LexisNexis and Cornell's Legal Information Institute)
Large capacity ammunition ban	Statutory definitions vary, but magazines with a capacity of more than 10 rounds of ammunition are generally considered "large capacity" magazines.	1 = passage of a law restricting ammunition clip size, 0 = no passage	internet and database searches (LexisNexis and Cornell's Legal Information Institute)
Child Access Prevention (CAP)	Impose criminal liability on adults who negligently leave firearms accessible to children or otherwise allow children access to firearms. Most require gun owners to lock up their firearms.	1 = passage of a law restricting access for children, 0 = no law	Webster, et. al. (2004), internet and database searches

*Internet searches used the search strings: *gun, firearm, assault, child access, assault weapons ban, ammunition, purchase, possession, minimum age, junk guns, Saturday Night Specials, stand your ground, shoot to kill, shoot first, and castle doctrine*

Database

The largest undertaking in the study was the creation of the variables database. Table 3 provides an overview of the variables collected for the dissertation aims, the data sources, and the coding schema. Additional variables were collected (see Appendix B) for use in future studies. Due to theoretical, sample size and power limits, only the following selected variables were included in analysis for the dissertation. No previous study has collected all of these variables over such an extended time, and specifically for the designated years of 1993-2010. Annual panel data sets were created for all of the variables in the study. The study contains three main explanatory variables of interest: government preferences, professional legislature, and special interest pressures. Variables were selected because of their proven importance in the literature on policy adoption in general, and will be discussed in detail in the preceding paragraphs. Additionally, state demographics, crime statistics, and mortality statistics were collected for their hypothesized impact on firearm policy adoption. All of the selected variables were selected for their hypothesized impact on firearm policy adoption, as visually laid out in the conceptual diagram (see Figure 1).

Table 3. Study Independent Variables

Variable	Measure	Source(s)
Lobby Pressures (IV) - Gun producing state	States making greater than 1.5% of nation's firearms (produce = 1, non-producer = 0)	Bureau of Alcohol, Tobacco and Firearms - Annual Firearms Manufacturers and Export Reports
Citizen Pressures (IV) - Ideology	Score (-28.0 more conservative, -0.2 more liberal)	Erikson, Wright, McIver (2007)
- Gun ownership	Proportion of firearm suicides	CDC WISQARS
Legislative Characteristics (IV) - Legislative Professionalism	% state legislatures are similar to US Congress (Range 2.7% to 62.6%)	Squire Index (2008)
- Partisanship (Legislature: R/S & Governor)	0=Rep controlled, 1=Dem controlled	US Census Bureau
Issue (control) - Mortality	Suicide rates, Firearm homicide and suicide rates per capita	CDC WISQARS
- Crime Rates	Crime Rates – violent crime, burglary, robbery, murder per capita	US DOJ Bureau of Justice Statistics
State-level demographics (control)	<ul style="list-style-type: none"> • State population • % veterans/military • Population density • % complete education • % by race • Median income • % living below poverty • South (0,1) • Census Region 	US Census Bureau

Legislative Characteristics

Legislative professionalism and government control, as represented by partisanship, were used to represent the concept of legislative characteristics. State legislative partisanship of the state senate, assembly, and governor were collected for each state from the U.S. Census. If there was a year when the senate or house was split between the two parties, the party of the governor was used to determine government control; this was used in fewer than 4% of the cases across the 18 years (Berry & Berry, 1990). More conservative governments are friendlier to gun rights, therefore it is expected that more conservative governments will be less likely to adopt gun control laws (Wilson, 2007).

More professional legislatures have the staff and resources to look for policies (Squire, 1992). The validated Squire index score (2008) was used to capture the level of professionalism among the states' legislatures. The U.S. Congress is the most professional legislative body in the country. Each state is given a score as it relates to the U.S. Congress; scores closer to zero are less professional. The measure shows how closely a state legislature approximates the professional characteristics of the Congress, which is the "ideal" type of legislature. It measures state legislatures against key attributes such as respectable pay scale, provision for independent staff services, and the time allowed for legislatures to sit. New York is the most professional with a score of 65.9%, and New Hampshire is the least professional with a score of 4.2%. The score was updated during the study period, the 1996 score was used for 2002, and the 2003 score was used from 2003-2010. States with more professional legislatures have the time, money and staff to actively seek policies for their state and to deliberate those policies,

making them less susceptible to outside pressures. More professional legislatures will be more likely to adopt gun control policies to solve state firearm issues (Wilson, 2007).

Lobby Pressures

Firearm production was used to represent firearm industry pressure and lobbying. Data on annual state level firearm production was collected from *The Annual Firearms Manufacturers and Export Report*. These reports are available online for the year 1998-2010 (<http://www.atf.gov/statistics/index.html>) and a Freedom of Information Act (FOIA) request was made for the years 1993-1997. Firearms are produced in almost every state, but not at the same levels. A histogram was used to divide the states into gun producing states and non-gun producing states, states making greater than 1.5% of the country's firearm were coded as producers. Industry can create a natural lobby within the state (Hayden, 2002), therefore it is expected that firearm producing states will support laws that expand firearm prevalence. The measure was selected because it provided an annual total of industry presence for each state.

Citizen Pressures

Firearm ownership and gun rights are often associated with conservatives; therefore, it is expected that conservative states will be more likely to pass pro-gun laws (stand your ground) and less likely to pass gun control laws (Spitzer, 2004; Wilson, 2007). Two measures captured this concept: 1) citizen ideology and 2) gun ownership rates. The validated Erikson, Wright, McIver (2007) index was used as a measure of citizen

ideology for each state in the study. Challenges regarding the static nature of the score are offset by the manner in which the data were collected. The score is created by aggregating state responses from 122 national CBS/NYT polls over a decade to generate state-level measures of partisanship and ideology. Other measures do exist, but they use elite partisanship and candidates running for office to measure citizen ideology variables (Berry et al., 2010). The Erikson, Wright and McIver (2007) measure was used because it actually captures citizen ideology and has been used by other diffusion and adoption studies (Barrilleaux, 1997; Jensen, 2003; Shipan R & Volden, 2006).

Gun ownership was estimated by dividing the number of firearm suicides by the number of total suicides in a given year (Azrael, Cook, & Miller, 2001; Cook & Ludwig, 2006; Cook, 1979b; Miller, Azrael, & Hemenway, 2002b). This is a validated measure used within the field for capturing gun ownership rates by state for individual years. Data for suicides were obtained from the CDC's WISQARS database (Centers for Disease Control and Prevention National Center for Injury Prevention and Control, 2012). Firearm ownership and gun rights are often associated with conservatives (Spitzer, 2011; Wilson, 2007); therefore, it is expected that conservative states will pass fewer gun control laws.

Contextual Factors, Demographic, Economic, and Issue Data

Outside factors, such as mortality, crime, and state demographics have the potential to impact firearms laws. Therefore, these variables also were collected and controlled for in the model. The U.S. Census was used for gathering state-level

demographics such as state population, percentage living below poverty, population density, and percentage of population with a bachelor's degree. All variables were standardized for state populations according to the 1990 and 2000 Census data. One of the arguments for firearms laws is that they will decrease crime (Bronars & Lott, 1998; Lott, 2010; Lott, 2003). More densely populated states are more likely to suffer from crime; they are also less likely to want people to carry firearms (Hemenway & Miller, 2002; Spitzer, 2011). It is expected that as population density increases, so will gun control laws. State demographics such as poverty and education can also influence the likelihood of adoption (Spitzer, 2011; Wilson, 2007). Because more educated populations are more likely to want more restrictive firearm measures, it is expected that education will increase the adoption of firearms laws.

Legislators could be prompted to enact firearms laws as a result of increases in crime or firearm deaths. Therefore, annual firearm mortality rates were collected from the Centers for Disease Control and Prevention WISQARS database for each state for each year of the study (Centers for Disease Control and Prevention National Center for Injury Prevention and Control, 2012) and annual violent crime were collected for each state during the study period from the US Department of Justice Bureau of Justice Statistics (Department of Justice, 2008).

Analysis Plan

The data were collected between February 2011 and April 2012 and entered into a STATA version 12 database (StataCorp, 2011). At the time of data collection, all of the data were available through 2010, which determined the end point for the study. The data were cleaned and checked for outliers. Descriptive statistics were run for the variables of interest. Bivariate statistics were run on all dependent variables and independent variables. Additionally, correlations were run on all covariates to determine if there were issues of multicollinearity. The likelihood of states passing firearms laws was analyzed using multivariate techniques. The models were performed using Generalized Estimating Equation (GEE), where states were assigned as the panel variable and repeated measures of citizen pressures, lobby pressures, and legislative characteristics were collected over the 18-year study period (1993-2010). GEE is an extension of the Generalized Linear Model allowing for longitudinal or clustered data (Liang & Zeger, 1986). The advantage of using a GEE model is that this procedure provides unbiased marginal (population-average) regression coefficients regardless of the correlation structure of the errors (Ghisletta & Spini, 2004). This occurs because the procedure allows for the specification of a working correlation matrix to account for the within-subject correlation of the dependent variable of various distributions (Ballinger, 2004). Because an individual state's legislative decisions are related from one year to the next, the assumption of statistical independence may be violated and therefore a model is needed that accounts for this within-group correlation structure. A covariance structure appropriate for this situation is the exchange form that specifies a constant relationship between the repeated observations for an individual state (Shook et al., 2013). The GEE

models constructed for this analysis used the exchangeable correlation structure but were also tested for robustness by verifying that other correlation structures (auto regressive and unstructured) produced similar results.

Data Sharing

The findings of this study will be submitted for publication in peer-reviewed journals as well as for presentations at public health and injury prevention scientific meetings and conferences. The final dataset, including the dependent and independent variables, will be available in Stata format and can be obtained by contacting the PI. Acknowledgement of the origins of the dataset will be requested in any and all future use.

Human Subjects Research

This study was submitted for review to the Temple University Institutional Review Board and received an exemption in December 2010 (Protocol#13552:) [Appendix A].

Dissertation Overview

The remainder of this dissertation will include four chapters: three manuscripts designed to address the research aims, and a conclusion.

The second chapter will include a detailed description of the dependent variable data collection process, documentation of laws, and descriptive statistics for those variables. An historical overview of federal laws as they relate to firearms also will be discussed in this chapter to provide a context for future state-level discussions. The focus

of the chapter is to describe the adoption rates of the states for the seven laws across the time period of 1993-2010. The manuscript highlights how laws passed in waves over the study period, with the greatest activity at the very beginning, 1993-1994, and at the end, 2005-2009. Of particular interest, is the increased activity of laws promoting firearms at the end of the study period. The findings from this chapter provided the foundations for Chapters Three and Four.

The third chapter is an exploration of the six gun control laws: minimum age to possess, minimum age to purchase, assault weapons ban, large capacity ammunition, Saturday night special bans, and child access prevention across the 18 years of data. This chapter tests the main study hypotheses of the association of citizen pressures, lobby pressures, and state legislative characteristics on firearm law adoption while controlling for demographic and economic variables of interest. The paper discusses the role of citizen and legislative characteristics in the adoption of the selected firearms laws.

Chapter Four analyzes the adoption and influencing factors of permissive firearm laws emerging across the 50 states that was identified in Chapter Two. In this chapter, the main study hypotheses of the association of citizen pressures, lobby pressures, and state legislative characteristics, and demographics on stand your ground laws were conducted using GEE modeling. The chapter discusses the role that population density, poverty rates, and legislative control have on stand your laws.

The conclusion summarizes key findings from the research overall, specifically pointing out the importance of legislative characteristics and poverty on firearm adoption. It also provides recommendations for future research, pointing out the need to further

exploration of internal factors of adoption, such as unpacking the variable of poverty; and the need to look at external factors, such as national organizations. Finally, recommendations are made for injury prevention advocates and researchers.

CHAPTER 2

PAPER 1: THE EVOLUTION OF FIREARM LAWS, 1993-2010

Abstract

The study presents newly analyzed data on seven firearm laws: child access prevention, minimum age to purchase, minimum age to possess, stand your ground, large capacity ammunition limits, Saturday night specials and assault weapons bans, from 1993-2010 for all 50 states. During this time, 37 states passed firearm laws and the federal government passed four laws. Stand-your-ground laws passed most, followed by minimum age to purchase laws. Despite public and media attention to firearms, states have been inactive in the firearm injury prevention policy arena. In fact, aside from legislation to ensure consistency with federal law, very few states have passed gun control laws in recent years. Rather a trend of liberalizing of firearm laws is actually occurring.

Target Journal: *American Journal of Public Health*

Introduction

Firearm injuries plague the United States. Suicide and homicide by firearm accounted for the fourth and fifth leading causes of death due to injury in the United States (Centers for Disease Control and Prevention National Center for Injury Prevention and Control, 2012). Handguns account for 80% of all firearm homicides and suicides; and are also the predominate firearm involved in accidental childhood shooting fatalities (Cook & Ludwig, 2006). Annually, firearms fatally injure more than 30,000 people, and cause an additional 55,000 nonfatal injuries. Estimates of the financial impact of firearm injuries on society range from \$45 million to \$1 billion dollars a year (Centers for Disease Control and Prevention National Center for Injury Prevention and Control, 2012; Cook & Ludwig, 2004). Solutions to the problem of firearm injuries vary widely and must respond to multiple competing obstacles. Collaboration and cooperation across agencies and jurisdictions is needed for a comprehensive solution to firearm injury prevention. Since the 2000s, laws that move in a permissive direction have become increasingly popular; and following events like Virginia Tech and Sandy Hook, there is a divide on the solution to firearm injuries. An assessment of state response is necessary to research developing trends in firearm policy adoption. It is the goal of this paper to examine the passage of selected firearm laws: child access prevention (CAP), minimum age to possess, minimum age to purchase, Saturday night special bans, assault weapons bans, limits on magazine capacity, and stand your ground laws, across the 50 states from 1993-2010.

Summary of Federal Agencies and Laws

Federal firearm regulation depicts the struggle between creating legislation for public safety and removing restrictions that infringe on Second Amendment rights. At this level, laws pass infrequently and oscillate between gun control measures that regulate purchase and possession laws (*The Brady Handgun Violence Prevention Act of 1993*, 1993), and laws that loosen restrictions on firearms and prevent lawsuits against firearms manufacturers and permit firearms in more locations (*Truth in Lending Act Fair Credit Reporting Act Electronic Fund Transfer Act Omnibus Appropriations Act, 2009*, 2009). Currently trends at both the federal and state levels are moving from gun control measures toward permissive firearm laws.

States and Firearm Regulations

The power to regulate the sale, possession, and use of firearms lies with the states. These laws vary from, and are independent of federal firearm laws. Individuals are subject to the firearm laws of the state they are in, not exclusively of the laws from their state of residence. Some states can have reciprocity for laws; for example, conceal carry permits from one state can be recognized by another state (e.g. Idaho recognizes an Oregon permit, but Oregon does not recognize an Idaho permit). State and local police departments are not legally obligated to enforce federal gun laws though this does not confer immunity against prosecution for violations of federal laws. Great variation exists across and within states with regards to firearm laws in order to address the needs of both the state and the individuals living within the state, two things that are not always in agreement (Vernick & Teret, 1993). State solutions can range from minimal restrictions

such as no background checks on private sales and stand your ground laws to targeted restrictions such as bans on specific types of weapons and restricting child access to firearms. It is not the purpose of this paper to enter the debate on the impact of laws on firearm injury outcomes. Rather the study examines the passage of a subset of firearm laws that are intended to prevent firearm injury within states from 1993-2010 as a first step to analyzing factors that could inform the injury prevention community on allocating scarce resources for the passage of effective state-level firearm laws.

Methods

This study is a descriptive analysis of seven selected firearm laws across the 50 states from the time period of 1993-2010, including: 1) minimum age of possession (handgun), 2) minimum age of purchase (handgun), 3) stand your ground laws, 4) assault weapons bans, 5) child access prevention laws, 6) Saturday night specials ban, and 7) bans on large capacity ammunition clips. These seven laws were chosen because they provide a sample of the range of types of firearm laws intended to prevent firearm injuries: 1) child access prevention and minimum age to possess/purchase, 2) specific weapons bans in the form of Saturday night special, assault weapon and limits on ammunition capacity, and 3) permissive firearm laws in the form of stand-your-ground laws. The last law was added because pro-gun advocates argue that looser restrictions on firearms, and sometimes more firearms themselves, create a safer community by acting as a deterrent; therefore the study included stand your ground, an example of a law supported by these groups (Lott, 2010). Additionally, these specific laws were selected after consultation with experts in the field for the potential impact on public health and

safety (Vernick, Webster, & Hepburn, 1999; Webster, Vernick, Zeoli, & Manganello, 2004; Weiner et al., 2007). Table 4 outlines the type of law, the definition, and the study measure and data source for the study.

