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Encouraging Action During Overdose Events – the Good, the Bad, and the Barriers

Thomas Griner

ABSTRACT

"Encouraging action during overdose events – the good, the bad, and the barriers"

by

THOMAS E. GRINER

April 17, 2019

INTRODUCTION: Timely medical attention could decrease mortality following drug or alcohol overdose events, but overdose victims and witnesses often delay or fail to seek professional help because they fear police involvement. Statutes that provide immunity from criminal action may have an important impact on the likelihood of seeking timely treatment. As overdose deaths have increased despite legislative attempts to encourage contacting authorities during overdoses, other measures should be considered. In Georgia, recent legislation should make opioid antagonist products like naloxone more accessible to the public.

METHODS: The first paper systematically analyzes variability in Medical Amnesty Laws (or "Good Samaritan Laws") across states that are designed to encourage bystanders and others to contact authorities for assistance during overdose emergencies. The second paper examines drug poisoning death rates in states with five years of data available after enactment of Medical Amnesty Laws (MALs) to determine whether drug poisoning death rates have decreased. The

third paper utilizes a randomized survey of pharmacies across Georgia to report on barriers that exist for the purchase of naloxone by the public.

RESULTS: Forty-six states plus the District of Columbia have MALs, but provisions differ widely in scope. Some laws may not meet legislative goals because they lack protections, allow broad prosecutorial discretion, or are difficult to research, assimilate, and understand. Of the nine states with five years' experience with MALs, only Washington's drug poisoning death rates have not increased. Statistical analyses failed to find an association between MALs and drug poisoning deaths. Among Georgia pharmacies surveyed, only half had naloxone in stock, with prices ranging from $65.00 to $201.00. Approximately one-half of pharmacy representatives misstated that a physician's prescription was required to purchase naloxone, despite a Standing Order and changes in Georgia law that removed this formerly mandated requirement.

CONCLUSIONS: Overdose immunity laws prove to be complex and may not be easily understood by the general population, making them less effective in reaching statutory goals. In Georgia, certain barriers to the purchase of naloxone persist despite recent legislative changes, making it less likely that those who may need a safe, easily administered form of naloxone will obtain the product. Findings from this research reveal an important opportunity to understand how policy goals can be more strongly aligned with diverse stakeholder groups' knowledge, needs, and interests - from professionals to the public.

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APPROVAL PAGE

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Author's Statement Page

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Table of Contents

CHAPTER 1 – LITERATURE REVIEW AND STATEMENT OF PURPOSE

Over the past 20 years, the increased availability of controlled prescription drugs (CPDs) and inexpensive heroin has led to a dramatic increase in overdose deaths in the U.S. Since 2008, drug overdoses have killed more people each year in the U.S. than either motor vehicle crashes or the misuse of firearms. (The U.S. Drug Enforcement Agency, 2015) Despite leading in many areas of medical technology, the U.S. has the highest drug-related mortality rate in the world (Cochran et al., 2014).

While street drugs posed the greatest risk of overdose for past generations, since 2002, CPD abuse has resulted in more deaths than cocaine and heroin combined. However, increased law enforcement pressure on the diversion of CPDs from legitimate channels has prompted drug

cartels to increase the supply of heroin and other illicit drugs to the American market (The U.S. Drug Enforcement Agency, 2015). Today, heroin is more readily available and drives more overdose deaths than in 2007 (The U.S. Drug Enforcement Agency, 2015).

Heroin carries well-known risks, and overdoses occur frequently among its users. Research of illicit drug use conducted by Tracy and colleagues, found that approximately one-half (50%) of respondents had a minimum of one non-fatal drug overdose event (Tracy et al., 2005). Among intravenous drug users, those experiencing a non-fatal overdose has ranged between 50% and 70% (Warner-Smith, Darke, Lynskey, & Hall, 2001). Moreover, those who quit using heroin have a much higher likelihood of overdose if they renew usage, because tolerance levels usually diminish (The U.S. Drug Enforcement Agency, 2015).

Whether a lethal opioid overdose involves CPDs or street drugs, the time from initial injection or consumption to death may leave a one-to-three (1 – 3) hour window for an overdose witness to intervene and seek medical attention for the victim (Enteen et al., 2010). Naloxone (Narcan ®), the first therapeutic drug overdose reversal agent, is easy to administer and is commonly used by medical professionals to counteract the effects of heroin and other opiates (Sporer & Kral, 2007).

Some states permit the dissemination of Naloxone to drug users' family members, friends, and others who may be in the best position to respond directly to witnessed overdose events (Davis & Carr, 2015; Galea et al., 2006; Phillips, 2013; Seal et al., 2003; Sporer & Kral, 2007). While effective in many cases, this approach is not without potential problems. Because

Naloxone is generally safe and effective against opioid based overdoses, some may rely too much on its ameliorating effects and fail to seek professional help following an overdose. Further, Naloxone is only effective with opioid-based overdoses. Overreliance on Naloxone or simply not knowing what drugs are taken by a victim could prove disastrous with a poly-drug overdose or when the overdose agent is not an opioid, because Naloxone does not ameliorate the effects of non-opioid drugs or alcohol. Naloxone may also be perceived as a "safety net" which enables opioid drug users to take risks with dosage levels.

Like many states Georgia's drug overdose death rates have risen each year. From 2010 to 2017, Georgia's overall drug poisoning deaths increased by 52%, while the population increased 7.6%. [i] The characteristics of Georgia's drug overdose deaths have also changed. The percentage of opioid-related deaths among all drug overdose deaths increased from 40.1% in 2010 to 64.4% in 2017 (see Appendix Table 1). Drug poisoning deaths are also distributed unevenly across Georgia: out of 159 counties, 42 reported higher poisoning death rates than the national average during 2008 - 2014. Georgia's most populous 20 counties account for more than 50% of all statewide drug poisoning deaths.

Some states allow police officers, paramedics, and first responders to carry and administer Naloxone to avoid the delay in treatment that would otherwise occur while transporting an overdose victim to a hospital. While published research has demonstrated the effectiveness of this approach (Banta-Green, Beletsky, Schoeppe, Coffin, & Kuszler, 2013), other studies show that emergency medical services (EMS) are activated in fewer than half of

overdose events (Seal et al., 2003; Sporer, 1999; Warner-Smith et al., 2001). The low rate of EMS activation occurs in part because witnesses to overdose are often drug abusers themselves, and fear legal consequences such as arrest and prosecution for drug offenses, violations of probation or bond conditions, or violations of Temporary Protective Orders (Banta-Green et al., 2013; Darke & Zador, 1996; Davidson et al., 2003; Sherman et al., 2008; Tobin, Davey, & Latkin, 2005).