Table 4. State Firearm Laws Collected for the Study, 1993-2010

Law	Definition	Assignment	Data Source
Minimum age to purchase	The minimum legal age to purchase a firearm. If the age was different among handgun and long gun, the minimum age to purchase a handgun was used.	1 = passage of law restricting the age to 18 y.o. or older, 0 = under age 17, or no law	Webster, et. al. (2004), internet and database searches
Minimum age to possess	The minimum legal age to possess a firearm. If the age was different among handgun and long gun, the minimum age to possess a handgun was used.	1 = passage of law restricting the age to 18 y.o. or older, 0 = under age 17, or no law	Webster, et. al. (2004), internet and database searches
Stand your ground	Type of self-defense law that gives individuals the right to use deadly force to defend themselves without any requirement to evade or retreat from a dangerous situation. Differs from Castle Doctrine which states that a person has no duty to retreat when their home is attacked.	1 = passage of a law, 0 = no law	internet and database searches (LexisNexis and Cornell's Legal Information Institute)
Saturday night special bans	Slang for inexpensive handgun. Defined as compact, inexpensive, small-caliber handguns. Also known as "junk guns" by means of composition or materials strength. No federal definition exists.	1 = passage of a law banning these types of guns, 0 = no law	internet and database searches (LexisNexis and Cornell's Legal Information Institute)
Assault weapons ban	Generally, but not exclusively, refers to semi-automatic firearms sold on the civilian market. Semiautomatic rifles with detachable magazines and "military" features like pistol grips, flash suppressors and collapsible or folding stocks.	1 = passage of law restricting assault weapons, 0 = no passage	internet and database searches (LexisNexis and Cornell's Legal Information Institute)
Large capacity ammunition ban	Statutory definitions vary, but magazines with a capacity of more than 10 rounds of ammunition are generally considered "large capacity" magazines.	1 = passage of a law restricting ammunition clip size, 0 = no passage	internet and database searches (LexisNexis and Cornell's Legal Information Institute)
Child Access Prevention (CAP)	Impose criminal liability on adults who negligently leave firearms accessible to children or otherwise allow children access to firearms. Most require gun owners to lock up their firearms.	1 = passage of a law restricting access for children, 0 = no law	Webster, et. al. (2004), internet and database searches

*Internet searches used the search strings: *gun, firearm, assault, child access, assault weapons ban, ammunition, purchase, possession, minimum age, junk guns, Saturday Night Specials, stand your ground, shoot to kill, shoot first, and castle doctrine*. Websites included individual states' websites, The Brady Campaign to Prevention Gun Violence, NRA, DOJ, FBI, ATF, and the Legal Community Against Violence. Database searches were conducted in LexisNexis and Cornell's Legal Information Institute.

Study Time Frame

A time period of 18 years (1993-2010) was selected to capture the modern firearm injury prevention story. The 1993 *Brady Handgun Violence Prevention Act* was the first major piece of firearm legislation at the national level for over three decades and as such was selected as the study start date to effectively look at injury prevention in the modern era. The study concluded in 2010 with the most recent data available at the time.

Data Sources

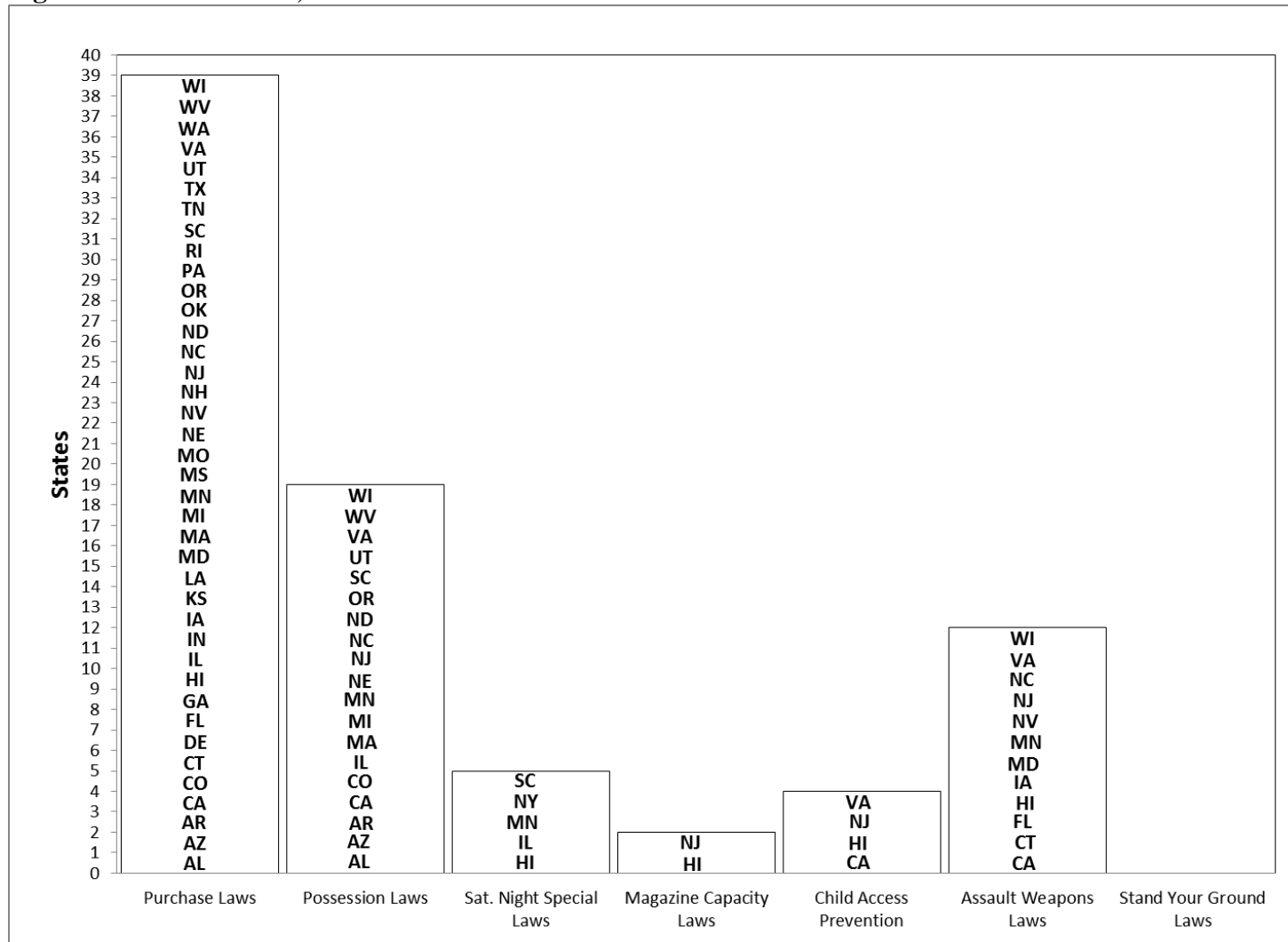
Data were obtained from publicly available sources, such as special interest (NRA, The Brady Campaign to Prevent Gun Violence, and the Law Center to Prevent Gun Violence), government (Department of Justice, Federal Bureau of Investigation, and the Bureau of Alcohol, Tobacco, Firearms, and Explosives), and individual state's websites. Additionally, searches were conducted in LexisNexis and the Cornell Legal Information Institute databases. The following search terms were used when conducting search queries: *gun, firearm, assault, child access, assault weapons ban, ammunition, purchase, possession, minimum age, junk guns, Saturday night specials, stand your ground, shoot to kill, shoot first, and castle doctrine*. Researchers in the field also provided published works on CAP and minimum age to purchase/possess laws from 1993-2001; these were updated for the current study (Webster et al., 2004). After the laws were collected and reviewed, they were recorded and states were assigned a zero for no law, or a law not meeting a minimum requirement of the study, and one for the enactment of a law [Table 4]. The laws were not systemically coded for individual legal provisions, just for the presence of the law. Double-data entry was used for quality

checking. The data were collected between February 2011 and April 2012, at the time of data, 2010 data was the most current data across all of the variables.

Results

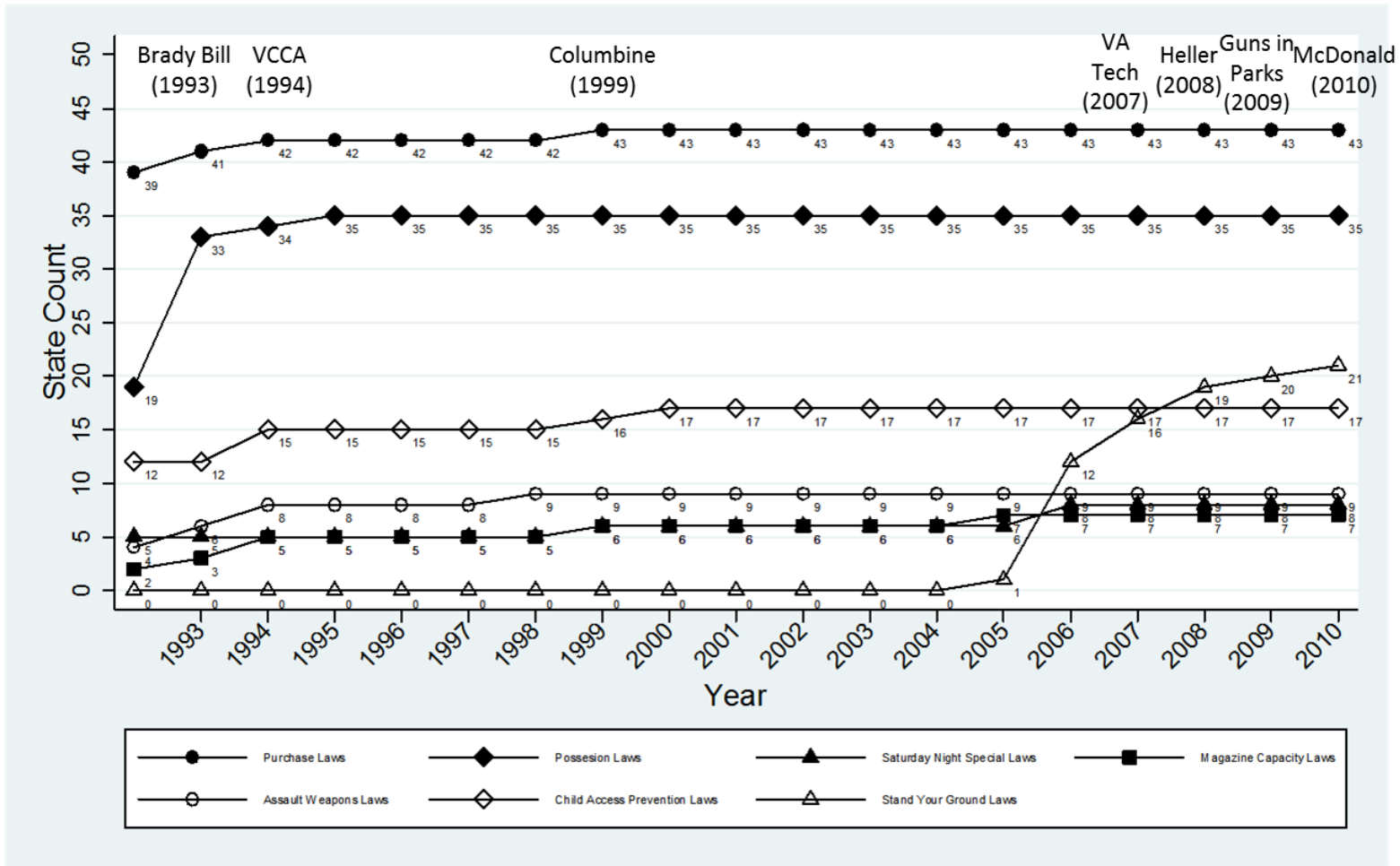
In 1992, 81 laws were in place across 39 states: minimum age of purchase (39 states) and minimum age of possession (19 states) were the most prolific laws in 1992, followed by child access prevention laws (12 states), Saturday night special bans (5 states), assault weapons bans (4 states), and magazine clip capacity limits (2 states) [Figure 2].

Figure 2. Firearms laws, 1992



During the 18-year study period (1993-2010), 59 firearm laws were passed by 37 states [Figure 3]. The most laws passed were stand your ground laws (21 states), followed by minimum age to possess (16 states), child access prevention laws (5 states), assault weapons bans (5 states), large capacity ammunition limits (5 states), minimum age to purchase laws (4 states), and Saturday night special bans (3 states). In the first three years, 1993-1995, 29 states passed laws restricting access to firearms for youth and limited the types of weapons available within the state. The most activity was in 1993 with the passage of 14 minimum age to possess laws, two minimum age to purchase laws, two assault weapons bans and one limit on magazine capacity, for a total of 19 laws passed. This period coincided with two pieces of federal legislation – the Brady Law (1993) and the VCCA (1994). Three years passed without legislation, and then another wave of laws occurred, specifically in 1999, coinciding with the Columbine shooting (Lamb, 2008). It was not until 2005, that the final wave of firearm legislation took place within the states. This wave looked different; it only included two pieces of legislation limiting access to firearms – magazine capacity and Saturday night specials. The remaining legislation, passed by 21 states, was legislation favored by pro-gun rights groups – stand your ground laws.

Figure 3. States with Enacted Laws, by Law Type, and Federal Events, 1993-2010



Limiting Child Access

Laws limiting child access made strong gains during the first half of the study [Figure 4]. Specifically laws imposing a minimum age to possess a firearm were passed in 16 states: 14 states in 1993, one state in 1994, and one state in 1995. Minimum age to purchase a firearm laws were passed in 4 states: two in 1993, one in 1994, and one in 1999. Child access prevention laws were passed in five states: three states in 1993, one state in 1999, and one state in 2000. By 2010, 87 laws restricting access to minors were on the books: 9 states had CAP laws, 43 states had a minimum age to purchase law, and 35 states had a minimum age to possess law. Minimum age to purchase and possess laws were distributed throughout the states rather evenly, but CAP laws were found on the rim of the country in populace states along the Northeast and West coasts.

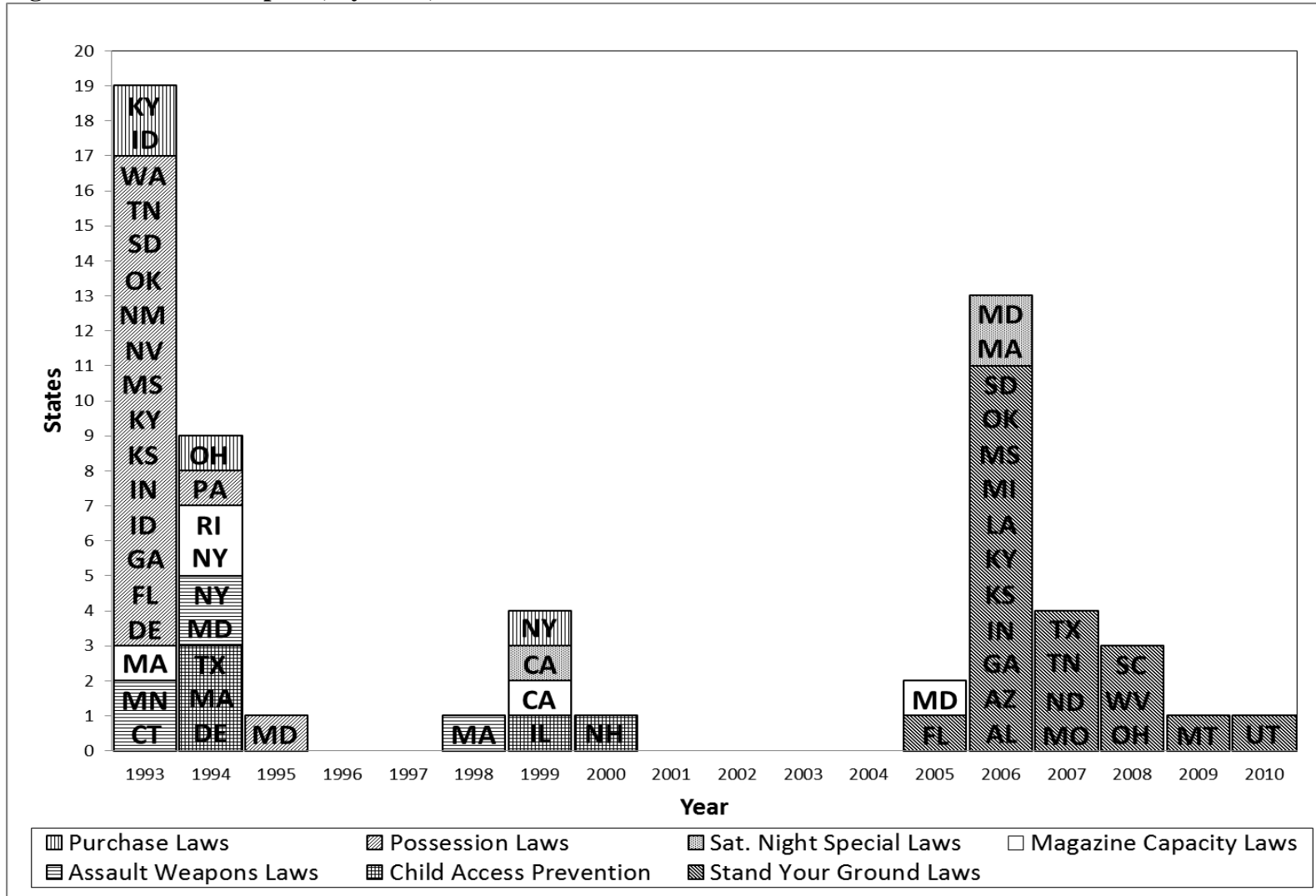
Weapons Bans

Specific weapons bans were less popular than child prevention laws [Figure 4]. Most popular among these laws were assault weapons bans, passed by five states: two in 1993, two in 1994, and one in 1998. Limits to magazine clip sizes were passed in 1993, 1994, 1999, and 2005. Laws banning Saturday night special, or Junk Guns, were passed by three states: one in 1999 and two in 2006. By 2010, 30 states had laws restricting access to specific weapons: 9 states had assault weapons bans, 7 states had magazine capacity bans, and 8 states had Saturday night special bans. These laws again tended to be found in the populace states along the East and West Coasts of the country. Three states had all three of these laws, Hawaii, California, and Maryland; and four states had two types of weapons bans, Massachusetts, Minnesota, New Jersey, and New York.

Permissive Firearm Laws

Stand your ground laws, also known as shoot to kill or shoot first laws, were first introduced in Florida in 2005 [Figure 4]. Since the introduction of stand-your-ground, 21 states have adopted this law from 2005-2010: 11 states passed a stand-your-ground law in 2006, four states passed it in 2007, three states in 2008, one state in 2009, and one state in 2010. These laws are predominately distributed across the South and Midwest of the Country.