Encouraging more frequent and timely reporting of overdose emergencies to trained personnel could turn the tide of overdose deaths in the United States. Many states have enacted statutes that provide immunity to the reporter of an overdose emergency, the overdose victim, or both. Often called "Good Samaritan Laws" or "Medical Amnesty Laws" (MALs), these statutes are meant to encourage calls for medical assistance during overdose emergencies with the overall goal of saving lives.

"Good Samaritan Law" versus "Medical Amnesty Law"

Throughout this dissertation, the term "Medical Amnesty Law" (MAL) is used universally to categorize statutes that grant full or partial immunity from criminal liability specifically following overdose events. In contrast, the term "Good Samaritan law" (GSL) has traditionally described statutes that provide protection from civil liability based on negligence committed during good-faith attempts to assist during an emergency (Dov Waisman, 2013). For clarity, therefore, this paper distinguishes statutes that provide protection from civil liability following an wide spectrum of accidents ("Good Samaritan laws") from statutes that provide

immunity from criminal responsibility specifically following overdose events ("Medical Amnesty Laws"), irrespective of how a statute may be labeled.

Summary of limitations in literature

Two surveys support the notion that target populations are largely ignorant of the existence of MALs or their provisions. One survey among Washington police officers and paramedics by Banta-Green and colleagues conducted in the Fall of 2011 found that few had knowledge of the state's MAL, which had been passed in June of 2010 (Banta-Green et al., 2013). Although the majority of respondents had been present at an overdose during the prior year, only 16% of the officers and 7% of the paramedics surveyed were aware of the new law. Knowledge increased following an informational intervention.

A second survey by Evans (Evans, Hadland, Clark, Green, & Marshall, 2016) among young adult users of non-prescription opioids found that fewer than half (45.5%) were aware of Rhode Island's MAL. Participants were recruited from January 2015 through February 2016 and were surveyed about, among other things, knowledge of the 2012 MAL. Awareness of Rhode Island's MAL was associated with older age (age range was 18 to 29), being white, a history of incarceration, a history of injection drug use, lifetime heroin use, witnessing or experiencing an overdose, having heard of naloxone, knowing where to obtain naloxone, and experience administering naloxone (all $p < 0.05$). The final explanatory regression model found an independent association between awareness of Rhode Island's MAL and lifetime injection drug

use, having heard of naloxone, and knowing where to obtain naloxone. An informational intervention was recommended.

Two studies have attempted to determine whether MALs have actually been effective in accomplishing the goal of reducing overdose deaths by encouraging calls for professional assistance. Rees attempted to measure the effects of naloxone access laws (NALs) and "Good Samaritan Laws" on opioid-related deaths. (Rees, Sabia, Argys, Latshaw, & Dave, 2017) Drawing upon mortality data obtained from the National Vital Statistics System multiple cause-of-death mortality files for the period 1999 – 2014, those researchers found evidence that adoption of a NAL leads to a reduction in opioid-related deaths of 9 to 11 percent, but failed to find statistically significant effects of MALs at conventional levels.

McClennan used 2000 – 2014 National Vital Statistics System data, 2002 – 2014 National Survey on Drug Use and Health data, and primary datasets of the location and timing of NALs and "Good Samaritan Laws" nationwide and reported that states with a MAL had a 15% ($p = 0.050$) lower incidence of opioid-overdose mortality (McClellan et al., 2018). However, use of this timeframe limits the amount of data available to follow any trend in mortality, since seven (7) states enacted a MAL in 2014, six (6) states enacted a MAL in 2013, and five (5) states enacted a MAL in 2012. Only four (4) states would present 4 or more years of data following enactment of a MAL.

Statement of Purpose

The three studies presented in this dissertation address different, but interconnected, facets of combating the current overdose crisis. The first study surveys MALs nationwide in an effort to provide baseline data on what protections currently exist. This contributes to a growing knowledge of MALs by analyzing statutory features that bear on the applicability of MALs to a broad range of overdose scenarios and whether or not MALs are easily understood. Further, this work reviews features that may make some MALs more effective than others in encouraging calls for professional assistance following overdose events. Suggestions are made concerning the language most likely to encourage calls for professional assistance during overdose events.

The second paper presented in this dissertation attempts to add to growing knowledge of the efficacy of MALs by comparing drug poisoning death data from the five year periods before and after enactment of a MAL in those nine (9) states with the longest history of MALs. While Rees (2017) and McClellan (2018) studied the effects of MALs on opioid-overdose mortality, this dissertation presents a broader analysis by studying the effects of MALs on drug poisoning deaths generally.

From 2010 to 2017, the percentage of opioid-related overdose deaths among drug poisoning deaths in Georgia increased from approximately 40% to nearly 65%. Failing to address the increasing importance of the opioid class of drugs would omit an important piece in

drug poisoning deaths in Georgia. The third study examines barriers that may make purchasing Narcan®, an intra-nasally administered form of naloxone, more difficult in Georgia. An examination of price, availability, and pharmacy policies that may discourage the discrete purchase of Narcan® may illustrate barriers not addressed by legislation. To date, no other such study has been conducted.

CHAPTER 2 – NATIONWIDE SURVEY OF MEDICAL AMNESTY LAWS

Abstract

TITLE: "State-by-State Examination of Overdose Medical Amnesty Laws."

INTRODUCTION: Timely medical attention could decrease mortality following drug or alcohol overdose events, but overdose victims and witnesses alike often delay or fail to seek professional help because they fear police involvement. Statutes that provide immunity from criminal action can have an important impact on the likelihood of seeking timely treatment.

METHODS: We systematically collected and reviewed Medical Amnesty Laws (commonly know as "Good Samaritan Laws") that are designed to encourage bystanders and others to contact authorities for assistance during overdose emergencies. Each law was coded to analyze: (1) who receives statutory protections and under what circumstances; (2) what factors may undercut the credibility of statutory protections for those who may already distrust authorities; and (3) whether statutory language is easily attainable and understandable.

RESULTS: Forty-six states plus the District of Columbia have Medical Amnesty Laws (MALs), but provisions differ widely in their scope of protection. Some laws may not meet legislative goals because they either lack protections against collateral consequences of reporting an overdose or allow broad prosecutorial discretion. Most MALs refer to other statutes for definitions, making them harder to research, assimilate, and understand.

CONCLUSIONS: Some statutory provisions should be more effective than others in encouraging calls for professional assistance following overdose events. Narrow immunity provisions with complex language may not be easily understood by the general population, making certain statutes less effective in reaching statutory goals. Prosecuting attorneys and policymakers are wise to consider overarching policy goals and potentially unintended consequences when considering prosecution and future legislation.

Background

Over the past 20 years, the increased availability of controlled prescription drugs ("CPDs") and inexpensive heroin has led to a dramatic increase in overdose deaths in the U.S. Since 2008, drug overdoses have killed more people each year in the U.S. than either motor vehicle crashes or the misuse of firearms (The U.S. Drug Enforcement Agency, 2015).

Whether a lethal opioid overdose involves CPDs or street drugs, the time from initial injection or consumption to death may leave a one-to-three (1 – 3) hour window for an overdose witness to intervene and seek medical attention for the victim (Enteen et al., 2010). Naloxone products such as Narcan®, the first therapeutic drug overdose reversal agent, are easy to administer and are commonly used by medical professionals to counteract the effects of heroin

and other opiates (Sporer & Kral, 2007). Some states allow police officers, paramedics, and first responders to carry and administer naloxone to avoid the delay in treatment that would otherwise occur while transporting an overdose victim to a hospital. While published research has demonstrated the effectiveness of this approach (Banta-Green et al., 2013), other studies show that emergency medical services (EMS) are activated in fewer than half of overdose events (Seal et al., 2003; Sporer, 1999; Warner-Smith et al., 2001). The low rate of EMS activation occurs in part because witnesses to overdoses are often drug abusers themselves and fear legal consequences such as arrest and prosecution for drug offenses, violations of probation or bond conditions, or violations of temporary protective orders (Banta-Green et al., 2013; Darke & Zador, 1996; Davidson et al., 2003; Sherman et al., 2008; Tobin et al., 2005; Tracy et al., 2005).

Encouraging more frequent and timely reporting of overdose emergencies to trained personnel is a legislative goal that could turn the tide of overdose deaths in the United States. In West Virginia, for example, "The Legislature finds it is in the public interest to encourage citizens to intervene in drug and alcohol overdose situations by seeking potentially life-saving emergency medical assistance for others without fear of being subject to certain criminal penalties." West Virginia 16-47-2 (b). Nearly all states have enacted statutes that provide immunity to the reporter of an overdose emergency, the overdose victim, or both. Often called "Medical Amnesty Laws", "Medical Immunity Laws", or "Good Samaritan Laws", these statutes are meant to encourage calls for medical assistance during overdose emergencies with the overall

goal of saving lives. [1] To be an effective medical amnesty law, a statute must grant immunity in a broad range of overdose events, convince those affected that its statutory protections will be followed by law enforcement officials, and be readily understood by those seeking to understand its legislative provisions.

Methodology

This study identifies provisions in state statutes that are most likely to save lives by encouraging overdose victims and witnesses to seek professional help during overdose events involving any substance. "Naloxone access" laws, which provide civil or criminal protections for those who administer naloxone (an "opioid antagonist") to opioid overdose victims, are excluded as being too limited in scope to motivate behavior during a wide spectrum of overdose events. Similarly, "mitigation only" statutes, which do not confer immunity at all but merely grant an ability to argue for leniency at a sentencing hearing, are not included because they are unlikely to encourage those who distrust authorities to take action.

[1] In this paper, the term "Medical Amnesty Law" is used universally to categorize statutes that grant full or partial immunity from criminal liability specifically following overdose events. In contrast, the term "Good Samaritan" law has traditionally described statutes that provide protection from civil liability based on negligence committed during good-faith attempts to assist during an emergency. (Dov Waisman, 2013) For clarity, therefore, this paper distinguishes statutes that provide protection from civil liability following an wide spectrum of accidents ("Good Samaritan" laws) from statutes that provide immunity from criminal responsibility specifically following overdose events ("Medical Amnesty" laws), irrespective of how a statute may be labeled.

Using standard legal research procedures, a research team reviewed statutes that provide immunity in overdose emergencies. The legal research system Fastcase was used to search for statutes in all fifty states plus the District of Columbia and the U.S. Virgin Islands that grant immunity for any reason in overdose emergencies.[2] Multiple searches generated lists of statutes for review. These results were then cross-referenced with a publicly available resource located at https://www.networkforphl.org/_asset/qz5pvn/legal-interventions-to-reduce-overdose.pdf (Davis & Carr, 2015) to ascertain whether all potentially useful statutes had been collected. The research team then determined whether the language of each statute provided immunity from criminal justice actions such as arrest or prosecution within the context of a drug or alcohol overdose. This research includes all laws in effect as of January, 2019.

Characteristics of each statute were then evaluated under the following criteria:

1. **Coverage** - The strength of a medical amnesty law's ability to encourage bystanders and/or victims of overdose to contact authorities hinges on its ability to provide protections in a broad range of overdose events. (Table 1, Items 3 – 4)
2. **Credibility** - An effective medical amnesty law must be convincing to those affected that statutory protections will be followed by law enforcement officials. (Table 1, Items 5 - 16)

[2] Fastcase is a popular online legal research system that provides free access to members of many Bar Associations nationwide, including the State Bars of Arizona, Arkansas, Washington D.C., Delaware, Federal Circuit Bar Association, Florida, Georgia, Hawaii, Illinois, Iowa, Louisiana, Massachusetts, Maryland, Minnesota, Mississippi, Missouri, Montana, Nevada, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, Virginia, West Virginia, and Wisconsin. https://www.fastcase.com/bar-associations/ accessed 12/26/18.

3. **Accessibility** - An effective medical amnesty law must be understandable and ascertainable by the intended readership. (Table 1, Items 17 - 19)

Results

One potentially effective way to address overdose deaths is to remove disincentives for contacting authorities when overdose events occur. MALs have been enacted by statute in the majority of states and generally seek to increase the number of requests for professional assistance during overdose emergencies by removing threats associated with the criminal justice system. This study comprehensively describes aspects of medical amnesty laws most likely to accomplish the intended policy goals of saving lives by encouraging requests for professional assistance during overdose events.

Forty-seven states (including the District of Columbia, hereinafter included as a "state") have enacted statutes, or contain provisions in existing statutes, that provide some measure of immunity against criminal prosecution following drug or alcohol overdose events. Some states (Connecticut, Georgia, Illinois, Kentucky, Michigan, Nebraska, New Jersey, New York, and North Carolina) have more than one MAL that provides for immunity under different circumstances. Indiana only has a "mitigation only" statute. Kansas, Oklahoma, and Wyoming do not have MALs as defined in this work. Composite overviews are presented in Table 2 and Table 3.

1. **Coverage.** (See Table 2) Medical amnesty laws across the U.S. do not provide immunity consistently for everyone associated with an overdose event.