Figure 4. Firearm Adoption, by State, 1993-2010



Discussion

State governments are smaller than the federal government, and often more homogenous; this nimble nature gives states the ability to respond to the policy needs of their population faster than the federal government. The flexibility offered by individual state firearm laws is positive when they are acting as a laboratory for other states and the federal government. However, the lack of uniformity in the passage of firearm laws can also cause problems for neighboring states. Due to the non-expendable nature of firearms, piecemeal policies across the nation are not always an appropriate solution. Externalities from one state's firearm policy, or lack thereof, could impact surrounding jurisdictions thus negatively impacting both policy and health outcomes. An example of this is the number of illegal firearms from Pennsylvania involved in crimes in New Jersey (Maag & Adely, 2013). However, geographic proximity is not always a requirement for these issues; New York struggles with firearms from Virginia and Mexico border states struggle with violence from illegal firearms from Arizona (The Associated Press State & Local Wire, 2012; *U.S. Attorney's Office - U.S. Department of Justice*, 2013).

Over the 18-year period, 37 states passed laws in clusters rather than a consistent spread throughout the time period. Of the seven laws, minimum age to possess laws and stand your ground laws were the only laws to pass in any real volume. The uptick in minimum age to possess laws could be explained by national factors. Since 1968, federal law prohibited licensed firearms dealers from making sales to purchasers younger than 21 years (*Gun Control Act of 1968, Public Law 90-618, Title 18, United States Code – Firearms*, 1968). Then in 1994, a federal law established 18 years as the minimum legal age to purchase/possess a handgun (*Violent Crime Control and Law Enforcement Act of*

1994, 1994). This included sales by gun owners who are not licensed dealers. The change in federal law could explain the activity with regards to minimum age to purchase/possess laws at the beginning of the study, specifically in 1993 and 1994.

Stand your grounds laws are a different story. States are pushing the trend of permissive firearm laws, and stand your ground is an example of this. Firearms are a contentious area in American politics, cleaving along geographic and demographic lines. Individuals living in the South and in rural areas are less likely to support a variety of gun control measures; the lack of movement in gun control laws in these areas and the surge in enactment of stand your ground laws among the Southern states demonstrate this point (Wilson, 2013).

While a few states (CA, IL, MA, MD, NH, and NY) passed laws in 1999-2000 and 2005, the gains were quite shallow for firearm regulation across the states. Momentum at the state and federal levels moved in the direction of loosening controls with the sun-setting of the Assault Weapons Ban (2004) and the dramatic increase in stand your ground laws across the states. Florida was the first to pass this law in 2005, and it quickly swept through 21 states in the South and Midwest by 2010. The 2012 shooting of the unarmed teenager Trayvon Martin, grabbed public attention regarding stand your ground laws, yet they continue to be plausible solutions for many states (Weiner, 2014). Stand your ground laws were the only laws in the sample that did not move in a gun control strengthening direction; and this could explain why they were so successful. The strength of the gun lobby and their ability to pass, or prevent, legislation is well documented (Cigler & Loomis, 1983; Goss, 2010; Spitzer, 2011).

As can be seen by the findings in the latter years of the study, a large portion of states were passing laws that loosened restrictions; a trend that was mirrored at the federal-level with the sunset of the Assault Weapons Ban and the lift on the ban on firearms in state parks. These laws show a trend that not only limits sensible firearm injury prevention laws, but supports the expansion of firearms in settings where they were not previously found; and this has the potential to impact firearm injury prevention and public safety in negative ways. These laws are not supported by the existing evidence and do not align with public opinion on firearms laws. Nor do they align with the goals of public health and injury prevention. Collection of a larger sample of laws would provide an even more detailed story of how states are addressing firearms. For purposes of this study, the inclusion of one type of pro-gun law provided an example of the diversity of the states' solutions to firearms and told a more detailed story of efforts at the state-level.

Limitations

The laws were documented in the dataset as existing or not. Categorical coding of the various provisions of the law could provide more detailed information regarding the various changes over the 18 year study period. For example, states such as Georgia, Hawaii and Washington changed the age to purchase a firearm from 21 years old to 18 years old during the study period, and New Jersey changed its age from 18 years old to 21 years old. Such examples are limited among the study sample, but they do exist and may find other similar nuances in these laws. The goal of the study was to examine

trends in the presence of gun control laws across the states; the current coding schema accomplished this.

Conclusion

Efforts to prevent firearm morbidity and mortality must occur at both the federal and state levels, but it is clear that the states are the jurisdictional proving grounds. Given the limited amount of resources for firearm injury prevention, it is important for researchers and advocates alike to focus efforts at this level in order to maximize the resources available (Jamieson, 2013). Future work should examine the factors that influence the passage of firearm laws to better understand the possible influences for change, such as the role of state legislatures, special interests or state demographics. As this work evolves, firearm injury prevention advocates should work on building connections within state legislative offices to promote evidence-based policy-making and encourage funding for firearm injury prevention research.

CHAPTER 3

PAPER 2: INJURY PREVENTION THROUGH POLICY: ADOPTION OF FIREARM LAWS IN THE UNITED STATES, 1993-2010

Abstract

Firearm injury prevention policymakers and advocates must navigate a politically charged environment of social regulatory politics, dominated by strong single-issue groups, to affect change. Understanding firearm policy adoption could help researchers and advocates focus on elements that have the greatest impact. This study used general estimating equation models on a database of firearm laws across 50 states from 1993-2010, including child access prevention, minimum age to purchase and possession handguns, Saturday night special bans, assault weapons bans, and large capacity ammunition bans to evaluate the impact of citizen pressures, lobby pressures, and legislative characteristics on policy adoption. More progressive gun control laws, such as weapons bans, were significantly impacted by citizen ideology, legislative professionalism, and legislative partisanship; whereas minimum age requirements were ubiquitous across the states and therefore were not significantly impacted by the predictors. Political environments are rather stable over time; however, advocates should respond to cues within legislatures across the states to optimize change for injury prevention in multiple jurisdictions.

Target Journal: *Journal of Public Health Policy*

Introduction

Traditionally, firearms were seen as a criminal justice issue but, in the 1970s (Dahlberg & Mercy, 2009; Hemenway, 2004, 2009), the Centers for Disease Control and Prevention (CDC) declared firearm violence a threat to the public's health. Firearm injuries were consistently ranking among the top 15 leading causes of death in the United States since 1965 (Centers for Disease Control and Prevention, n.d.); and by the 1980s, the risk of homicide and suicide reached epidemic proportions, disproportionately affecting youths and minorities. In response, the CDC began funding surveillance of firearm morbidity and mortality, coupled with research into violence prevention measures (Surgeon General, 1979). Congress suspended funding of the CDC's division of firearm injury prevention in 1996. Funding to the CDC was reinstated in 2013, but the seventeen year gap resulted in a loss of knowledge and surveillance data that are necessary to properly evaluate policy. The information vacuum and politicized nature of firearms makes the issue of firearm injury prevention distinct from more traditional disease prevention efforts. Due to this, federal and state firearms laws were passed for nearly two decades based on politics rather than evidence (Spitzer, 2004).

For firearm injury prevention research to succeed, it must navigate a politically-charged environment that is multi-jurisdictional. States have the power to regulate the sale, possession, and use of firearms. State laws are independent of federal firearms laws and can be broader or more limited in scope. State and local police departments are not legally obligated to enforce federal gun laws; however this does not confer immunity against prosecution for violations of federal laws (Boro Gun Club, Inc., 1995). States

serve as policy laboratories for the federal government and neighboring states, however little research has been conducted to illuminate firearm policy adoption across the 50 states in either the policy or public health literature. Knowledge of the state influencers for firearms law adoption could assist researchers and advocates in their work. This study has focused on six laws that are often discussed to prevent childhood injuries and limit the lethality of firearms: child access prevention laws (CAP), minimum age to purchase/possess a handgun, Saturday night special (also known as junk guns) bans, assault weapons bans, and limits on ammunition clip capacity.

Restricting Youth Access

Protecting children from firearm injury was one of the goals of the CDC in 1979 (US Department of Health Education and Welfare, 1979). Millions of children live in homes with firearms; and many of these firearms are easily accessed by minors. In fact, approximately one in three handguns is kept loaded and unlocked. A 2006 study found that 73% of children under age 10 living in homes with guns reports knowing the location of their parents' firearm, with 36% admitting they had handled the weapon (Baxley & Miller, 2006). Children who access firearms are at greater risk of injury, specifically suicide; and the firearms used in these attempts were stored in the residence of the victim, a relative, or a friend (Grossman, Reay, & Baker, 1999; Kellermann et al., 1993). Studies of school shootings have found that in more than 65% of the cases, the attacker got the gun from his or her own home, or that of a relative (United States Secret Service, 2000). Child access prevention (CAP) laws impose criminal liability on adults who give

children unsupervised access to firearms. CAP laws have been found to be effective in reducing unintentional firearm deaths among children. Studies have found that safe gun storage practices have a protective effect on reducing youth suicide and unintentional injury (Cummings, Grossman, Rivara, & Koepsell, 1997; Grossman et al., 1999; Webster, Vernick, Zeoli, & Manganello, 2004).

Minimum Age Requirements

Minimum age requirements intend to decrease access to firearms by young people and correspondingly, decrease the number of suicides, homicides, and unintentional shootings affecting youth. Federal law prohibits dealers from selling or delivering handguns and ammunition for those firearms to any person under the age of 21, but a loophole exists because unlicensed dealers are allowed to sell handguns and their ammunition to persons aged 18 or older. A survey of convicted gun offenders in 13 states found that nearly a quarter of them would have been prohibited from obtaining firearms at the time of the crime if the minimum legal age for possessing any type of firearm was 21 years (Vittes, Vernick, & Webster, 2012).

Safety Requirements

Federal law imposes no design safety standards on domestically produced firearms. As a result, many firearms are manufactured and sold in the U.S. without completing appropriate safety testing and without including certain basic safety features. Poorly constructed guns can fire when the trigger has not been pulled, or sometimes will

not fire when the trigger has been pulled. Firearms of this kind are commonly referred to as “junk guns” or “Saturday night specials.” These low-quality handguns are often composed of inferior metals or plastic and are designed in ways to unreasonably reduce the manufacturing costs. Broadly speaking, these handguns are cheap, easily concealed, and more likely to misfire or malfunction than other firearms. Half of the firearms most frequently traced by the ATF in 2000 were manufactured by companies known to produce low-quality firearms (Dahl, 2004). Poorly constructed firearms play a significant role in unintentional shootings and are disproportionately associated with criminal misuse, especially by juveniles and young adults. Deaths caused by unintentional shootings are preventable and one of the ways to prevent them is through proper firearm design. Evidence supports the ban on the sale of these types of firearms, with a study of Maryland’s ban demonstrating an 8.6% decrease in firearm homicides over an eight year period (Vernick, Webster, & Hepburn, 1999).

Ban on Large Capacity and Assault Weapons

Following mass shootings, weapons bans are often discussed as a way to prevent or reduce firearm injuries. Large capacity magazines and assault style semi-automatic weapons have increased in popularity since the 1980s, growing from 32% of the weapons produced to 74% (Violence Policy Center, 2011). Certain classes of weapons, specifically those classified as assault weapons, are found to be involved in more shootings than other types of weapons; and their use has more deadly outcomes. Incidents where assault weapons, or large capacity ammunition magazines, were involved

resulted in 135% more people shot and 57% more people killed, when compared to other mass shootings (Mayors Against Illegal Guns, 2013). Definitions vary, although general consensus defines a magazine holder of more than 10 rounds as large capacity. Some magazines have the ability to hold upwards of 100 rounds of ammunition, increasing the shooter's ability to injure and kill more people quickly. Large types of magazines were used in many of the high-profile shootings over the past twenty years, including Columbine and the Aurora "Batman" shootings (Violence Policy Center, n.d.). Large capacity magazines are often associated with assault weapons, though they can be attached to any weapon that accepts a detachable magazine clip. Large capacity ammunition bans have been found to reduce the lethality of both assault and non-assault weapons because they reduce the capacity of the weapon to fire multiple rounds (Koper, 2004). A 2012 survey found that 62% of respondents were in favor of these types of laws (CNN/ORC International Poll, 2012). Of all of the gun control proposals, "gun bans stand out as the most restrictive and most broadly applicable across categories," (Hayden, 2002, 204) setting it apart from other gun control methods, making them the most progressive laws of the sample.

Firearm Literature & Adoption Theory

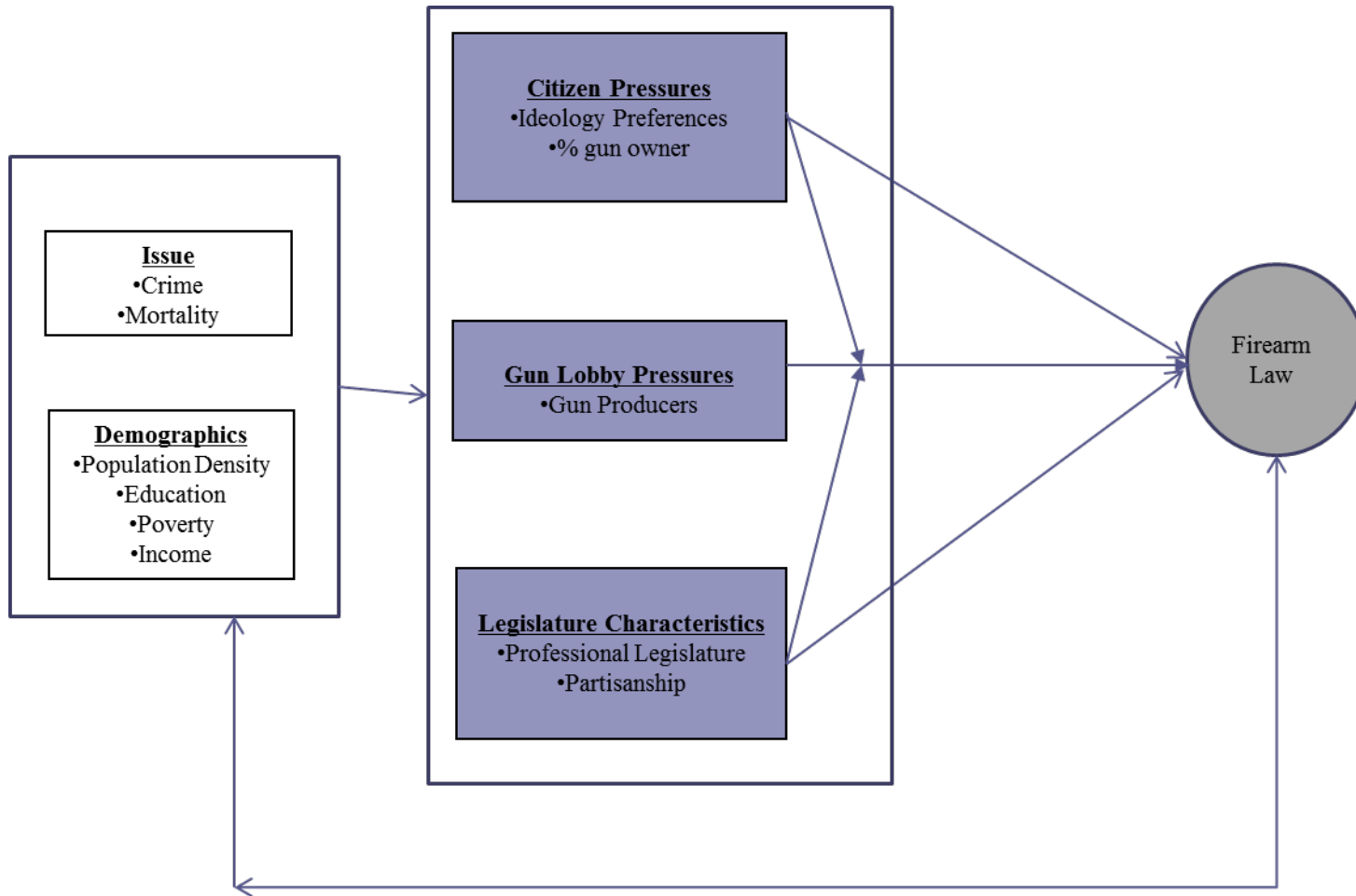
Firearm policies are often viewed as a social regulatory policy, dominated by advocacy groups (e.g., the Brady Campaign, the National Rifle Association [NRA]) and cultural conflict (Spitzer, 2004). Social regulatory policies try to limit the discretion of individuals and agencies in order to compel certain types of behaviors. They are often

characterized by a vocal minority with strong opinions on the topic that are based more on cultural and political identity rather than concerns regarding crime and injury outcomes (Kleck, Gertz, & Bratton, 2009; Kleck, 1997; Lowi, 1998). Specific research on firearm policies suggests that policy will be shaped by political variables such as partisanship, ideology, lobby pressures, and economic and demographic variables such as population density, geographic needs (or perceived needs), education, and income (Bruce & Wilcox, 1998; Gimpel & Wolpert, 1998; Hemenway, 2004; Kleck et al., 2009; Spitzer RJ, 2004; Wilson, 2013). The impact that any one of these variables potentially has on firearm perceptions and laws has been explored (Bruce & Wilcox, 1998; Goss, 2010; Grossman & Lee, 2008; Teret et al., 1998; Wilson, 2013). However, no previous study has longitudinally tested across all 50 states, neither has the interaction of these variables on the adoption of firearms policies been tested (Bruce & Wilcox, 1998; Spitzer RJ, 2004; Tucker, Stoutenborough, & Beverlin, 2012; Vizzard, 2000). This is an emerging and interdisciplinary field of research that needs further exploration.