A primary concern involves exactly who receives immunity from criminal charges, such as the illegal possession of controlled substances or underage possession of alcohol, following an overdose event. If immunity provisions cover only those who seek aid on behalf of an overdose victim, some may hesitate or fail to contact authorities out of concern that the overdose victim may later face criminal charges. Conversely, if a statute provides immunity for the overdose victim only, bystanders may fear contacting authorities for their own sake. What about a bystander who attempts first aid on the victim, or lends a cell phone to another who calls for assistance? Clear statutory definitions and broader coverage of those who may assist during an overdose emergency will more likely encourage timely contact of authorities.

Amid the current, widely reported opioid overdose crisis, alcohol and non-opioid drug overdoses seem all but forgotten. Medical amnesty laws that provide immunity for a broad range of overdose scenarios are more likely to encourage timely contact of authorities than statutes that limit immunity to a narrower range.

Seeker of aid only

This study identified seven statutes (from Alabama, Louisiana, New Jersey, New York, Texas, Virginia, and Wisconsin) that allow immunity for the seeker of aid only, providing no immunity for the overdose victim. This lack of immunity for the victim may discourage overdose bystanders from contacting authorities, especially if the overdose victim is a friend or loved one.

Other statutory language may also dissuade bystanders from contacting authorities. In Iowa and Minnesota, the seeker of aid must be the first one to contact authorities to receive immunity. In South Carolina, a caller for help must reasonably believe that he or she is the first one to call to receive immunity. Provisions such as these are less likely to encourage those who witness an overdose to contact authorities than statutes with more permissive language.

Seeker of aid and others

While it may be clear that someone seeks medical assistance when they call 9-1-1 for emergency assistance or deliver an overdose victim to a hospital, some states clearly extend immunity to those who assist in other ways. Kentucky, for example, provides immunity for those who "act in concert" with a caller during an overdose. Hawaii defines "seeking medical assistance" as action that "includes but is not limited to reporting a drug or alcohol overdose to law enforcement, the 9-1-1 system, a poison control center, or a medical provider; assisting

someone so reporting; or providing care to someone who is experiencing a drug or alcohol overdose while awaiting the arrival of medical assistance." §329-43.6 (a) (2).

Including all who attempt to help during an emergency is important, as an individual who renders first aid to an overdose victim (while another calls 9-1-1) may help save the victim's life. An individual who meets first responders at the curb and leads them to an overdose victim may save precious minutes that prove critical. Contributing to a life-saving effort beyond placing a 9-1-1 call should not be disregarded or ignored, as mightoccur in those states that do not clearly provide for immunity for all individuals who aid or assist in overdose emergencies. Failing to grant immunity to all who provide meaningful assistance seems to undercut the often-stated legislative purpose of saving lives.

Although opponents to more inclusive measures may argue that the drug-using population could flout the law by falsely claiming that they assisted in order to obtain immunity, provisions such as the "good faith" requirement contained in most statutes already address this concern (See Table 1, Item 16).

The overdose victim

Many states confer immunity on the overdose victim whether a third party calls on the victim's behalf or whether the victim contacts authorities on his or her own. Missouri's medical amnesty law is exemplary:

> A person who, in good faith, seeks or obtains medical assistance for someone who is experiencing a drug or alcohol overdose or other medical emergency *or a person experiencing a drug or alcohol overdose or other medical emergency who seeks medical assistance for himself or herself or is the subject of a good faith request.* MO Rev. Stat 195.205 1. 2.

However, other states are far less lenient on overdose victims. Colorado, North Carolina, and Pennsylvania mandate that overdose victims qualify for immunity only if the caller for assistance qualifies. Alaska, Arkansas, and Virginia extend immunity to overdose victims only if they seek medical assistance themselves. Maryland requires that the overdose victim reasonably communicates that a medical emergency is occurring in order to receive immunity.

Requiring an overdose victim to participate in the request for assistance seems to ignore the most serious overdose scenario: when the overdose victim loses consciousness and is unable to ask for help. For example, a person who loses consciousness will be unable to reasonably communicate that a medical emergency is occurring to receive immunity in Maryland, or meet Alaska's requirement that he or she "was experiencing a drug overdose and sought medical assistance" Alaska 11.71.311 (a) (2), or meet the requirement in Arkansas that the victim "… in good faith seek[s] medical assistance for himself or herself." Arkansas 20-13-1704 (a) (2).

A person may only qualify for immunity one time

A few states limit the number of times a person qualifies for immunity under a medical amnesty law. Under 34-20A-113, for example, South Dakota provides: "Any person seeking medical assistance or who reports a person is in need of medical assistance shall only qualify

once for immunity under §§ 34-20A-109 to 34-20A-112, inclusive." Iowa also permits an individual to receive immunity only one time. Tennessee only confers immunity for an overdose victim on his or her first overdose. South Carolina seems to allow some discretion with the court concerning whether immunity may be permitted for seeking aid more than once:

> "If the person seeking medical assistance pursuant to this section previously has sought medical assistance for another person pursuant to this article, the court may consider the circumstances of the prior incidents and the related offenses to determine whether to grant the person immunity from prosecution." SC Code 44-53-1920 (C)

What substance involved in overdose event qualifies

States also vary in what type of overdose event is covered: some states provide immunity for alcohol-only overdoses, other states provide immunity for only drug overdoses, and still other states allow immunity for either drug or alcohol overdoses. Twenty-two states have statutes that provide for immunity only when an overdose involves a controlled substance, or other drug, and completely exclude alcohol overdoses. Texas and Maine permit immunity only in alcohol overdose cases, with no provisions for drug overdoses. Twenty-three states specifically allow immunity for either drug or alcohol-related overdose events. Many states define "drug" overdoses as those involving controlled substances, while a few include alcohol in the definition of a "drug". Illinois, Michigan, Minnesota, and Oregon have statutes that limit immunity to overdoses involving only certain drugs, such as methamphetamine or marijuana. The extent to which states fail to provide adequate definitions for "overdose" is further examined in Part 3.

Statutory language that imposes more restrictive provisions will apply to fewer overdose events and will be less likely to encourage bystanders and others to contact authorities during overdose events. Statutes that are less encouraging are less likely to achieve the desired legislative goal of saving lives.

2. **Credibility.** (See Tables 2 and 3) Medical amnesty laws across the U.S. do not provide consistent assurances that statutory protections will be followed.

A MAL is unlikely to influence action during an overdose event unless those affected believe that immunities described will actually be granted by authorities. A prosecuting attorney's ability to exercise discretion or find exceptions to a statute that allow prosecution despite an initial appearance of immunity may undercut public trust. Such discretion may be used in a manner that systematically excludes certain members of the public from receiving the benefits of a MAL, such as addicts with a history of drug-related arrests. MALs were evaluated to determine whether they imposed certain requirements for an individual to qualify for immunity, whether immunity is disallowed in absence of good faith, whether the overdose event may be considered as a mitigating circumstance if full immunity is not granted, whether immunity requires evidence from the overdose event, and whether immunity may apply to crimes involving the distribution of drugs or alcohol.

Similarly, an official's ability to seek penalties outside of prosecution may foster enmity among those who already distrust authorities. Because many drug users fear police involvement, these collateral consequences, or potentially unforeseen penalties, of reporting an overdose are

critical to consider. Collateral consequences may include civil asset forfeiture, using evidence gathered during an overdose event to prosecute other crimes, levying sanctions or requiring drug testing for those already under court supervision, or prosecution for possession of drug paraphernalia.

Civil asset forfeiture (See Table 2)

Civil asset forfeiture proceedings vary from state to state, but generally allow authorities to gain legal possession and title to assets, property, money, and other items that are "fruits of a crime". In some instances, seizure of assets may exact the most immediate, painful cost on a suspect because such assets could otherwise be used to hire legal counsel, post bond, or pay bills.

Only Hawaii, Maine, Mississippi, Missouri, Nevada, and Vermont provide some measure of protection from civil asset forfeiture proceedings within medical amnesty statutes. Because government officials could potentially confiscate and gain ownership of property (including money) following overdose events in other states, public confidence in those medical amnesty laws may erode, especially among the drug-using population. Further, not allowing some protection from civil asset forfeiture proceedings may outright discourage more wealthy individuals from contacting authorities during overdose events.

Probation/parole/pretrial release (See Table 2)

Unless an amnesty statute provides special protections for those on probation, pretrial release, or parole, individuals in that position are less likely to contact authorities for assistance

during an overdose event. Probationers and parolees are important consider because they are often at greater risk of overdose than others. *Noble v. State*, Case No. 2476 (Md. App., 2018). Twenty-one states limit the ability to drug test or otherwise sanction a person on probation, pretrial release, or parole following a drug overdose event. The lack of protection in remaining states makes those under court supervision less likely to contact authorities.

Those under court supervision may still have to defend their actions following an overdose event, even in states that provide some measure of protection under a medical amnesty law. See *Noble v. Maryland*, Case No. 2476 (Md. App., 2018). In North Carolina, a person on probation receives immunity for certain criminal charges, but still may be drug tested; the upshot of which may result in a revocation of probation and a jail sentence if such drug test is positive.

Because those on probation, parole, or pretrial release are particularly vulnerable to law enforcement action, a lack of protections in this area will more likely provide a disincentive to contact authorities during drug overdose events.

Drug paraphernalia (See Table 2)

Thirty states provide immunity for charges pertaining to the possession or use of drug paraphernalia during an overdose event. Remaining states either specifically allow prosecution or are silent on this issue, seemingly leaving drug paraphernalia charges available for prosecution. Although drug paraphernalia charges are usually considered minor offenses, the

presence of such items can justify a police search of property, support the decision to arrest, or be used to lengthen a criminal sentence. The extent to which individuals contact authorities for assistance during overdose events, and later face legal consequences that arise from that contact, however remote, may influence future requests for professional assistance.

Limitations on protections – prosecutorial discretion (See Table 3)

Some states allow prosecuting attorneys discretion in determining whether or not immunity applies in a given case. While officials should be able to exercise reasonable discretion in pursuing criminal charges, the public should not believe that the process is too subjective. A prosecuting attorney's ability to exercise discretion or find exceptions in a given case that enable either prosecution or aggravation of punishment despite an initial appearance of immunity should be cautiously measured so as to not undercut public trust.

Medical amnesty laws often allow subjectivity to enter prosecutorial decision making by specifying requirements that an individual must meet to qualify for immunity, by requiring that a person act in good faith, or by allowing the use of evidence gathered during an overdose event to prosecute other crimes. Prosecutors may be more limited by medical amnesty laws that permit an overdose event to be considered as a mitigating circumstance if full immunity is not granted or that require that evidence of a crime originate from the overdose event. Prosecutors may also be limited by medical amnesty laws that permit immunity for crimes involving the distribution of drugs or alcohol.

Specific requirements to receive immunity (See Table 3)

More than half of the states with a medical amnesty law describe requirements that an individual must meet in order to receive immunity, such as providing a name, remaining with the overdose victim, or cooperating with officials. Such requirements may allow prosecutorial discretion regarding who receives immunity. For instance, someone who calls 9-1-1 to report an overdose but fails to provide his or her full name, or fails to "cooperate" with police by providing names of all attendees at a party may or may not be considered to have met statutory requirements. California, for example, requires that a person "not obstruct" a law enforcement officer, which may be subjectively applied under the facts of a given case.

These provisions help ensure that police and first responders receive complete information about an overdose event. While legislators may trust police officers and prosecuting attorneys to make appropriate decisions in such matters, the drug-using population (and their friends) may not share the same enthusiasm. Witnesses to overdose may be reluctant to provide a complete name, or wish to make a statement regarding drug use by the overdose victim or others. Such hesitation to fully cooperate may be deemed a failure to meet the standards of a medical amnesty law. Statutes with fewer requirements to receive immunity may garner more calls for authority in overdose emergencies than those with cumbersome requirements.

Requirement of good faith

Oregon, Nebraska, Texas, and Wisconsin do not require that a person act in "good faith" in seeking assistance either for him or herself or a third party, or have a "reasonable belief" that a person needs medical assistance. Medical amnesty laws in all other states contain these "good faith" and "reasonable belief" requirements, which have their own merit in preventing individuals from defrauding the criminal justice system. However, these provisions also could provide prosecutors with the ability to negate well-intentioned actions in some cases by deeming an action to be "not in good faith" and pursuing criminal charges.

Partial immunity where full immunity not granted (See Table 3)

Arizona, the District of Columbia, Hawaii, Iowa, Maryland, South Carolina, Tennessee, Vermont and West Virginia have statutes that allow the accused to mitigate a sentence by arguing for partial immunity where the accused does not qualify for full immunity. Massachusetts, Minnesota, Montana, Nevada, New Mexico, Rhode Island, and South Dakota have similar provisions for drug offenses, but not alcohol-related offenses. However, at a sentencing hearing where full immunity is not granted, argument for leniency on the behalf of the accused enables the prosecuting attorney to request harsher sentencing by pointing out aggravating factors.

Evidence obtained as result of overdose event (See Table 3)

As officials enter the scene of an overdose event they may observe incriminating evidence, and to the extent that they can then bring criminal charges, confidence in medical amnesty laws may decrease. Most states provide that immunity provisions protect against prosecution where evidence is discovered as a result of the overdose event and the need for medical assistance. However, such provisions generally allow police to secure evidence by other means, such as receiving consent from a property owner to conduct a thorough search for contraband or by obtaining a search warrant to conduct a search. California, Delaware, Texas, West Virginia, and Wisconsin do not articulate that immunity applies only where evidence is obtained as a result of the overdose and the need for medical assistance. Nebraska and Louisiana require evidence from the overdose event for immunity in drug overdose cases, but not alcohol overdose cases.