Policy adoption and diffusion have often been used interchangeably within the diffusion literature (Karch, 2007); and while diffusion is a piece of the adoption process, they are still separate concepts. To understand firearm policy adoption, theories and methods from the policy diffusion literature can be adapted and used for testing adoption. Public health practitioners are familiar with diffusion theory; it is used to help spread programs, behavior changes, and social norms (Oldenburg & Glanz, 2008). In the policy world, diffusion implies that decision makers consider the policies of other cities or states in their deliberations for policies in their home jurisdiction. Not unlike other theories,

policy diffusion theory has evolved over decades of research from a regional diffusion model to an internal determinants model (Berry & Berry, 1990; Gray, 1973; Walker, 1969). Firearm problems cut across geographic boundaries via criminal spillovers, this and the ease of transportability of firearms can negatively impact outcomes of another state's policies. Still, geography alone is not the reason for adoption (Bronars & Lott Jr., 1998; Cook & Ludwig, 2004; Grossman & Lee, 2008; Spitzer, 2011). Due to the social regulatory aspect of firearms, it is more likely that similar states, regardless of geographic proximity will adopt similar firearm laws. Thus, the internal determinants model is a better theoretical test for the current study. Internal determinants propose that states are motivated to innovate based upon political, economic, and social characteristics of the state (Berry & Berry, 1990; Karch, 2007; Shipan & Volden, 2008). Arguments focus on the dynamic political processes of adoption. Policymakers are often driven by shared policy-relevant characteristics such as ideology or resources and they intentionally look to others for solutions to solve problems within their own state. Shared state boundaries are not a precondition for this theory. One more poignant precondition for adoption of state policymaking is issue area. For example, New York may look to California for solutions to problems like Medicaid allocations; however, when dealing with immigration issues, it would look to states like Texas and Arizona. The conceptual diagram in Figure 5 depicts the hypothesized pathways of effects of state political and demographic characteristics on the adoption of firearm laws within and across the 50 states.

Figure 5. Theoretical Model for Internal State Determinants of Adoption



The proposed study seeks to understand the factors for firearm policy adoption across the 50 states between 1993 and 2010. Using a newly developed comprehensive database of selected state-level firearm laws (child access prevention, minimum age to purchase/possess, assault weapons bans, Saturday special bans, and large capacity ammunition bans) for all 50 states across an eighteen year period (1993-2010), the analysis will examine the role of key variables, including special interest groups, legislative professionalism, and state demographics in the process of firearm policy adoption. In addition to responding to a very important and emerging research question, the study is innovative as it is building on both public health and political science literature and is the first of its kind in this content area. Findings have the potential to inform policy advocates as they work to reduce firearm injuries across the states. By understanding factors for adoption, public health advocates and researchers alike will be able to identify opportunities for policy change, targeting limited resources for the most significant impact on firearm policies for the best health outcomes.

Methods

The study includes a 50 states longitudinal comparative analysis of six selected enacted firearms laws, including: minimum age of possession (handgun), minimum age of purchase (handgun), child access prevention laws, bans on large capacity ammunition clips, and Saturday night special and assault weapons bans between 1993 and 2010 to determine the impact of political characteristics, citizen pressures, and producer pressures on the adoption of firearm policies across the 50 states. The study begins during the modern era of firearm injury prevention regulation, in 1993, just three years prior to the

loss of CDC funding for firearm injury research, and when the federal government enacted the *Brady Bill*. It concludes in 2010 when the most recent data were available.

Internet queries in LexisNexis and Cornell Legal Information Institute databases; special interest websites (such as the National Rifle Association, the Brady Campaign, and the Law Center to Prevent Gun Violence (LCPGV, previously known as the Legal Community Against Violence (LCAV)); government websites (the Department of Justice (DOJ), the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF); and individual states' websites were conducted using the following search terms: *gun, firearm, assault, child access, assault weapons ban, ammunition, purchase, possession, minimum age, junk guns, Saturday night specials, stand your ground, shoot to kill, shoot first, and castle doctrine*. Researchers in the field also provided laws for the study from published works (Webster et al., 2004). After the laws were collected and reviewed, they were documented as being existent (1) or not in existence or meeting a minimum specified requirement (0) in that state [Table 5]. Double data entry techniques were used when creating the data set. The study is a higher-level exercise to test adoption theories, therefore specificity at the level of state provisions was not necessary for this analysis and thus a dichotomous coding schema was employed. Because no laws were repealed during the study period, only those states that had not previously passed a given law were included in the final analysis.

Table 5. State Firearm Laws Collected for the Study, 1993-2010

Law	Definition	Assignment	Data Source
Minimum age to purchase	The minimum legal age to purchase a firearm. If the age was different among handgun and long gun, the minimum age to purchase a handgun was used.	1 = passage of law restricting the age to 18 y.o. or older, 0 = under age 17, or no law	Webster, et. al. (2004), internet and database searches
Minimum age to possess	The minimum legal age to possess a firearm. If the age was different among handgun and long gun, the minimum age to possess a handgun was used.	1 = passage of law restricting the age to 18 y.o. or older, 0 = under age 17, or no law	Webster, et. al. (2004), internet and database searches
Saturday night special bans	Slang for inexpensive handgun. Defined as compact, inexpensive, small-caliber handguns. Also known as “junk guns” by means of composition or materials strength. No federal definition exists.	1 = passage of a law banning these types of guns, 0 = no law	internet and database searches (LexisNexis and Cornell’s Legal Information Institute)
Assault weapons ban	Generally, but not exclusively, refers to semi-automatic firearms sold on the civilian market. Semiautomatic rifles with detachable magazines and “military” features like pistol grips, flash suppressors and collapsible or folding stocks.	1 = passage of law restricting assault weapons, 0 = no passage	internet and database searches (LexisNexis and Cornell’s Legal Information Institute)
Large capacity ammunition ban	Statutory definitions vary, but magazines with a capacity of more than 10 rounds of ammunition are generally considered “large capacity” magazines.	1 = passage of a law restricting ammunition clip size, 0 = no passage	internet and database searches (LexisNexis and Cornell’s Legal Information Institute)
Child Access Prevention (CAP)	Impose criminal liability on adults who negligently leave firearms accessible to children or otherwise allow children access to firearms. Most require gun owners to lock up their firearms.	1 = passage of a law restricting access for children, 0 = no law	Webster, et. al. (2004), internet and database searches

*Internet searches used the search strings: *gun, firearm, assault, child access, assault weapons ban, ammunition, purchase, possession, minimum age, junk guns, Saturday Night Specials, stand your ground, shoot to kill, shoot first, and castle doctrine*

Annual panel datasets were created for the three predictor variables of interest as well as demographic, economic, mortality, and crime data. The variables listed below are commonly featured in examinations of state policy diffusion. Table 6 provides an overview of the predictor variables in the study.

Table 6. Predictor Variables

Variable	Measure	Source(s)
Lobby Pressures (IV) - Gun producing state	States producing greater than 1.5% of nation's firearms (produce = 1, non-producer = 0)	Bureau of Alcohol, Tobacco and Firearms - Annual Firearms Manufacturers and Export Reports
Citizen Pressures (IV) - Ideology	Score (-30.2 more conservative, -8.0 more liberal)	Erikson, Wright, McIver (2007)
- Gun ownership	Proportion of firearm suicides	CDC Web-based Injury Statistics Query and Reporting System (WISQARS)
Legislative Characteristics (IV) - Legislative Professionalism	How similar state legislatures are to the US Congress (Range 2.7% to 62.6%)	Squire Index (2007)
- Partisanship (Legislature: R/S & Governor)	0=Rep controlled, 1=Dem controlled	US Census Bureau
Issue (control) - Mortality	Firearm mortality rates	CDC Web-based Injury Statistics Query and Reporting System (WISQARS)
- Crime Rates	Violent crime rates	US DOJ Bureau of Justice Statistics
State-level demographics (control)	- Population density - % with Bachelor's degrees - % living below poverty	US Census Bureau

Legislative Characteristics

Partisanship and legislative professionalism were used to represent the concept of legislative characteristics. More Democratic governments are friendlier to public health efforts, specifically; they are friendlier to gun control measures. Therefore, state legislative partisanship was collected for each state from the U.S. Census. Partisanship of the state senate, assembly, and governor were collected. If there was a year when the senate, or house, majority was split between the two parties, the party of the governor was used to assign partisanship (Berry & Berry, 1990; Berry, Fording, Ringquist, Hanson, & Klarner, 2010). The validated Squire (2007) index score was used to capture the level of professionalism among the states' legislatures (Squire, 1992; 2007). The U.S. Congress is the most professional legislative body in the country and therefore, each state is given a score as it relates to the U.S. Congress based on key attributes, such as: respectable pay scale, provision for independent staff services, and the time allowed for legislatures to sit. Lower scores are deemed less professional. The measure shows how closely a state legislature approximates the professional characteristics of the Congress, which is the "ideal" type of legislature. New York is the most professional with a score of 65.9%, and New Hampshire is the least professional with a score of 4.2%. The score was updated during the study period. The 1996 score was used for the years 1993-2002, and the 2003 score was used from 2003-2010. States with more professional legislatures have the resources (e.g., time, money, and staff) to actively seek policies for their state and to deliberate those policies. This in turn, may make them less susceptible to outside pressures.

Lobby Pressures

The Annual Firearms Manufacturers and Export Report (Bureau of Alcohol Tobacco and Firearms, n.d.) was used to gather data from each state on the number of guns produced each year. These reports are available online for the years 1998-2010. A FOIA (Freedom of Information Act) request was made for the years 1993-1997. These state gun production numbers were divided by the total U.S. gun production in a given year in order to generate the production percentages for each state. A histogram for firearm production by state makes clear the difference in state firearm production. The majority of states produce far less than 1% of the nation's firearms while the remaining few states produce a significant percentage. Over the study period, approximately 10 to 12 states are responsible for producing over 90% of the nation's firearms. Based on these data, states were coded as either firearm producing states (producing greater than 1.5% of the nation's firearms) or non-firearm producing states (producing less than 1.5% of the nation's firearms). Because industry can create a natural lobby within the state (Hayden, 2002), it is expected that firearm producing states will not support gun control laws.

Citizen Pressures

Firearm ownership and gun rights are often associated with conservatives (Wilson, 2006); therefore it is expected that conservative states will be less likely to pass firearm laws. Two measures captured this concept: 1) citizen ideology and 2) gun ownership rates. The validated Erikson, Wright, and McIver (2007) index was used as a measure of citizen ideology for each state in the study. Challenges regarding the static

nature of the score are offset by the manner in which the data were collected. The score is created by aggregating state responses from 122 national CBS/NYT polls over a decade to generate state-level measures of partisanship and ideology. Other measures do exist, but they use elite partisanship and candidates running for office to measure citizen ideology variables (Berry et al., 2010). The Erikson, Wright and McIver (2007) measure was used because it actually captures citizen ideology and has been used by other adoption studies (Barrilleaux, 1997; Jensen, 2003; Shipan R & Volden, 2006). Gun ownership was estimated by dividing the number of firearm suicides by the number of total suicides in a given year (Cook, 1979; Miller, Azrael, & Hemenway, 2002). This is a validated measure used within the injury prevention field for capturing gun ownership rates by state for individual years. Data for suicides were obtained from the CDC's Web-based Injury Statistics Query and Reporting System (WISQARS) database.

Demographics, Crime, and Mortality

Non-political factors, such as mortality, crime, and state demographics have the potential to impact the adoption of firearm laws (Hemenway, Azrael, & Miller, 2001; Spitzer, 2011). Therefore, these variables were also collected and controlled for in the models. More densely populated states are more likely to suffer from crime and may seek options to curb crime. A relationship between crime and population density and the adoption of firearm laws is expected to exist but the direction of the relationship is not determined (Bruce & Wilcox, 1998; Hemenway et al., 2001; Kleck et al., 2009; Spitzer, 2011; Wilson, 2006). State demographics such as poverty and education can also

influence the likelihood of adoption (Hemenway et al., 2001; Wilson, 2006). More educated populations may be more likely to accept more restrictive firearm measures. Therefore, it is expected that education will increase the adoption of the firearm laws.

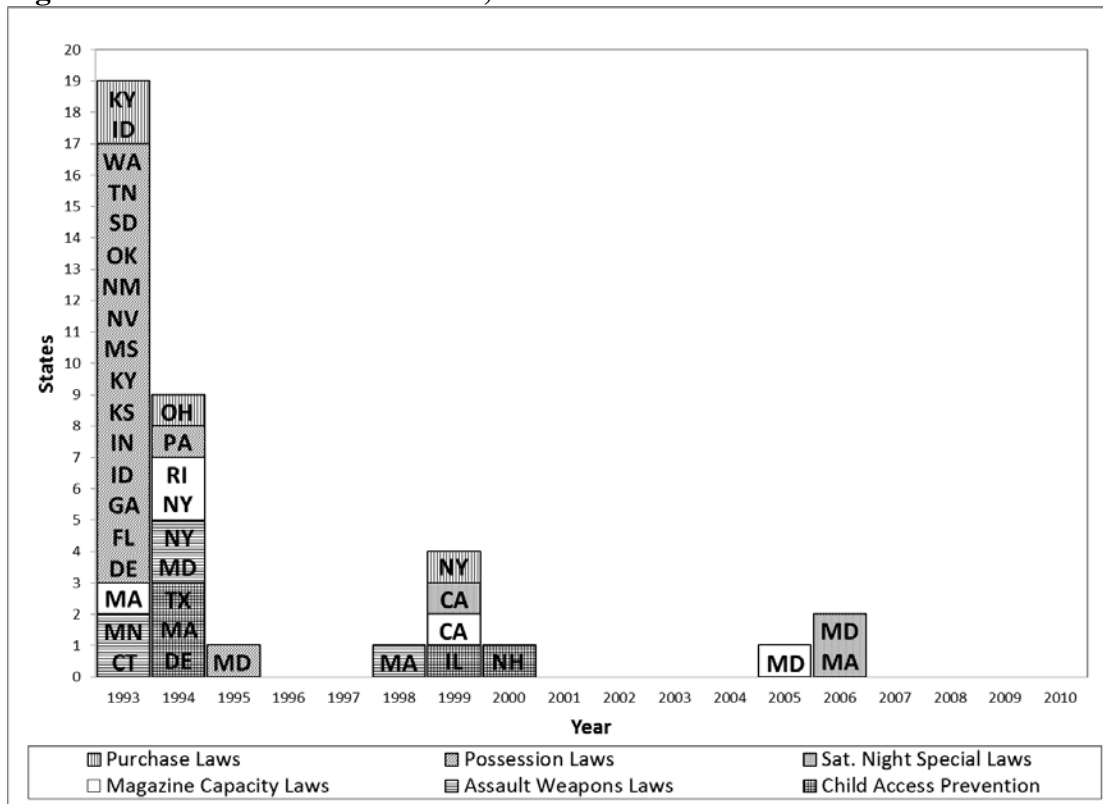
The data were collected between February 2011 and April 2012 and entered into a STATA version 12 database (StataCorp, 2011). The data were cleaned and checked for outliers. The likelihood of states passing a firearm laws was analyzed using multivariate techniques. Specifically, binary logistic regression models were constructed that examined the predictors of a given state adopting a firearm law while controlling for citizen pressures, lobby pressures, legislative characteristics, demographic, crime, and economic data. For models that were not able to support all 12 predictor variables (due to sample size constraints), a subset consisting of the most significant predictors that were also robust to multiple correlation structures was used. The models were constructed using Generalized Estimating Equation (GEE) where states were assigned as the panel variable and repeated measures of citizen pressures, lobby pressures, and legislative characteristics, were collected over the 18 year study period (1993-2010). Because an individual state's legislative decisions are related from one year to the next, an assumption of statistical independence may be violated and therefore a model is needed that accounts for this within-group correlation structure. A covariance structure appropriate for this situation is the exchangeable form which specifies a constant relationship between the repeated observations for an individual state (Shook et al., 2013). The GEE models presented in this analysis utilize the exchangeable correlation

structure but were also tested for robustness by verifying that other correlation structures (auto regressive and unstructured) produced similar results.

Results

During the study period, laws were adopted by the 50 states across the U.S. Minimum age to possess laws were adopted by the greatest number of states (16) during the study period, 1993-2010. Laws were adopted widely across the states, but two states, Maryland and Massachusetts saw the most activity with five and four adoptions respectively. Figure 6 illustrates the states that passed each of the six study laws during the study period of 1993-2010.

Figure 6. States that Enacted Laws, 1993-2010



Regression models were run to examine the influence of the predictor variables and selected demographic and economic variables on the six laws. For models that were not able to support all 12 predictor variables (due to sample size constraints), a subset consisting of the most significant predictors that were also robust to multiple correlation structures was used. Table 7 presents the data from the regression models for the three child protection laws: minimum age to purchase, minimum age to possess, and Child Access Prevention (CAP).

Minimum age to purchase and possess

None of the variables were statistically significant predictors for the passage of minimum age to purchase and minimum age to possess laws (see Table 7). Due to the small sample size of purchase laws ($n = 11$ states), the GEE model was only able to converge on the main predictors of interest. To stay true to the research question, only the predictor variables of interest were used for analysis of purchase laws. The GEE model for possession would only converge with ideology and house partisanship removed from the model. These convergence problems for purchase and possession laws are most likely due to the small sample size ($n = 11$ and 31 states respectively) and the fact that the majority of states adopted the laws by 2010 despite each state's individual characteristics. However, the data does show a trend toward more conservative states adopting these policies later than more liberal states (most of which had adopted prior to the start of the study period); though this difference is not significant among the groups.

Child Access Prevention

The regression model for child access prevention (CAP) laws shows that ideology, governor's party, and violent crime rates had a significant impact on the likelihood of adopting these laws when accounting for the effects of the other variables in the model. States with more liberal ideology scores were more likely to adopt CAP laws (7% more likely to adopt the law for every 1 point increase in the ideology score). States with a Democratic controlled governor's office were approximately 3 times more likely to adopt a CAP law than states with a Republican controlled governor's office. Finally, for every additional violent crime incident, a state had a 1% increase in the likelihood of adopting a CAP law.