Requiring evidence from the overdose event for immunity means that criminal investigations that were undertaken prior to an overdose event could remain viable. However, the boundaries of police investigations are often blurry, leaving prosecutors able to pursue charges in some situations despite well-meaning intentions of an overdose witness.

Evidence gathered independently of overdose event

All states with medical amnesty laws allow the use of evidence gathered independently from the overdose event to prosecute other crimes. This means that officers who are alerted to

the scene of an overdose may conduct surveillance and make valid arrests based on crimes they later witness. Likewise, officers who arrive at the scene of an overdose may obtain consent to search property such as a car, book bag, or residence, and may seek charges for contraband discovered.

While some may be less likely to contact authorities during overdose events because of the possibility of being charged with other crimes, an appropriate balance should exist between promoting responsible behavior during overdose events and allowing police to enforce criminal laws. Allowing evidence gathered independently from an overdose event enables criminal investigations that began before the overdose event to remain intact, and also permits law enforcement personnel to pursue other criminal charges unrelated to the overdose event itself.

Application to distribution crimes (See Table 3)

Most states grant immunity only for "simple" possession charges of illegal drugs or possession of alcohol by minors, as opposed to charges involving the distribution of alcohol or drugs. Prosecutors may be allowed to bootstrap other evidence, such as the presence of cash, weighing scales, or text messages to support prosecution of drug or alcohol distribution charges, which would remove such charges from the purview of medical amnesty laws.

While all entities that provide immunity for drug crimes include "simple" possession of certain amounts of a drug among covered offenses, Colorado, Delaware, Iowa, Maryland, Minnesota, Pennsylvania, and Tennessee additionally cover specified crimes related to the

distribution, exchange, or delivery of certain drugs. The District of Columbia, Georgia, Hawaii, Kentucky, Missouri, Nebraska, and Vermont provide some form of immunity for crimes other than "simple" possession of alcohol by minors, such as purchasing, acquiring, or sharing alcohol with a minor. Expanding amnesty beyond possession of small amounts of drugs may reach those segments of the drug using population who possess the most drugs, and therefore may be most at risk of overdose. Conversely, those heavily involved in the drug or (illegal) alcohol distribution business should not be granted unbridled immunity.

3. **Accessibility**. (See Table 3) Medical amnesty laws across the United States are not consistently drafted in a manner that is easily researched or understood by the public.

To effectively encourage those present at overdose events to contact authorities, statutory language should be easy to research and understand. This group of statutory characteristics concerns the ease with which each statute can be interpreted: whether a definition is provided for "overdose", and whether references are made to other statutes for definitions or other purposes.

A statute is unlikely to be effective unless its intended audience can understand its provisions. Beyond having clear language, the provisions of an effective medical amnesty law should be researchable with a reasonable amount of effort. The efficacy of each medical amnesty law was measured by whether a definition for "overdose" was provided and how many other statutes were referenced (See Table 1, Items 17 – 19).

Definition of "overdose" (See Table 3)

Whether an event constitutes an "overdose" may be obvious in many cases, but unclear in others. Consider a social event where a person is lethargic and unresponsive. Others attempt to offer aid. Believing this to be an overdose, well-meaning bystanders contact authorities, who arrive and begin treating the patient. Police also arrive and notice alcohol or drugs present. A medical examination determines that the person was not suffering an overdose at all, but rather, suffered from a medical condition that might appear to be an overdose. Could those at the party be charged with crimes related to the illegal possession of drugs or, in the case of minors, the illegal possession of alcohol? If so, reports of such treatment by authorities may discourage those who encounter lethargic individuals from contacting authorities.

Certain medical conditions may carry symptoms that mimic intoxication or overdose. A person's true level of intoxication may also change. Providing a definition of "overdose" is therefore important to avoid uncertainty. Most states provide a definition for "overdose" or medical emergency, which can be helpful in determining whether a reported overdose event should qualify for immunity, and may thus save the expense of litigation. For example, the Florida medical amnesty statute does not contain a definition of "overdose", which became a litigated issue in a criminal case (*Florida v. Silliman*, Case Number 5D14-2895, Fla. App., 2015). See also *State v. Brooks*, 210 So.3d 514 (La.App., 2016), in which the Court of Appeals of Louisiana reversed the trial court's grant of the defendant's motion to quash the bill of information. In *Brooks*, officers responded to a scene regarding two males who were "using

drugs" or "passed out high on drugs". An officer located two males in a car who appeared to be unconscious. After failing to get a response from the males, the officer opened the driver's door and both males awoke. The males complied with the officer's commands, did not lose consciousness or "slobber" again, and refused medical assistance. The relevant statute, La. R.S. 14:403.10, lacks a definition of "overdose". The court reasoned that for the purposes of La. R.S. 14:403.10 B (the relevant MAL) an overdose "must be of a lethal, toxic, or poisonous amount that is capable of causing death or serious injury, rather than one which is merely dangerous, 'too great a dose,' or causing a lower level of consciousness." Otherwise, the court reasoned, "[A]ny amount of a [Controlled Dangerous Substance] [would] satisfy this prong of the test for immunity granted by La. R.S. 14:403.10 B." (210 So. at 520) See also *State v. Jago,* 209 So.3d 1078 (La. App., 2016) which involved the co-defendant.

If the legislative goal is truly to save lives by encouraging more calls for professional assistance during overdose events, medical amnesty laws should include a definition of overdose to eliminate guesswork and interpretation by courts. Better yet, medical amnesty laws could encompass definitions such as those found in Georgia and Mississippi, which contemplate a layperson's subjective belief of whether a person is experiencing an overdose.

In Georgia:

> "Drug overdose" means an acute condition, including, but not limited to, extreme physical illness, decreased level of consciousness, respiratory depression, coma, mania, or death, resulting from the consumption or use of a controlled substance or dangerous drug by the distressed individual in violation of this chapter <u>or that a reasonable person would believe to be</u> resulting from the consumption or use of a

> controlled substance or dangerous drug by the distressed individual. O.C.G.A. § 16-13-5(a) (1).

Georgia's alcohol-related medical amnesty law defines overdose as follows:

> "Alcohol related overdose" means an acute condition, including, but not limited to, extreme physical illness, decreased level of consciousness, respiratory depression, coma, mania, or death, resulting from the consumption or use of alcohol or that a layperson would reasonably believe to be resulting from the consumption or use of alcohol for which medical assistance is required. O.C.G.A. § 3-3-23 (j) (1) (A).

To encourage professional calls for assistance during overdose events, some leeway should exist that enables bystanders and overdose victims to contact authorities without having to accurately diagnose an overdose victim's true medical condition.

The presence or absence of a definition of overdose may serve another benefit relating to the credibility that authorities will acknowledge immunities named in medical amnesty laws. For instance, in both *Silliman supra,* and *Brooks, supra,* courts grappled with medical amnesty laws that lack a definition for overdose. Both courts looked to other sources and denied immunity because intoxication levels failed to be sufficiently serious. Leaving such matters to court interpretation is less certain and unclear than defining what constitutes an overdose for the purposes of a statute. Further, providing a definition of "overdose" may assist public health officials distribute accurate information about medical amnesty laws to the public.

References to other statutes (See Table 3)

When a statute refers to other statutes for definitions, the legal research process becomes more complicated and less likely to be completed comprehensively (Read, 1941). Courts often interpret a law in an unexpected way, or declare it altogether invalid, when a statute refers to other statutes for definitions (Boyd, 2008).

Nearly all medical amnesty laws refer to other statutes for definitions or other purposes. Only medical amnesty statutes from Arizona, Florida, Illinois, Rhode Island, and South Dakota, and one of two statutes from Kentucky make no such references to other laws. Medical amnesty statutes from Alabama, Louisiana, New Hampshire, New Mexico, and Texas, and one each from Nebraska and North Carolina make only one reference to another statute for defining terms. Twenty-six states have at least one medical amnesty law that refers to four or more other statutes for defining characteristics or other information. Delaware, the District of Columbia, Michigan, Missouri, Nevada, Oregon, Pennsylvania, South Carolina, and Virginia have medical amnesty laws that refer to seven or more statutes.

While references to multiple statutes undoubtedly complicate legal research, failing to provide citations may complicate research even more. For example, understanding one Connecticut statute (21a-279) may require the reader to look up what is a "controlled substance" in that state, without a citation to the relevant statute. Illinois omits a citation for "Class 3 felony possession of methamphetamine" in one of its medical amnesty laws (720 ILCS 646/115),

leaving the reader to research what constitutes that offense. Such complexity decreases the likelihood that a reader will fully research or understand the provisions of a statute.

Limitations and Future Research

State legislatures may enact medical amnesty laws and appellate courts may interpret statutes in a manner unforeseen by the authors. As of this writing, most states do not have a lengthy history with their respective medical amnesty laws. This work should be viewed as a starting point and future research should seek the most effective language in prompting calls for professional assistance during overdose events.

Conclusion

Medical amnesty laws have been enacted in a majority of states and in the District of Columbia to encourage requests for professional assistance during overdose emergencies by alleviating the fear of criminal charges. Laws vary drastically, and some statutes may be more effective than others in encouraging calls for professional assistance.

This study defined major features of existing medical amnesty laws as a first step in determining what provisions are most effective. By comparing the efficacy of different medical amnesty laws, policy makers can craft effective tools to fight the growing epidemic of drug and alcohol overdoses in the United States.

Appendix – Chapter 2 – Nationwide Survey of Medical Amnesty Laws

Table 1 – Rating Instrumentation to Examine Medical Amnesty Statutes

1.	STATENAME: Name of State
2.	STATNUM: Statute number and Edition (year):
	Protections granted by each statute: who receives immunity, what type of overdose event applies, and whether an overdose event may be considered a mitigating factor during a sentencing hearing.
3.	PERSON: Immunity provision for individual who: (1) calls or requests aid only, (2) overdose victim only, (3) both caller for aid and overdose victim (4) caller for aid and also others who act in concert in requesting aid (5) caller for aid and others who act in concert with caller in requesting aid and also the overdose victim (6) unspecified/unclear
4.	SUBSTANCE: Immunity provision related to overdose of: (1) drugs, (2) alcohol, (3) either drugs or alcohol, (4) unspecified/unclear, (5) specific drug or combination
5.	MITIGATEDRG: Is the action of calling/seeking assistance specifically mentioned in the statute as a mitigating factor that may be used at sentencing for drug-related offenses even if complete immunity is not granted. Mitigation must be specifically mentioned in the statute. O=yes, 1=no
6.	MITIGATEALC: Is the action of calling/seeking assistance specifically mentioned in the statute as a mitigating factor that may be used at sentencing for alcohol-related offenses even if complete immunity is not granted. Mitigation must be specifically mentioned in the statute. O=yes, 1=no
	Limitations on protections granted by each statute – what collateral consequences may occur despite immunity provisions
7.	CIVIL: Does the statute under review provide for immunity from civil forfeiture of property aside from contraband? 0=yes, 1=no
8.	USEEVIDENCE: Can police use evidence gathered independently for prosecution of other crimes? Yes – evidence gathered independently may be used. O=yes, 1=no, 2=silent
9.	DRUGTESTPROB: Does the statute limit the ability to drug test or otherwise sanction a person on probation, pretrial release, or parole? 0=yes, 1=no, 2=silent
10.	PARAPHERNALIA: Does immunity apply to possession or use charges pertaining to drug paraphernalia? 0=yes, 1=no, 2=silent
	Limitations on protections granted by each statute – areas open for prosecutorial discretion

11. QUALIFY: Does immunity require that evidence for the arrest/charge/prosecution be obtained as a result of the overdose and the need for medical assistance? 0=yes, 1=no
12. WHATOFFENSEDRG: Pertaining to drug overdose events, does immunity apply to "simple" possession of certain amounts of a drug only? If no immunity for distribution of any amount, answer is "yes". Coded as yes if an individual could be punished for a drug offense related to the event. If a person could be prosecuted for certain amounts of drugs, PWID, trafficking, supplying, distributing, etc. then this is YES. 0=yes, 1=no, 2=silent, 3=not applicable
13. WHATOFFENSEALC: Pertaining to alcohol overdose events, does immunity apply to the possession or use of alcohol only? If no immunity for distribution of any amount, answer is "yes". Coded as yes if an individual could be punished for an alcohol offense related to the event. If a person could be prosecuted for distributing, acquiring or providing alcohol, then this is YES. 0=yes, 1=no, 2=silent, 3= not applicable
14. OTHEROFF: Is there a possibility for arrest/charge/prosecution/penalty for another offense (whether drug or alcohol related or not) arising out of the event, even if a person might receive some immunity? O=yes, 1=no, 2=silent, 3=not applicable
15. OTHERREQUIREMENTS: Are specific requirements named in the statute to receive immunity? Requirements such as: provide name, remain with victim or at the scene, cooperate with law enforcement or medical personnel, being the first to call or providing other relevant information would denote a YES. O=yes, 1=no
16. SAFEGUARD: Is there any safeguard against the intent to defraud, such as requiring that a caller or OD victim act in good faith or reasonably believe that an overdose event is occurring? O=yes, 1=no
Complexity of each statute – whether statutory language is attainable and understandable
17. OVERDOSEDEF: Is a definition provided for what constitutes an overdose or medical emergency? 0=yes, 1=no
18. OTHERSTATUTES: Does the statute under review refer to other statutes for definitions, drug limits, etc.? 0=yes, 1=no
19. HOWMANYSTATS: How many other statutes are referred to by the statute under review, if any? 0=N/A, 1=1, 2=2, 3=3, 4=4 or more