Table 7. Regression Model, Child Protection Firearm Laws

Variable	<u>Child Protection Laws</u>		
	Purchase (State Years, N = 137) (States, n = 11) Odds Ratio (Std. Err.) 95% Conf. Interval	Possession (State Years, N = 289) (States, n = 31) Odds Ratio (Std. Err.) 95% Conf. Interval	CAP (State Years, N = 615) (States, n = 38) Odds Ratio (Std. Err.) 95% Conf. Interval
Citizen Pressures			
Ideology	.8385 (.0900) .6793 to 1.0350	_____	1.0762* (.0402) 1.0002 to 1.1580
Firearm Ownership	1.0107 (.0103) .9906 to 1.0312	1.0001 (.0012) .9977 to 1.0025	1.0681 (.0552) .9652 to 1.1820
Lobby Pressures			
Firearm Producing	.6352 (.3957) .1873 to 2.1538	.9897 (.0092) .9717 to 1.0080	_____
Legislative Characteristics			
Legislative Professionalism	1.1003 (.0686) .9737 to 1.2434	.9871 (.0066) .9742 to 1.0003	.9584 (.0494) .8662 to 1.0605
Governor's Party	1.0948 (.3158) .6220 to 1.9269	1.0025 (.0068) .9890 to 1.0161	3.2532* (1.7926) 1.1047 to 9.5797
Senate Party	1.9093 (1.0211) .6692 to 5.4467	1.0068 (.0058) .9954 to 1.0184	1.2679 (1.4311) .1387 to 11.5835
House Party	.4319 (.4369) .0594 to 3.1366	_____	1.3023 (.6350) .5008 to 3.3866
Issues			
Firearm Mortality	_____	.9937 (.0067) .9805 to 1.0070	.6386 (.1805) .3670 to 1.1113
Violent Crime	_____	1.0002 (.0001) .9999 to 1.0004	1.0089*** (.0027) 1.0037 to 1.0142
Demographic/Economic			
Bachelor's Degree	_____	.9998 (.0001) .9995 to 1.0002	_____
Poverty	_____	.9991 (.0081) .9954 to 1.0028	.6961 (.2321) .3621 to 1.3382
Population Density	_____	.9992 (.0012) .9968 to 1.0016	_____

*p<.05, **p<.01, ***p<.001

Table 8 presents the data from the regression models from the study for the three weapons ban laws: Saturday night special bans, assault weapons bans, and large capacity ammunition bans. For models that were not able to support all 12 predictor variables (due to sample size constraints), a subset consisting of the most significant predictors that were also robust to multiple correlation structures was used.

Saturday night special bans

The regression model for Saturday night special bans showed that house and senate partisanship were perfect predictors for the adoption of these laws (only Democratic controlled houses and senates passed the law) and therefore had to be removed from the analysis. Of the remaining predictors, ideology, legislative professionalism, percent of bachelor's degrees, and poverty rate had a significant impact on the likelihood of adopting these laws when accounting for the effects of the other variables in the model. States with higher ideology scores (more liberal) were significantly more likely to pass a Saturday night special ban law (2.5 times as likely for every 1 point increase in ideology score). States with a more professional legislature were also significantly more likely to pass the law (1.5 times as likely for every 1% increase in legislative professionalism). Poverty was significantly associated with a decrease in the likelihood of adoption; states were 89% *less* likely to adopt the law for every 1% increase in their poverty rate. Finally, the greater a percentage of a state's population with a bachelor's degree, the more likely they were to adopt a Saturday night

special ban; a state is 28% more likely to adopt the law for every 1% increase in the bachelor's degree population.

Assault Weapons Ban

The regression model for assault weapons bans showed that house partisanship was a perfect predictor for the adoption of these laws (the law was only passed by states with Democratic house majorities) and was therefore removed from the analysis. Of the remaining predictors, ideology, firearm production, and senate party had a significant impact on the likelihood of adopting these laws when accounting for the effects of the other variables in the model. States with a Democratic controlled state senate were 6.5 times *more* likely to pass an assault weapons ban than a state with a Republican controlled senate. A firearm producing state was 10 times *more* likely to pass the law than a non-producing state. Finally, states had a 15% increased chance of passing an assault weapons ban for every 1 point increase in their ideology scores (more liberal).

Magazine capacity bans

The regression model for magazine capacity bans showed that house partisanship was a perfect predictor for the adoption of the law and senate partisanship was a near perfect predictor (large capacity laws were only passed one time without a Democratic controlled senate) and therefore these two predictors were removed from the analysis. Legislative professionalism, percentage of the population with a bachelor's degree, violent crime rates, population density, and poverty had a significant impact on the likelihood of adopting these laws when accounting for the effects of the other variables in

the model. For every 1% increase in legislative professionalism, a state was 44% more likely to adopt a magazine capacity ban. States with a greater proportion of their population with a bachelor's degree were more likely to adopt the law (14% more likely for each 1% increase in the bachelor's degree population). States with a higher violent crime rate were more likely to adopt a magazine capacity ban (1% more likely for every additional incident), as were more densely populated states (3% more likely for every additional person). Finally, states with increased poverty rates were *less* likely to adopt a large capacity ban (48% less likely for every 1% increase in the poverty rate).

Table 8. Regression Model, Weapons Bans Laws

Variable	<u>Weapons Bans</u>		
	Saturday Night (State Years, N = 791) (States, n = 45) Odds Ratio (Std. Err.) 95% Conf. Interval	Assault Weapons (State Years, N = 750) (States, n = 46) Odds Ratio (Std. Err.) 95% Conf. Interval	Large Capacity (State Years, N = 799) (States, n = 48) Odds Ratio (Std. Err.) 95% Conf. Interval
<u>Citizen Pressures</u>			
Ideology	2.4205* (.9661) 1.1070 to 5.2925	1.1544** (.0535) 1.0541 to 1.2643	.7720 (.2371) .4228 to 1.4097
Firearm Ownership	1.0334 (.0594) .9232 to 1.1567	1.0614 (.0979) .8858 to 1.2719	1.2287 (.1978) .8961 to 1.6847
<u>Lobby Pressures</u>			
Firearm Producing	—————	10.1208* (11.4972) 1.0920 to 93.7952	1.2240 (1.4455) .1209 to 12.3893
<u>Legislative Characteristics</u>			
Legislative Professionalism	1.6686* (.4255) 1.0122 to 2.7505	1.1126 (.0782) .9693 to 1.2771	1.4352** (.1893) 1.1082 to 1.8587
Governor's Party	4.4987 (19.5859) .0008 to 22853.15	3.6326 (6.1130) .1342 to 98.3171	—————
Senate Party	—————	6.5150*** (3.1800) 2.5029 to 16.9588	—————
House Party	—————	—————	—————
<u>Issues</u>			
Firearm Mortality	2.7505 (1.5837) .8898 to 8.5023	1.0999 (.1134) .8986 to 1.3463	.5461 (.3446) .1586 to 1.8804
Violent Crime	1.0037 (.0026) .9985 to 1.0089	1.0002 (.0022) .9958 to 1.0047	1.0129** (.0047) 1.0038 to 1.0222
<u>Demographic/Economic</u>			
Bachelor's Degree	1.2867** (.1259) 1.9621 to 1.5588	1.0166 (.0153) .9870 to 1.0472	1.1395** (.0585) 1.0303 to 1.2603
Poverty	.1130* (.1033) .0188 to .6787	.8614 (.1257) .6470 to 1.1469	.5187** (.1085) .3442 to .7816
Population Density	1.0033 (.0043) .9948 to 1.0119	1.0040 (.0059) .9923 to 1.0157	1.0307* (.0147) 1.0023 to 1.0600

*p<.05, **p<.01, ***p<.001

Discussion

This study bolsters literature on policy adoption, specifically within the field of firearm injury prevention as it relates to laws focused on protecting children and banning specific weapons that have the potential to increase the risk of injury. Reduction of firearm injuries is a multivariate and multijurisdictional issue due to the highly transportable and non-expendable nature of firearms. The findings illuminate the influencers that have bearing on policy adoption of legislation to reduce firearm injuries.

Findings corresponded with previous research on specific political and demographic variables on firearm policies (Bruce & Wilcox, 1998; Spitzer, 2011; Wilson, 2006), but the study went a step further to analyze how these variables interacted to produce the outcome of these six laws across the years 1993-2010. This study shows that the adoption of laws strengthening gun control is significantly linked with internal state political and demographic characteristics. Advocates can take cues from these characteristics to create change. It was not a goal of the research to evaluate the innovation of the laws; however, some of the selected laws are considered to be more progressive (e.g., weapons bans) than others. Many of the more progressive laws to counter firearm injuries are not widely diffusing across the states and when they do diffuse, it is usually only under specific circumstances, such as a Democratic-controlled state government for multiple years paired with a liberal citizenry ideology. Sustained and aligned government partisanship and citizen ideology can create conditions for laws like weapons bans because these laws are more likely to be supported by these two groups, therefore advocates should continue to pursue these laws in states meeting these

specifications. It is also important to note that the study assumed that external influencers did not impact outcomes, this assumption could skew the results specifically in the area of assault weapons bans where there was a federal law in place from 1994-2004. The federal law may have relieved the pressure from the states to pass their own bans. Future studies should examine these external influencers when considering state firearm policy adoption.

Two of the laws included in the study, minimum age to purchase/possess, had no significant predictors for their passage. These laws followed a national trend resulting from federal legislation and were supported by public sentiment regarding children accessing firearms (Smith, 2012). The study did not capture minimum age to purchase/possess laws for long guns such as rifles and shotguns. In states with a sporting culture, laws regarding minimum age to purchase/possess long guns may be quite different, especially because federal law does not provide guidelines for these firearms. Long guns have been linked with an increased risk of injury (Dahlberg, Ikeda, & Kresnow, 2004) and they would be worth further examination in future adoption research. Significant political and demographic predictors were found for the remaining four laws.

Legislative characteristics of the state were found to significantly influence the adoption of many of the selected firearms laws. Partisan control of the legislature significantly predicted the outcome of the adoption of more progressive firearms laws (e.g., weapons bans); and professional legislatures were also significant in the adoption of some of the more progressive laws. Time and resources for policy development are

linked to professional legislatures. Advocates should seek to educate all legislators and their staff regardless of the level of professionalism; however approaches cannot be one size fits all. Advocates should devote more resources in states with less professional legislatures and advocates in states with more professional legislatures should be sure to develop relationships with staffers, providing messages on the importance of research. More professional legislatures that are Democratic controlled would be ideal venues for change and efforts should really be made in these states to introduce comprehensive gun control measures.

The power of the firearm lobby is well documented (Gimpel & Wolpert, 1998; Goss, 2010; Spitzer, 2011; Wilson, 2007), however, lobby pressures, as measured by firearm production, did not produce the expected results. Firearm producing states were not significant in the passage of any of the laws, except with assault weapons bans where they were found to significantly *increase* the likelihood of adoption. Other policy areas, such as farming or tobacco, have demonstrated the strength of their lobbies at both the state and federal levels (Food & Water Watch, n.d.; Givel & Glantz, 2001; Hayden, 2002; Morley, Cummings, Hyland, Giovino, & Horan, 2002); however, this was not seen for the firearm producers in this study. This could be because the variable was not an inappropriate measure for firearm lobbying. Other measures may have better captured the power of the firearm lobby, such as NRA candidate endorsements or campaign contributions (Goss, 2006; Wilson, 2006). Lobbying can also happen through other channels, such as visits with assemblypersons and senators, or through membership emails and phone calls. An alternative measure was not selected for the study due to

challenges of collecting a meaningful, free, reliable, and publicly available time-varying measure. Future research should examine alternative measurers of lobby pressure for outcomes in adoption.

Looking to the citizens may be a better indicator of lobby power for firearms. Social regulatory movements often garner support from a strong ideologically-tied base. Citizen ideology was a significant predictor of firearm laws, as were other demographic characteristic of education and poverty. Changing an individual's ideological identification is beyond the powers of public health advocates. However, social norms can be changed over time through appropriate messaging. Tobacco control and motor vehicle safety have successfully packaged messages to change social norms (Hemenway et al., 2001; Hemenway, 2009). Research in injury prevention is working to understand how to better communicate messages on firearm injury prevention (O'Brien, Neffinger, Kohut, & Quinlan, 2012; Ridgeway, Braga, Tita, & Pierce, 2011) and this study provides evidence for the continued need of this work. Tailored messages in traditionally hostile venues could educate and build support for prevention and thus create incremental changes in states that were previously viewed as unfriendly to public health efforts in injury prevention. Polls indicate (CNN/ORC International Poll, 2012) that the majority of Americans want to see a change in firearm laws; issue framing and messaging may be a way to ensure that laws are introduced and passed. Injury prevention advocates should not be discouraged by more conservative venues but rather work to educate voters with appropriately tailored messages that are digestible and clear for both legislators and citizens.

Firearm injury prevention navigates politically charged waters that are dominated by single-issue lobby groups. The strength of these lobbies is often one-sided, with groups like the National Rifle Association monopolizing the discussion on solutions, or lack thereof, for problems facing many Americans. Currently there is a disconnect between public sentiment and firearm laws. Change is slow to come at the federal level; therefore efforts should be focused on the states. Identifying contributing factors for state adoption of firearms laws could be a key component for influencing change at the state level.

Passing effective, evidence-based laws in multiple venues so as to prevent spill-over affects through the coverage of as many people as possible is a goal for firearm injury prevention. However, working to improve the current laws should also be examined. Enforcement and outcomes of these laws was beyond the scope of this study but the lack thereof can negatively affect policy intentions. In this vein, not all policies are created equal. Future research should account for provisions within each type of firearm law because these could impact health outcomes, and they may also be more palatable to certain legislatures and citizens. For example, Hawaii bans large capacity magazines for handguns only and Maryland bans large capacity magazines over 20 rounds. CAP laws also vary from criminal liability when a child accesses a firearm (e.g., Hawaii, Maryland, and New Jersey) to criminal liability only if a child possesses a firearm (e.g., California, Illinois, and Rhode Island). Future research should examine differences among the laws for adoption and injury prevention outcomes.

The current study was a higher level examination of policy diffusion of specified firearm laws. Findings support that internal political, social, and economic characteristics of states influence firearm injury prevention law adoption. They serve also as a reminder of the importance of state level politics when it comes to preventing injury through policy adoption. Many public health efforts focus at the federal level because of the potential for broader population-level impact. However, these efforts can overshadow opportunities for local victories. The more firearm laws are adopted, the greater the likelihood that they will continue to gather momentum and continue to be adopted by other states and jurisdictions. Because firearm injuries are sometimes met with challenges not faced by more traditional disease prevention areas, public health professionals must be armed with continued surveillance data to inform policy advocates. Injury prevention advocates within states should be aware of political cues that can create opportunities for policy change. Additionally, national organizations should encourage members to think locally in addition to nationally for firearm injury prevention venues. Together, public health professionals and policy advocates can identify and pursue the elements that contribute to successful passage of firearms injury prevention laws, such as those found in this study.

CHAPTER 4

PAPER 3: ADOPTION OF STAND YOUR GROUND LAWS

Abstract

Since the 2000s, there has been a trend of permissive firearm laws spreading across the 50 states. Amidst debates of their impact on public safety, stand your ground laws (SYG) have been quickly adopted throughout the U.S. This study used GEE analysis to understand internal state influencers, specifically legislative characteristics, industry pressures, and citizen pressures, on the adoption of SYG laws. The model also examined poverty, population density, education, violent crime rates, and firearm mortality rates on the adoption of SYG laws. Annual panel data sets were organized from publicly available sources for each state for the years 2002-2010. Democratic control of the legislature was shown to significantly reduce the likelihood of SYG laws, while increases in population density and poverty were shown to significantly increase the likelihood of SYG law adoption. Due to the increased likelihood of injury outcomes from SYG laws, advocates should educate legislators and communities in states that are trying to pass or expand SYG laws, especially when other permissive firearm laws are already in place.

Target Journal: *Injury Prevention*

Introduction

In 2005, Florida became the first state to enact a law which significantly expanded the Castle Doctrine, known as stand your ground laws (SYG). A Castle Doctrine (also known as castle law or a defense of habitation law) designates a person's home as a place in which they will have certain legal protections and/or immunities in certain circumstance to use force to defend themselves against an intruder (National Conference of State Legislatures, 2013). Stand your ground laws (also referred to as "shoot first" laws) eliminate the duty to retreat even if it can be accomplished safely. They also presume that deadly force is reasonable and therefore prevent prosecutors from conducting an investigation, protecting the shooter from criminal prosecution and civil liability (*Justifiable Use of Force*, 2005). These laws negatively impact minorities and youths and have harmful consequences for public safety and civil rights (Cook, 2013; Wade, 2013). Proponents of SYG laws claim they create safer environments but studies refute this claim (Cheng & Hoekstra, 2012; Lee, Moriarty, Tashjian, & Patterson, 2013; McClellan & Tekin, 2012), stating that they increase homicides and firearm injuries. Justifiable homicides resulting from these laws have increased 8%, which translates to roughly an additional 600 homicides between 2005-2012 (Cheng & Hoekstra, 2012). In Florida alone, 134 fatalities were a direct result of stand your ground cases from 2005-2013. Of those shootings, 40 victims were age 21 years or younger ("Florida's Stand Your Ground Law: Those Who Stood, Those Who Fell," 2013). Race also plays a significant role in the outcome of cases with those who killed a black person walking free 73% of the time and those who killed a white person walking free 59% of the time (Taylor Martin, Hundley, & Humburg, 2012).

The shooting of Trayvon Martin in 2012 (Weiner, 2014) captured national attention regarding these laws and called for a reexamination of their use. No studies support the claim that these laws prevent injuries or crime; however, they are growing in popularity and spreading across the states. Support for SYG laws differ for cross-sections of the population (Quinnipac University Polling Institute, 2012). Roughly 53% of voters support a stand your ground law; support is 75% among Republicans and 62% opposed by Democrats (Quinnipac University Polling Institute, 2012). Additionally, 67% of voters in households with firearms support these laws (Quinnipac University Polling Institute, 2012). However, prosecutors, law enforcement, and mayors of urban areas are less likely to support SYG laws (Mayors Against Illegal Guns, 2013; Quinnipac University Polling Institute, 2012; Washington Post Staff, 2013). The Association of Prosecuting Attorneys have consistently raised concerns about SYG laws, arguing that these laws can encourage vigilante behavior and may even place law enforcement at risk. David LaBahn, the president and CEO of the Association of Prosecuting Attorneys, testified before Congress that, “by expanding the realm in which violent acts can be committed with the justification of self-defense, Stand Your Ground laws have negatively affected public health and undermined prosecutorial and law enforcement efforts to keep communities safe” (LaBahn, 2013, 5). Amid the conflict of opinions on SYG laws, statehouses are passing them at a rapid pace. It is the goal of this study to test internal state predictors that influence the adoption of these laws.

Theory

Changes in firearm policy have been modeled in a variety of ways, including the political theories “window of opportunity” model (Carter, 1997; Kingdon, 2002; Weir, 1997), punctuated equilibrium theory (Baumgartner & Jones, 1993; Bruce & Wilcox, 1998; Godwin & Schroedel, 1998), and several atheoretical “garbage can” models (Grossman & Lee, 2008). While valuable to the study of firearm adoption, none of these studies examine adoption across all 50 states longitudinally and they also lack internal state explanatory variables, specifically for stand your ground laws. Researchers are beginning to ask questions about broad adoption of laws across the 50 states (Spitzer, 2011; Tucker, Stoutenborough, & Beverlin, 2012; Wilson & Rozell, 1998). Much of the pertinent theories and methods to address complex answers to policy adoption across the 50 states are coming from the policy diffusion literature. Adoption and diffusion, while often times used interchangeably within the literature, are in fact two different concepts. Adoption is “the decision to establish policy in an individual jurisdiction,” while diffusion is “about the movement of policy across jurisdictional boundaries” (Karch, 2007, 56). These concepts are different, but theories and methods to test them are similar because diffusion is but a part of the larger process of adoption (Karch, 2007). As a first step to understand diffusion, the current study examines internal state factors that facilitate the adoption of stand your ground laws across the 50 states, using theoretical approaches from political science for application to injury prevention efforts.

Early theorists focused on regional adoption models using geographic proximity as a means of explaining diffusion across the 50 states. Theory dictated that one state was prompted to adopt a policy based on the adoption of that policy by a neighboring state

(Karch, 2007; Walker, 1969). These assumptions were based on communications networks among policy makers, overlapping media markets, and possible cultural and demographic similarities of neighboring states. As communication networks and transportation technology improved, the geographic proximity argument has become less influential, with scholars arguing for a national view on diffusion (Berry & Berry, 1990; Karch, 2007; Minitrom, 1997). Internal determinants models propose that states are motivated to innovate based upon political, economic, and social characteristics of the state. Arguments focus on the dynamic political processes of diffusion (Berry & Berry, 1990; Karch, 2007). Policymakers intentionally look to others for solutions to solve problems within their own state. States with similar shared characteristics will be most likely to pass similar firearm policies regardless of shared borders. The current study will fill a gap in the firearm adoption literature by applying diffusion theory to stand your ground laws. Firearms laws negatively impacting public health are spreading across the states. Understanding influences on the adoption of these laws will help advocates identify cues for potential change.

Methods

The study is a 50 states longitudinal comparative study of stand your ground laws between 2002 and 2010 to determine the impact of political characteristics, citizen pressures, and producer pressures on the diffusion of firearms policies across the states. The study began in 2002 to capture states prior to the introduction of the Florida bill and it concluded in 2010 when the most recent data were available. Laws were documented as being existent (1) or not in existence in that state (0). Laws were retrieved from

internet queries in LexisNexis and Cornell Legal Information Institute databases; special interest websites (such as the National Rifle Association, the Brady Campaign, and the Law Center to Prevent Gun Violence (LCPGV, previously known as the Legal Community Against Violence (LCAV)); government websites (the Department of Justice (DOJ), the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)); and individual states' websites. The following search terms were used for the searches: *gun, firearm, stand your ground, shoot to kill, shoot first, and castle doctrine*. Annual panel datasets were created for the three predictor variables of interest as well as demographic, economic, mortality, and crime data. The variables described below are drawn from the theoretical examination of state policy diffusion.

Legislative Characteristics

Legislative professionalism and government control, as represented by partisanship, were used to represent a state's legislative characteristics. Legislative partisanship of the state senate, assembly, and governor were collected for each state from the U.S. Census. In years where the senate, or house, majority was split between the two parties, the party of the governor was used to assign partisanship (Berry & Berry, 1990; Berry, Fording, Ringquist, Hanson, & Klarner, 2010). However, this technique was used in fewer than 4% (n=10) of the cases across the 9 years. More conservative governments are friendlier to gun rights, therefore it is expected that more conservative governments are more likely to adopt SYG laws.

Second, the validated Squire index score (2008) was used to capture the level of professionalism among the states' legislatures. The U.S. Congress is the most

professional legislative body in the country; each state legislature is given a score as it relates to the U.S. Congress. Lower scores are deemed less professional. The score was updated once during the study period. The 1996 score was used for 2002, and the 2003 score was used for the years 2003-2010. States with more professional legislatures have the time, money and staff to actively seek policies for their state and to deliberate those policies, making them less susceptible to outside pressures (Squire, 2007).

Lobby Pressures

Firearm production was used to represent firearm industry pressure and lobbying. The measure was selected because it is free and publicly available. Data on annual state level firearm production was collected from The Annual Firearms Manufacturers and Export Report (Bureau of Alcohol Tobacco and Firearms, n.d.). These reports are available online for the years 2002-2010. Firearms are produced in almost every state, but not at the same levels. These state gun production numbers were divided by the total U.S. gun production in a given year in order to generate the production percentages for each state. When a histogram was created for firearm production by state, it became clear that a handful of states were responsible for the majority of the nation's firearm production. Over the study period, approximately 10 to 12 states are responsible for producing over 90% of the nation's firearms. Based on these data, states were coded as either firearm producing states (producing greater than 1.5% of the nation's firearms) or non-firearm producing states (producing less than 1.5% of the nation's firearms). It is expected that firearm producing states will support laws that expand firearm prevalence.

Citizen Pressures

Firearm ownership and gun rights are often associated with conservatives (Spitzer, 2004; Wilson, 2007). Therefore, it is expected that conservative states will be more likely to pass SYG laws. Two measures captured this concept: 1) citizen ideology and 2) gun ownership rates. The validated Erikson, Wright, and McIver (2007) index was used as a measure of citizen ideology for each state in the study. Challenges regarding the static nature of the score are offset by the manner in which the data were collected. The score is created by aggregating state responses from 122 national CBS/NYT polls over a decade to generate state-level measures of partisanship and ideology. Other measures do exist, but they use elite partisanship and candidates running for office to measure citizen ideology variables (Berry et al., 2010). Therefore, the Erikson, Wright and McIver (2007) measure was used because it actually captures citizen ideology and has been used by other diffusion studies (Barrilleaux, 1997; Jensen, 2003; Shipan & Volden, 2006). Gun ownership was estimated by dividing the number of firearm suicides by the number of total suicides in a given year (Cook & Ludwig, 2006; Cook, 1979; Miller, Azrael, & Hemenway, 2002). This is a validated measure used within the field for capturing gun ownership rates by state for individual years. Data for suicides were obtained from the CDC's Web-based Injury Statistics Query and Reporting System (WISQARS) database. It is expected that more conservative states will pass fewer gun control laws.

Demographics, Crime, and Mortality.

Non-political factors, such as mortality, crime, and state demographics have the potential to impact firearms laws. Therefore, these variables were also collected and controlled for in the model. More densely populated states are more likely to suffer from crime (Cook & Ludwig, 2002; Hemenway, 2004; Spitzer, 2004). Alternatively, more densely populated states may see SYG laws as creating the potential for firearm injuries. The relationship between SYG laws and population density is expected to exist but the direction of the relationship is not determined. One of the arguments for SYG laws is that they will decrease crime (Lott, 2010). Therefore, state crime rates were controlled for in the study. State demographics such as poverty and education can also influence the likelihood of adoption (Wilson, 2007). More educated populations are more likely to want more restrictive firearm measures (Spitzer, 2004; Wilson, 2007), therefore it is expected that education will decrease the adoption of SYG laws. Table 9 provides an overview of the predictor variables in the study.

Table 9. Predictor Variables

Variable	Measure	Source(s)
Lobby Pressures (IV) - Gun producing state	States producing greater than 1.5% of nation's firearms (produce = 1, non-producer = 0)	Bureau of Alcohol, Tobacco and Firearms - Annual Firearms Manufacturers and Export Reports
Citizen Pressures (IV) - Ideology	Score (-30.2 more conservative, +8.7 more liberal)	Erikson, Wright, McIver (2007)
- Gun ownership	Proportion of firearm suicides	CDC WISQARS
Legislative Characteristics (IV) - Legislative Professionalism	How similar state legislatures are to the US Congress (Range 2.7% to 62.6%)	Squire Index (2007)
- Partisanship (Legislature: R/S & Governor)	0=Rep controlled, 1=Dem controlled	US Census Bureau
Issue (control) - Mortality	Firearm mortality rates	CDC WISQARS
- Crime Rates	Violent crime rates	US DOJ Bureau of Justice Statistics
State-level demographics (control)	<ul style="list-style-type: none"> • Population density • % with Bachelor's degrees • % living below poverty 	US Census Bureau

The data were collected between February 2011 and April 2012 and entered into a STATA version 12 database (StataCorp, 2011). The data were cleaned and checked for outliers. The likelihood of states passing SYG laws was analyzed using multivariate techniques. Specifically, binary logistic regression models were constructed to analyze the likelihood of a state adopting a SYG law while controlling for citizen pressures, lobby pressures, legislative characteristics, demographic, crime, and economic data. The models were performed using Generalized Estimating Equation (GEE) where states were assigned as the panel variable and repeated measures of citizen pressures, lobby pressures, and legislative characteristics, were collected over the 9 year study period (2002-2010). Because an individual state's legislative decisions are related from one year to the next, the assumption of statistical independence may be violated and therefore a model is needed that accounts for this within-group correlation structure (Shook et al., 2013). The GEE models constructed for this analysis used the exchangeable correlation structure.

Results

During the study period, 21 states adopted stand your ground laws. Florida was the first to pass the law in 2005, quickly followed by 20 additional states in five years (Figure 7).

Figure 7. States with Stand Your Ground Laws, by Year of Passage, 2005 – 2010

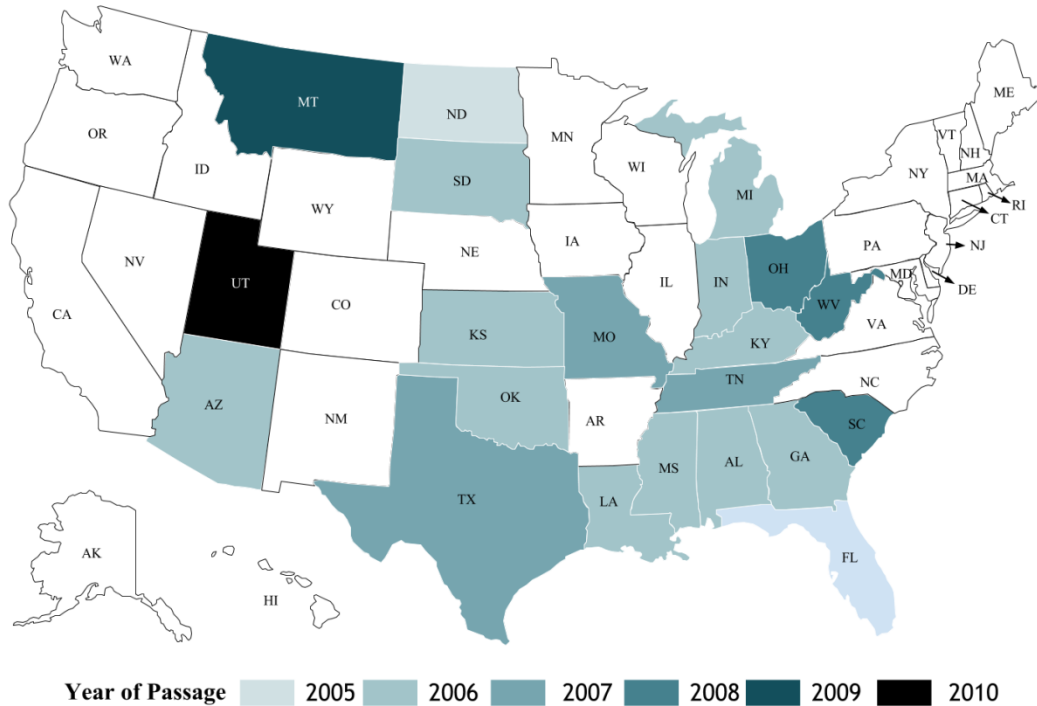


Table 10 presents the descriptive statistics for states that passed SYG laws and the states that *did not* pass SYG laws. In general, states passing SYG laws had more conservative ideology scores, higher rates of firearm ownership, and lower rates of professionalism in the legislature. SYG states also had lower population density, lower rates of college completion, and higher rates of poverty. Government control was dominated by Republicans in the SYG states. Rates of firearm production were similar between the two groups. Violent crime and firearm mortality rates were lower for the states that did not pass SYG laws.

Table 10. Descriptive Statistics, Independent Variables, 2002-2010

Variable	N	States that passed SYG		N	States that did <i>not</i> pass SYG	
		Range	Mean (SD)		Range	Mean (SD)
Ideology	121	-30.2 to -10.9	-20.2 (5.13)	261	-24 to 8	-8.91 (7.62)
Ownership	121	45.56 to 76.59	60 (7.24)	261	14.29 to 78.1	47.41 (13)
Legislative Professionalism	121	5.1 to 51.6	14.44 (8.25)	261	2.7 to 62.6	20.91 (12.93)
Violent Crime (rate per 100,000)	121	78.2 to 822.7	428.33 (186.06)	261	103.7 to 770.8	378.8 (167.6)
Firearm Mortality (rate per 100,000)	121	6.75 to 19.77	12.63 (2.81)	261	2.19 to 20.78	9.38 (4.1)
Education (% of Bachelor's Degree)	121	15.3 to 87.03	24.58 (6.57)	261	18.3 to 40.4	28.76 (4.69)
Population Density	121	6.18 to 270.46	91.29 (70.1)	261	.97 to 1007.21	213.13 (259.91)
Poverty (% of population living below poverty)	121	9.1 to 21	14.07 (2.64)	261	5.8 to 19.8	11.49 (2.6)
Variable	N	Total	Percentage	N	Total	Percentage
<i>Producer</i>						
No	86	121	71	192	261	74
Yes	35		29	69		26
<i>Governor Control</i>						
Republican	70	121	58	117	261	45
Democrat	51		42	144		55
<i>Senate Control</i>						
Republican	88	121	73	88	261	34
Democrat	33		27	173		66
<i>House Control</i>						
Republican	73	121	60	91	261	35
Democrat	48		40	170		65

Table 11 presents the findings of the regression model predicting SYG law adoption. When accounting for political, demographic, and economic variables, government control of the legislature, poverty rate, and population density were significantly associated with SYG adoption. Increases in population density were significantly ($p < .01$) related to the odds of passing a SYG law. Specifically, for every 10 extra people per square mile, there was a 5% increase in likelihood of passage. Partisan control of the legislature was also significantly ($p < .01$) related to the odds of adoption a SYG law. A Republican controlled house was 5.5 times *more* likely to pass SYG law than a Democratic controlled house. Similarly, a Republican controlled senate was 19 times *more* likely to pass a SYG law than a Democratic controlled senate. The most significant predictor was poverty. Increases in poverty rate were significantly related to the increased likelihood of passing SYG laws. States were approximately twice as likely to pass SYG for every 1% increase in a state's poverty rate.

Table 11. Estimates of the Effects on Adoption of Stand Your Ground Laws from the Regression Models

Variable	Odds Ratio	Std. Err.	95% Confidence Interval	
Ideology	.9170	.0532	.8184	1.0274
Ownership	.9250	.0549	.8234	1.0393
Professionalism	.9418	.0322	.8808	1.0071
Governor's Party	3.2662	2.4055	.7711	13.8340
House Party	.1851**	.1176	.0532	.6433
Senate Party	.0516**	.0547	.0064	.4123
Producer	1.1084	.5755	.4006	3.0668
Bachelor's Degree	1.0118	.0199	.9736	1.0516
Violent Crime	.9977	.0015	.9946	1.0008
Firearm Mortality	1.2044	.1941	.8781	1.6520
Population Density	1.0047**	.0019	1.0009	1.0086
Poverty	1.9810**	.3569	1.3915	2.8202

*p<.05, **p<.01, ***p<.001

Discussion

The popularity of stand your ground laws continues to grow. Between the conclusion of the study in 2010 and December 2013, six additional states (Alaska, Nevada, New Hampshire, North Carolina, Pennsylvania, and Wisconsin) adopted SYG laws; and in 2013 alone, an additional twelve states (Alaska, Alabama, Colorado, Connecticut, Florida, Georgia, Iowa, Nevada, Oklahoma, Pennsylvania, Texas, and West Virginia) introduced bills that would establish or expand shoot first provisions.

Supporters of these laws posit that SYG laws are for self-defense and safety but the findings of this study did not find a significant link between violent crime and firearm mortality and the adoption of SYG laws. In fact, these laws are linked with increased mortality and morbidity (Cheng & Hoekstra, 2012; McClellan & Tekin, 2012). It is not surprising that crime and safety factors did not significantly contribute to the adoption process because firearm policies occupy a more ideological space in American politics

(Goss, 2010; Spitzer, 2004). Due to this, political influencers must be evaluated when trying to understand their adoption.

The adoption of SYG laws appears to be an ideological and partisan response to the perceived threat of personal safety within communities and mistrust of government to protect them (Pew Reserach Center for the People & the Press, 2013a, 2013b). Poverty was such a strong predictor for the adoption of SYG laws that it could be a proxy for something else that is occurring within the population, such as racial tensions or immigration politics (Lin & Harris, 2008). Future studies should include these variables to better understand the relationship between poverty and the adoption of progressive firearm laws.

The goal of the current study was to understand internal state characteristics on the adoption of SYG laws, not the outcome of these laws on injury. However, for injury prevention efforts, the adoption of these laws do have health costs that are estimated at an additional 600 lives since their initial adoption (Cheng & Hoekstra, 2012). Compounding the problem of SYG laws is the expansion of permissive concealed carry laws throughout the states. Other such examples of permissive firearm laws were not examined by this study. However, concealed carry laws that allow firearms in new venues such as bars and college campuses, are expanding throughout the 50 states. These laws coupled with SYG laws have the potential to increase firearm injuries. Future studies should examine the injury outcomes of these laws. Of particular interest, is the expansion of legislation to allow firearms in bars in states like Georgia, Tennessee, and Florida (Gay, 2010). SYG laws can encourage people to take the law into their own hands, and have the potential to

escalate violent situations. This could be particularly dangerous in combination with alcohol, which can flare tempers and blur perceptions of threats.

Findings were strong for internal determinants of SYG law adoption. However, there are indications that trans-boundary efforts could also be influencing diffusion. This could help to explain the rapid adoption of stand your ground laws, where 11 states adopted the law in 2006, just one year after Florida passed the first such law. Findings suggest that something beyond internal state determinants is driving SYG law adoption. Many national organizations, such as the National Conference of State Legislatures and the United States Conference of Mayors have mission statements that include diffusing policy information to policy makers. These activities can appear in many forms ranging from publications, to conferences, to interest group campaigns (Karch, 2006, 2007; Minitrom, 1997). In the arena of firearms, groups such as the NRA and the American Legislative Exchange Council (ALEC) have successfully promoted policies across the states. These organizations search for states that have internal dynamics to support the proposed legislation. Activities from these groups can include overt lobbying, crafting of legislation, placing advertisements, and directly reaching out to voters.

The policy adoption and diffusion literature has begun to explore the role of national organizations and policy entrepreneurs on policy adoption (Karch, 2006, 2007; Minitrom, 1997). The NRA has a strong grass roots movement, but it also has a very strong national presence that is able to strategically introduce bills in multiple states at once. The NRA is not the only national organization that works across state borders to affect change within the states. Public health has professional organizations and groups like the Society for the Advancement of Violence and Injury Research (SAVIR), the

American Academy of Pediatricians, the American Medical Association, and the Brady Campaign to Prevent Firearm Violence that can also work across state boundaries to affect individual state change.

Conclusion

Addressing firearm morbidity and mortality is a complicated, multifactorial, and multijurisdictional problem that requires a multipronged solution. Policies can intentionally, or unintentionally, impact health outcomes, and often times these policies are passing for political reasons rather than injury prevention reasons (Weiner et al., 2007). The public health approach to violence and injury prevention is valuable but frequently misunderstood by the public, inviting critics to discredit solid science. Additionally, public health professionals are not always successful, or willing to engage in the political process, relying instead on knowledge-driven models of policy-making (Cagle & Martinez, 2004; National Academy of Sciences, 1988). As a result, public health approaches to firearm injury prevention efforts are often met with constitutional, ideological, and partisan challenges. Injury prevention researchers need to navigate political channels to create positive health outcomes. Successes could be garnered with politics that are backed by science.

While this study focused narrowly on a specific permissive firearm policy, stand your ground laws, it has larger implications for the study of firearm policy adoption and injury prevention. The current study demonstrated that internal state political and demographic influencers are increasing the likelihood for adoption of SYG laws. Specifically poverty should be explored further to uncover the link between increased

poverty and permissive laws. Injury prevention researchers must continue to research the link between permissive firearm laws and health outcomes. Messaging of this information must be taken to legislators and the public in a manner that suits the targeted audience. In addition to researching outcomes, public health should continue to understand the influences of the political process and how to affect change through it. They also need to look for cues within their own states for opportunities to support, or speak out against, policies that impact injury prevention. Finally, state advocates should partner with national organizations as a way to create opportunities across state lines.

The findings contribute to the current knowledge of injury prevention. Findings from these studies serve as a reminder of the importance of state level politics when it comes to preventing injury. Unfortunately, public health professionals tend to shy away from politics and instead focus on the science. When efforts to impact policy are attempted, the focus is usually exclusively at the federal level. However, these efforts can overshadow opportunities for local victories. States are the laborites for democracy and they hold the majority of power for firearms regulation. Therefore, they must not be overlooked and should be examined more closely for injury prevention opportunities.

CHAPTER 5

CONCLUSION

Addressing firearm morbidity and mortality is a complicated, multifactorial, and multijurisdictional problem without one solution. Policies can intentionally, or unintentionally, impact health outcomes, and these policies are often passing for political reasons. In the late 1970s, the Centers for Disease Prevention and Control (CDC) entered the arena of firearm injury prevention to study the effects of violence; a domain that was previously overseen by the U.S. Department of Justice (DOJ) (Spitzer, 2011). The CDC introduced the public health approach to violence and injury prevention by defining the issue, identifying risk factors and at-risk populations, developing and testing interventions, and implementing effective interventions (Hemenway, 2009; US Department of Health Education and Welfare, 1979). Relying on knowledge that is complex, highly technical, open to interpretation, and poorly understood by the public, the CDC caught the attention of the National Rifle Association (NRA) (Cagle & Martinez, 2004). The NRA claimed that the science was ideologically tainted and began a campaign to remove the federal government from the firearm policy arena, specifically any research that could result in laws restricting firearms and their use. The NRA's advocacy was successful, resulting in funding cuts to the CDC's firearm injury research budget in 1996 (Jamieson, 2013). Public health professionals are not always successful, or willing to engage in the political process, relying instead on knowledge-driven models of policy-making (Cagle & Martinez, 2004; National Academy of Sciences, 1988). Those who work in knowledge-driven models attempt to use superior knowledge to

justify their domain in a policy area (Cagle & Martinez, 2004). Injury prevention researchers need to navigate political channels to create positive health outcomes. Many traditional public health approaches to firearm injury prevention efforts are met with constitutional, ideological, and partisan challenges. Firearm policies are spreading as a result of ideological-based politics, not based on scientific findings related to injury prevention outcomes. Successes could be garnered with politics backed by science.

This dissertation sought to understand the factors for policy adoption across the 50 states between 1993 and 2010. Using a newly developed database of selected firearm laws for all 50 states, the analysis tested the role of key internal determinants, including political characteristics, citizen and producer pressures on the process of firearm policy adoption. Across the three papers of the dissertation, the study addressed the two aims of the research:

Aim 1: Create a database of selected enacted state firearms laws from 1993-2010.

Aims 2a, 2b: Conduct a longitudinal analysis of the 50 states' selected firearm laws between the time period of 1993 to 2010 to determine the impact of political characteristics, citizen and producer pressures on the adoption of firearm policies.

Summary of Findings

Chapter 2 presented the data to address Aim 1, the creation of selected enacted firearm laws from 1993-2010. A descriptive analysis of the seven selected firearm laws across the 50 states between 1993-2010 was presented to explore the firearm laws and to look for patterns of adoption. The laws included: 1) minimum age of possession (handgun), 2) minimum age of purchase (handgun), 3) stand your ground laws, 4) assault weapons bans, 5) child access prevention laws, 6) Saturday night specials ban, and 7) bans on large capacity ammunition clips. During the 18-year study period (1993-2010), 59 firearm laws were passed by 37 states. Activity occurred in waves, with the greatest movement at the beginning (1993-94) and end (2005-2010) of the study period. The early laws moved in a direction of strengthening firearm laws, closely aligning with federal legislation at the time (*The Brady Handgun Violence Prevention Act of 1993*, 1993, *Violent Crime Control and Law Enforcement Act of 1994*, 1994).

It was the second major wave of firearm laws that proved to be the most interesting development, with the rapid adoption of stand your ground laws across 21 states in five years. This law was independent of federal legislation, and more significantly moved in a direction that runs counter to injury prevention efforts by placing more guns in public spaces. It also spread more rapidly than any other law in the study. With the exception of stand your ground laws, states have been relatively inactive in firearm injury prevention policy arena for the past decade, despite public and media attention to firearms. In fact, aside from legislation to ensure consistency with federal law, states have not responded to the public call for regulation. These findings were used to inform the direction of the subsequent chapters.

Chapters 3 and 4 addressed Aims 2a and 2b of the study, to conduct a longitudinal analysis of the 50 states' selected firearms laws between 1993 and 2010 in order to determine the impact of political characteristics, citizen and producer pressures on the adoption of firearm policies. These studies build on a rich literature of policy adoption and diffusion across the 50 states (Berry & Berry, 1990; Karch, 2007; Minitrom, 1997; Shipan R & Volden, 2006; Tucker, Stoutenborough, & Beverlin, 2012), specifically testing internal determinants of firearm adoption.

In Chapter 3, General Estimating Equations (GEE) were used to evaluate the impact of citizen pressures, lobby pressures, legislative characteristics, and state demographics on adoption of six firearm laws (child access prevention (CAP), minimum age to purchase and possess handguns, Saturday night special bans, assault weapons bans, and large capacity ammunition bans), across the 50 states from 1993-2010. The study found significant associations between many of the identified pathways. Specifically, more progressive laws including weapons bans and CAP occurred in states with a more liberal citizenry, a Democratic controlled government, and a more professional legislature. These states also tended to have a higher population density and a wealthier and more educated population. The two minimum age laws were adopted by almost every state (43 states for purchase laws, and 47 states for possession laws,) and therefore no predictors were found to be significant in their enactment. This aligned with the findings in Chapter 2 that these types of laws followed a national trend resulting from federal legislation and were supported by public sentiment regarding children accessing firearms (Smith, 2012). It is worth noting that the states that enacted the minimum age laws later, or did not enact them at all, had more conservative ideology scores. An

examination of the laws regulating the purchase/possession of long guns may have yielded different results because states with hunting and sporting traditions may have different beliefs surrounding child access to these types of weapons (Hemenway, Azrael, & Miller, 2001).

Findings from Chapter 3 confirmed that many of the more progressive laws to counter firearm injury (e.g., weapons bans) are not broadly adopted across the states but occur in a concentrated group of states. When a law is passed, it is under specific circumstances, such as a state government that has a firm Democratic controlled government for years, as opposed to swing states. Despite this finding, public health officials should not shy away from conservative or swing venues. A strictly science-based approach to gun control in these venues may be greeted with hostility and mistrust. Instead, the focus should be on working to bridge networks and conduct research on messaging of firearm injury prevention efforts with the intention of changing social norms and to make it more difficult for laws that do not support injury prevention efforts to pass. Building and engaging a strong grassroots base of supporters for firearm injury prevention policies will be the key to creating successful laws.

Chapter 4 tested internal state political characteristics from Chapter 3 to the outcome of stand your ground (SYG) laws in order to identify the influential variables for the adoption of permissive firearm laws. Since their introduction in Florida in 2005, SYG laws have been adopted by 21 states as of 2010. An additional six states have adopted SYG laws since conclusion of this study (post-2010). These laws are passing regardless of public debate and scientific studies showing that they increase crime and injury (Cheng & Hoekstra, 2012; McClellan & Tekin, 2012). SYG laws create environments

that can foster an escalated violent outbreak in public spaces and then offer immunity without an investigation, placing individuals above the law. Passage of SYG seems to be based on public fear rather than a public safety, with a strong divide along ideological and partisan lines. Arguments for SYG laws, and other laws that loosen firearm regulations, such as conceal carry, point toward a mistrust of government and its ability to provide protection. These laws are believed to provide an individual with the ability to protect him/herself when needed; and the racial divide for support of these laws, coupled with the outcomes of the victims of these laws, have a clear divide based on race and socioeconomic status within the country, pointing to a larger problem within American politics that cross-cut many public health efforts, such as health care reform, welfare policy, and access to care.

GEE analysis was used to test the adoption of these laws from 2002-2010. Democratic control of the legislature was shown to significantly *reduce* the likelihood of SYG laws, while increases in population density and poverty were shown to significantly increase the likelihood of SYG law adoption. SYG laws could be an ideological and partisan response to the perceived threat of personal safety within communities coupled with a mistrust of the government (Montgomery, 2012; Pew Reserach Center for the People & the Press, 2013a, 2013b). Increased firearm ownership has been linked with SYG laws (McClellan & Tekin, 2012), 30% of these households were Democrats, and 49% were Republicans (YouGov, 2014). Republican statehouses could be responding to citizen preferences for permissive firearms laws that encourage the expansion of firearm ownership. The trend of permissive gun laws continues to gain momentum. This study did not examine other permissive firearm laws; however, conceal carry laws are

expanding throughout the 50 states. These laws coupled with SYG laws have the potential to increase firearm injuries and should be studied further.

Across the two adoption studies, larger themes emerged between the gun control and pro-gun laws. Specifically, the role of partisanship was quite prominent across the two groups. Democratic controlled state legislatures were significantly more likely to adopt a gun control law while Republican controlled state legislatures were significantly more likely to adopt a SYG law. This speaks to a larger issue in American politics that other areas of public health are confronting when attempting to make changes for the public – an increasing partisan divide. The inability to create bipartisan agreements on issues that are plaguing the American people will have negative effects on health outcomes. Gun control is already viewed in a partisan light and the data reflect that adoption of these laws are highly partisan; this will create challenges for injury prevention efforts when proposing legislation in heavily Republican controlled states and will require new approaches in messaging and legal approaches.

Another important outcome across the two studies was the role of poverty in the adoption of firearm laws. Similar to partisanship, poverty also had an inverse relationship with states with higher poverty rates more likely to adopt SYG laws and states with lower poverty rates more likely to adopt gun control measures. The variable of poverty could be a proxy for something deeper within the states, specifically racial tensions, the impact of ruralness and urbancity, or views on the role of government. It could be that poorer states are more rural and have more gun owners who are seeking looser gun laws. The concept of poverty speaks to a larger divide within the country and must be examined further in future work. The states that are passing SYG laws are

becoming more polarized and are rejecting several measures, such as immigration reform, the new healthcare law, and challenges to voters' rights. This is a new era for public health and injury prevention. Politics are not driven by facts and science but rather by clever messaging, partisan ideology, and fear.

Contribution to the Field

The findings contribute to current knowledge of injury prevention efforts, serving as a reminder of the importance of state level politics when it comes to preventing injury. Public health researchers tend to shy away from politics and focus on the science (Cagle & Martinez, 2004). When public health efforts to impact firearm policy are made, the focus is typically on federal level policies because they can have the most impact on creating change at the population level. However, these efforts can overshadow opportunities for local victories. States are the laboratories for democracy and also hold the majority of power for firearms regulation. There is great variation in the political and social composition of the 50 states. In addition to waiting for the right conditions within a state, injury prevention advocates should create opportunities and work for victories at the state level, seeking states that are friendly to firearm injury prevention policy and expanding from there, this will require communication among advocates. Local (state and city) victories are often easier won because they reflect a local population's need and this can often times be more homogenous than the nation as a whole. State governments can create opportunity for more successful change than the federal government. Other areas of public health, such as tobacco, have successfully navigated state politics to change social norms and laws across jurisdictions (Hamilton WL et al., 2003; Ibrahim,

Tsoukalas, & Glantz, 2004; Shipan R & Volden, 2006; Wakefield & Chaloupka, 2000). Injury prevention advocates should continue to note politically friendly states for change. Enacting laws in states will also help build momentum and evidence for future policy growth.

One of the major contributions of the dissertation is the variables database. In addition to the seven selected state laws, the research constructed a database that spans 50 states and 18 years, containing political, economic, and demographic variables [Appendix B provides the codebook from the dissertation]. Data were collected from publicly available sources, such as published papers, the U.S. Census, special interest websites, legal databases, and government websites. This is the first such database dedicated to the public health exploration of policy adoption of firearms laws. No previous published study has attempted to tackle this type of policymaking analysis by applying the political science theory of policy diffusion to the adoption of these laws.

In addition to the wealth of data collected, the premise of the study was innovative, building on public health and political science literature. Specifically, taking the theory of internal determinants and testing it with selected firearm laws for policy adoption, thus marrying theory and methodology from the two disciplines. Findings of the study support the internal determinants theory, specifically as it related to gun control laws. A mix of legislative and citizen characteristics resulted in gun control laws across a handful of states. Internal determinants were found for SYG laws, but these findings were not as strong as those found in the gun control study and suggest a need to examine other attributes for adoption. For political science, the study tested known variables of interest, and builds on a topic area (firearm policy adoption and diffusion) that the field is

just beginning to be explored. Specifically, the study tested the theory of adoption with a GEE model for analyzing longitudinal data. This type of analysis is growing across disciplines and should continue to be explored for testing policy adoption (Ballinger, 2004; Evaluation, 2000; Shook et al., 2013; Twisk, Smidt, & de Vente, 2005). For public health, the study introduced new theory and its application and techniques to the discipline of injury prevention. Law making is an inherently political process that the field of injury prevention must navigate. Understanding variables that can influence this process provides researchers and advocates with tools to more efficiently navigate the system, something that the NRA has been successful at for decades.

There are also practical applications to the research. Injury prevention advocates can become more active in the policy making process by looking for political cues across the states that are friendly to firearm policy. The more these laws are adopted, the greater the likelihood that they will continue to gather momentum and diffuse. For example, the findings showed that legislative professionalism increased the likelihood of adoption. Injury prevention advocates should reach out to legislators and their staff to inform them of policy options that are occurring across the states. Injury prevention researchers should continue to push for funding of firearm injury prevention efforts, not shying away from state governments as a potential funding source. In addition to health outcomes-based research, researchers should create and test messages for populations in more conservative states that are traditionally seen as hostile to gun control measures. Similar to how tobacco and texting while driving messages have worked to create changes in social norms (Hemenway, 2009). Evidence based strategies need to be created for changing social norms around firearms laws. All facets of public health are faced with

the challenge of balancing the needs of the population versus individual freedoms and liberty, firearms are no exception. In fact, they are faced with the added challenge of Second Amendment protections afforded to firearms. Firearms are a part of the American fabric and this will not change, however, disarming fear and mistrust of efforts to prevent injuries should be pursued.

Limitations

The majority of the variables within this study were validated measures used across diffusion and adoption studies, such as legislative professionalism (Berry & Berry, 1990; Berry, Fording, Ringquist, Hanson, & Klarner, 2010), citizen ideology (Barrilleaux, 1997; Shipan R & Volden, 2006), and the demographic measures of poverty, education, and firearms outcomes (Bruce & Wilcox, 1998; Gimpel & Wolpert, 1998; Hemenway, 2004; Kleck, Gertz, & Bratton, 2009; Spitzer, 2011). The research tried to capture lobby pressures via the proxy of firearm production. However, as with many other areas of research, capturing lobby pressures are challenging and firearms are no exception. The power of the firearm lobby is well documented (Biskupic, 1991; Cagle & Martinez, 2004; Goss, 2006); however, collecting a meaningful measure of it for each state and year of the study proved challenging. In an effort to conduct research with free, reliable, and publicly available data, it was hypothesized that industry pressures would translate to lobby pressures as this is true for other industries (Food & Water Watch, n.d.; Herrnson, Wilcox, & Shaiko, 2005; Morley, Cummings, Hyland, Giovino, & Horan, 2002; Paul S. Herrnson Clyde Wilcox, 2005). Therefore the study gathered firearm manufacturing data and created an index for firearm producing states. This measure was found to be insignificant in the analysis, and in certain situations, it ran counter to

theorized pathways: firearm producing states were *more* likely to support gun control laws.

Previous research has clearly demonstrated that the gun lobby, specifically the NRA, is strong, multi-dimensional, and active in producing policy outcomes that are favorable to its interests. The attempt at using industry pressure to capture lobby pressure in the area of firearms was not found to be significant. This could be because unlike other industries, such as tobacco or farming (Food & Water Watch, n.d.; Morley et al., 2002), social regulatory policies are so tied to culture and political identity that economics are not driving forces for policy change. Lobbying can also happen through other channels, such as visits with assemblypersons and senators, or through membership emails and phone calls.

The study did conduct preliminary research on campaign dollars spent at the state level but the data were unusable because the spending was very small or non-existent. This may be explained by the fact that campaign donations can easily be hidden in political action committee (PAC) funds, or by individual donations that are not associated with lobby groups. NRA membership would be a good indicator of their presence in a state but these data are not available. Instead, some studies use the subscriptions to *Guns & Ammo* magazine as a proxy for NRA membership. Purchasing these data was beyond the capabilities of the current research; however, proxies for firearm owners were able to be captured and are considered to be a stronger measure (Azrael, Cook, & Miller, 2001; Webster, Vernick, Zeoli, & Manganello, 2004). Since firearms have such a strong cultural and ideological tie, firearm ownership could be seen as a lobby pressure. The

NRA is well documented as having a strong grass roots movement, with the ability to activate members through mailers and emails. Future studies should continue to test and develop measures of lobby pressures on firearm adoption.

The current study is one of a handful of studies that has gathered longitudinal data for firearm policy adoption, allowing for stronger predictive power. A goal of the research was to take political science theories on internal determinants for diffusion and apply them to firearm law adoption to further firearm injury prevention research. Studies coming from the political science literature select laws as a means of testing theory, thus eliminating left censoring of the data by having a perfect start date prior to the passage of any policy. The current study was designed to explore the application of theory on firearm law adoption during the post-Brady era. Some laws were passed prior to the study start-date causing a loss of some of the explanatory power of the research due to the small sample size. This was especially evident for the two minimum age laws (purchase and possession) which were widely adopted prior to the start date of the study. Considerations for expansion of the data collection beginning in 1985 could be considered for future work to test the strength of the measures. Several laws in the study were adopted between 1985 and 1993 so beginning in 1985 would provide more outcomes of interest. This date was not selected for the current dissertation due to time constraints and data availability for certain variables. Additionally, researchers and advocates work in the real world and have to work with imperfect time and financial constraints and this dissertation wanted to see if the methods could support these constraints and yield useful results, and it did. However, the study was successful in showing that the variables, methods, and analytical techniques can apply to policies that

do not have a start date prior to the first enactment of the first law. This is promising for future analyses of injury prevention policies because it could allow for faster application of results.

Future Studies

Future studies should continue to build on the application of political theories to assist with firearm injury prevention efforts. Testing internal determinants on more firearm laws of interest would continue to develop the literature and its application to research and advocacy efforts. Restricted persons, specifically those with mental illness, and background checks are two areas that may have nuanced differences from the laws examined in this paper because they run into problems with patient confidentiality and insufficient data collection by state and federal governments. Following tragic shootings like those at Virginia Tech (CNN, 2007) and Sandy Hook (Esposito, Smith, & Ng, 2013), discussions regarding access to firearms make headlines from both pro-gun and pro-gun control groups. However, even when there is bipartisan support, policies are not passed. Further examination of these laws and the adoption process could inform researchers, advocates, and policy makers on new avenues to approach firearm policy adoption.

Future research would benefit from examining provisions of laws, which would provide more information on the potential strength of a law. Not all laws are created equal; some include funding for implementation, or strong enforcement and retribution for breaking the law while others can be more ceremonial but lack enforcement. Noting differences among similar looking laws could also help to explain adoption and outcomes of specified laws. In the same vein, studies should also continue to evaluate

implementation of the laws that are currently in place in many states. Some state laws are being met with police who are unwilling to enforce the laws on the books and this could greatly impact the intentions of the law (Goode, 2013). Injury prevention researchers must continue to develop the link between permissive firearm laws and health outcomes in order to provide evidence-based research for legislators who are considering similar laws in their home state, or for states that are considering repealing these laws. This evidence should be ongoing and done in partnership with other stakeholders such as police and prosecutors to minimize attacks from pro-gun groups. Firearms are highly transportable and firearm laws work as a patchwork solution across the country to address firearm injuries. Ideal solutions would cover as much of the population of the U.S. as possible; however, the reality of the situation is that the federal government is slower to react than states. State governments are where the most activity for firearm laws can occur and this must be a focus of injury prevention. Continuing to conduct research and informing policymakers about the importance of solidarity could have a lasting impact on injury outcomes. The findings are crosscutting and can also benefit other areas of injury prevention research such as motor-vehicle safety and prescription drug abuse. Other areas of injury prevention are encouraged to add to the discussion.

The current study explored internal determinants of firearm policy adoption and the findings were strong. However, there are indications that trans boundary efforts could affect adoption. For example, the fast-paced adoption of stand your ground laws across multiple states at once beg the question of driving forces and require going back to the literature on diffusion. Specifically, that something larger than internal determinants are driving the adoption process. Many national public health and medical organizations

(e.g., the American Medical Association, the American Public Health Association, and the American Academy of Pediatrics) have mission statements that include diffusing policy information to policy makers. These activities can take multiple forms ranging from publications, to conferences, to interest group campaigns (Karch, 2006, 2007; Minitrom, 1997). In the arena of firearms, groups such as the NRA and the American Legislative Exchange Council (ALEC) have been successful at promoting firearm policies across the states. The current literature on policy adoption and diffusion has begun to explore the role of national organizations and policy entrepreneurs on diffusion (Karch, 2006, 2007; Minitrom, 1997). Groups like the NRA have a strong grass roots movement, but it also has a very strong national presence that strategically introduces bills in multiple states at once and the local grassroots organizations to support it. Professional and advocacy organizations exist within the field of public health (e.g., the Society for the Advancement of Injury and Violence Research (SAVIR), the APHA, and the Brady Campaign to Prevent Firearm Violence) that can work across state boundaries to affect individual state change. In line with this thinking is the role of policy entrepreneurs, individuals who are active in the policy making process and have connections across state borders, who can impact the adoption of policies (Karch, 2007). Studies on the role of national organizations would need to include interviews or mailed surveys to key policy makers across the states (Minitrom, 1997). In the realm of firearm laws, both sides of the debate have policy entrepreneurs. For example, Gabrielle Giffords speaks about gun control and the NRA uses Bill Workman to push stand your ground laws (La Ganga, 2014; Montgomery, 2012). Future studies should test the impact of national organizations and policy entrepreneurs on firearm policy adoption at the state

level. The role of the media was not explored in the dissertation, but messaging from the media can be very important when working on changing social norms. The impact of the media on shaping beliefs about solutions to firearm injury prevention and the role injury prevention can have in firearm injury prevention will be an important area for future research.

Study findings identified waves of adoption of the firearm laws across politically and demographically similar states. However, it was found that aside from legislation to ensure consistency with federal law, states are not responding to public calls for regulation as measured by the enactment of the selected laws. Instead, a trend of permissive firearm laws is rapidly diffusing across the 50 states. Firearm injury prevention advocates should not be deterred by political environments. Rather, they should respond to cues to optimize change for injury prevention. This dissertation contributes to the firearm injury prevention literature by applying political science theories and analysis techniques to firearm injury prevention efforts. Findings support the literature that internal state political and demographic characteristics guide the adoption of firearm laws.

This dissertation was an opportunity to design and execute a piece of original research. It was particularly rewarding to explore a pressing issue in injury prevention. Firearm injuries can affect anyone and the solutions are multifaceted and require collaboration across disciplines. Additional research is needed to further develop these connections. This is especially critical as budgets for research continue to shrink. Interdisciplinary approaches to research and its application can help all fields continue to develop and can provide new solutions to old problems.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL



TEMPE
UNIVERSITY®

Office for Human Subjects Protections
Institutional Review Board
Medical Intervention Committees A1 & A2
Social and Behavioral Committee B

3400 North Broad Street
Philadelphia, Pennsylvania 19140
Phone: 215.707.3360 Fax: 215.707.8387
e-mail: richard.throm@temple.edu

MEMORANDUM

To: **IBRAHIM, JENNIFER**
CHP-PUBLIC HEALTH (0910)

From: Richard C. Throm
Institutional Review Board

Date: 14-Dec-2010

Re: Exempt Request Status for IRB Protocol:
13552: Firearm Injury & Violence Prevention: Understanding Firearm Policy Diffusion

It has been determined by Expedited Review that this study qualifies for exemption status as follows:

45 CFR 46 Protection of Human Subjects

Section 101 (b): Unless otherwise required by department or agency heads, research activities in which the only involvement of human subjects will be in one or more of the following categories are exempt from this policy:

Exemption 2: Anonymous Educational Tests, Surveys, Interviews, or Observations. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public, unless (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Nothing further is required from you at this time; however, if anything in your research design should change, you must notify the Institutional Review Board immediately.

Should you have any further questions, please feel free to contact me at 215-707-8757.

APPENDIX B

THE DISSERTATION CODEBOOK: COMPLETE LIST OF COLLECTED VARIABLES

Variable Name	Measure/Code	Definition/Comment	Data Source
Year	1993-2010	1993-2010	
State	state name	all 50 states	
Division	Categorical, 0=New England, 1=Middle Atlantic, 2=East North Central, 3= West North Central, 4=South Atlantic, 5=East South Central, 6=West South Central, 7=Mountain, 8=Pacific	Census Division	Census
Region	Categorical, 0=South, 1=Northeast, 2=MidWest, 3=West	Census Regions	Census
FIPSCode	nominal 1-56	all 50 states	Census
Firearm Laws (DV)			
Purchase	Categorical, 0 = 17 y.o. and younger, or no law, 1 = 18 y.o	Minimum age to purchase a handgun	Webster, et. al. (2004), database and internet searchers
Possess	Categorical, 0 = 17 y.o. and younger, or no law, 1 = 18 y.o	Minimum age to possess a handgun	Webster, et. al. (2004), database and internet searchers
STK	Categorical 0 = no 1 = yes	Shoot to Kill Laws (Stand your ground)	database and internet searches
SatNgt	Categorical 0 = no 1 = yes	Saturday Night Speical	database and internet searches
LgCap	Categorical 0 = no 1 = yes	Large Capacity Ammunition (clip bans)	database and internet searches
CAP	Categorical 0 = no 1 = yes	Child Access Prevention Laws	Webster, et. al. (2004), database and internet searchers
Assault	Categorical 0 = no 1 = yes	Assault Weapons Ban	database and internet searches

Lobby Pressures (IV)			
Producer	dichotomous 0 = no 1 = yes	States producing greater than 1.5% of nations' firearms = producer	ATF Manufacturer's Report
Pro-Gun Control	Continuous, dollar amount	Pro gun control donations to state campaigns	followthemoney.org
Pro-Gun	Continuous, dollar amount	Pro gun donations to state campaigns	followthemoney.org
Citizen Pressures (IV)			
Ideology	Ordinal, -30.2 (conservative) to -8.0 (liberal)	EWM index of citizen ideology based on polling - more positive = liberal	Erikson, Wright, McIver (2007)
brfss	percentage	2001 BRFSS gun ownership question	CDC BRFSS
GunOwnershipProxy	percentage	FS/S - validated measure for ownership by state (Cook, 1979)	CDC WISQARS
Legislative Characteristics (IV)			
Legislative Professionalism	Ordinal, 2.7% to 62.6%	Validated measure of state legislative professionalism, closer to 100% is more professional - Squire Index (2007)	Squire Index (2007)
Governor's Party	1=Dem controlled, 0=Rep controlled	Governor - controlling party	Census
House Party	1=Dem controlled, 0=Rep controlled, 2 = split	House - controlling party	Census
Senate Party	1=Dem controlled, 0=Rep controlled, 2 = split	Senate - controlling party	Census
Issue (control)			
robbery	rate	robberies	US DOJ
burglary	rate	burglaries	US DOJ
murder	rate	murders	US DOJ
violcrim	rate	violent crime	US DOJ
suicide rate	percentage	suicide (age adjusted)	CDC WISQARS
suicidebyfirearmrate	percentage	suicide by firearm (age adjusted)	CDC WISQARS
gundeath	percentage	gun deaths (age adjusted)	CDC WISQARS

State Demographics			
Populaton	interval	state population	Census
Veteran	interval	veteran population	Census
High school	percentage	Percentage of population who completed high school	Census
Bachelor	percentage	Percentage of population who completed Bachelor's degree	Census
White	percentage	Percentage of White population	Census
Black	percentage	Percentage of Black population	Census
Income	Interval	Median household incom	Census
Poverty	Percentage	Percentage of population living in poverty	Census
Density	Interval	People per square mile	Census
Other			
PTPLG	dichotomous 0 = no 1 = yes	Permit to Purchase long gun	database and internet searches
PTPHG	dichotomous 0 = no 1 = yes	Permit to Purchase handgun	database and internet searches
Ballot	dichotomous 0 = no 1 = yes	Ballot Initiative	database and internet searches
Preemp	dichotomous 0 = no 1 = yes	Preemption law	database and internet searches
Supreme Court			
Heller	Dummy Variable, 1 for two year	Heller Ruling	database and internet searches
McDonald	Dummy Variable, 1 for two year	McDonald Ruling	database and internet searches

Federal Laws			
NFA1934	Dummy Variable, 1 for two year	National Firearms Act (NFA) 1934	database and internet searches
SafeStreet	Dummy Variable, 1 for two year	Omnibus Crime Control and Safe Streets Act of 1968 (SafeStre)	database and internet searches
GCA1968	Dummy Variable, 1 for two year	Gun Control Act of 1968 (GCA)	database and internet searches
FOPA	Dummy Variable, 1 for two year	Firearm Owners Protection Act of 1986 (FOPA)	database and internet searches
GunFree	Dummy Variable, 1 for two year	Gun-Free School Zones Act of 1990 (GunFr)	database and internet searches
BradyBill	Dummy Variable, 1 for two year	Brady Handgun Violence Prevention Act of 1993 (Brady)	database and internet searches
Assault	Dummy Variable, 1 for two year	Federal Assault Weapons Ban 1994-2004 (Assault)	database and internet searches
VCCA1994	Dummy Variable, 1 for two year	Violent Crime Control and Law Enforcement Act 1994 (VCCA)	database and internet searches
Lauten	Dummy Variable, 1 for two year	Lautenberg Amendment	database and internet searches
FederalPark	Dummy Variable, 1 for two year	Guns in State Parks 2009	database and internet searches
Tragedies			
WACO	Dummy Variable, 1 for two year	Waco, TX shooting 1993 (WACO)	Newspapers
Columbine	Dummy Variable, 1 for two year	Columbine, CO school shooting 1999	Newspapers
September11	Dummy Variable, 1 for two year	9/11 Terrorist Attacks 2001 (911)	Newspapers
MDSniper	Dummy Variable, 1 for two year	MD sniper shootings 2002 (MDSniper)	Newspapers
VATech	Dummy Variable, 1 for two year	Virginia Tech School Shooting 2007	Newspapers