Table 2 - Coverage and protections granted by each MAL statute

				Collateral Consequences		
STATE	**MAL Citation**	**Receiver of Immunity**	**Overdose Substance**	**Immunity provision regarding paraphernalia charges?**	**Immunity provision regarding civil asset forfeiture?**	**Immunity provision regarding Probation or parole violation?**
Alabama	20-2-281 (2017)	caller	either drugs or alcohol	no	no	no
Alaska	11.71.311 (2017)	caller and OD victim	drugs	no	no	no
	12.55.155 (d) (19) (2015)	*"Mitigation only" statute – not included in data calculations*				
Arizona	13-3423 (2018)	caller, OD victim	drugs	yes	no	no
Arkansas	20-13-1701 *et seq.* (2018)	caller, others, OD victim	either drugs or alcohol	no	no	yes
California	Health/Safety 11376.5 (2018)	caller, OD victim	drugs or drug in combination w/ alcohol	yes	no	no
Colorado	18-1-711 (2018)	caller and OD victim	either drugs or alcohol	yes	no	no
Connecticut	21a-267 (2017)	caller and OD victim	either drugs or alcohol	yes	no	no
	21a-279 (2017)	caller and OD victim	either drugs or alcohol	no	no	no
Delaware	T. 16 S. 4769 (2018)	caller, others, OD victim	either drugs or alcohol	yes	no	yes
Dist. Columbia	7-403 (2018)	caller and OD victim	either drugs or alcohol	yes	no	yes
Florida	893.21 (2018)	caller and OD victim	drugs	no	no	no
	921.0026 (2016)	*"Mitigation only" statute – not included in data calculations*				

Georgia	3-3-23 (2018)	caller, others, OD victim	alcohol	no	no	yes
	16-13-5 (2018)	caller, others, OD victim	drugs	yes	no	yes
Hawaii	329-43.6 (2017)	caller, others, OD victim	either drugs or alcohol	yes	yes	yes
Idaho	37-2739 C (2018)	caller and OD victim	drugs	yes	no	no
Illinois	720 ILCS 646/115 (2018)	caller and OD victim	specific drug/combination	no	no	no
	720 ILCS 570/414 (2018)	caller and OD victim	drugs	no	no	no
	730 ILCS 5/5-5-3.1 (2016)	*"Mitigation only" statute – not included in data calculations*				
Indiana	*IC 35-38-1-7.1 (2018)*	*"Mitigation only" statute – not included in data calculations*				
	16-42-27.2 (2017)	*"Mitigation only" statute – not included in data calculations*				
Iowa	124.418 (2018)	caller and OD victim	drugs	yes	no	yes
Kentucky	218A.133 (2018)	caller, others, OD victim	drugs	yes	no	no
	244.992 (2018)	caller, others, OD victim	alcohol	no	no	no
Louisiana	14:403.10 (2017)	caller and OD victim	drugs	no	no	no
	14:403.9 (2017)	caller	alcohol	no	no	no
Maine	28-A Section 2087 (2018) **	caller and OD victim	alcohol	no	yes	no
	28-A Section 2051 (2018) ***	caller and OD victim	alcohol	no	yes	no
Maryland	Crim Proc 1-210 (2018)	caller, others, OD victim	either drugs or alcohol	yes	no	yes

Massachusetts	Ch94C, Section 34A (2017)	caller and OD victim	drugs	no	no	no
Michigan	333.7403 (2018)	caller, others, OD victim	specific drug/combination	no	no	no
	333.7404 (2018)	caller, others, OD victim	specific drug/combination	no	no	no
Minnesota	604A.05 (2018)	caller and OD victim	drugs, specific drug/combination	yes	no	yes
Mississippi	41-29-149.1 (2018)	caller, others, OD victim	drugs	yes	yes	yes
Missouri	195.205 (2017)	caller, others, OD victim	either drugs or alcohol	yes	yes	yes
Montana	50-32-609 et seq. (2017)	caller and OD victim	drugs	yes	no	yes
Nebraska	53-180.05 (2018)	caller and OD victim	alcohol	no	no	no
	28-472 (2017)	caller and OD victim	drugs	yes	no	no
Nevada	453C.150 (2017)	caller, others, OD victim	either drugs or alcohol	yes	yes	yes
New Hampshire	318-B: 28-b (2018)	caller and OD victim	drugs	no	no	no
New Jersey	2C:35-31-8 (2018)	OD victim	drugs	yes	no	yes
	2C:35-30-7 (2018)	caller	drugs	yes	no	yes
New Mexico	30-31-27.1 (2018)	caller and OD victim	drugs	no	no	no
New York	220.78 (2018)	caller and OD victim	either drugs or alcohol	yes	no	no
	220.03 (2018)	caller	either drugs or alcohol	no	no	no
	390.40 (2016)	*"Mitigation only" statute – not included in data calculations*				
N. Carolina	18B-302.2 (2017)	caller and OD victim	alcohol	no	no	yes
	90-96.2 (2017)	caller and OD victim	drugs	yes	no	yes

N. Dakota	19-03.1-23.4 (2015)	caller, others, OD victim	drugs	yes	no	no
Ohio	2925.11 (2016)	caller and OD victim	drugs	no	no	no
Oregon	475.898 (2017)	caller and OD victim	drugs	yes	no	yes
	475.B393 (2017)	caller and OD victim	specific drug – cannabis	yes	no	yes
Pennsylvania	35PA Stat. 780-113.7 (2018)	caller and OD victim	drugs	yes	no	yes
Rhode Island	21-28.8-4 (2018)	caller and OD victim	either drugs or alcohol	yes	no	yes
South Carolina	44-53-1910 *et seq.* (2018)	caller and OD victim	either drugs or alcohol	yes	no	no
South Dakota	34-20A-109 *et seq*. (2018)	caller and OD victim	drugs	no	no	no
Tennessee	63-1-156 (2018)	caller, others, OD victim	drugs	yes	no	yes
Texas	Alc. Bev. T. 4 106.04 (2017)	caller	alcohol	no	no	no
Utah	58-37-8-16 (2018)	caller and OD victim	either drugs or alcohol	yes	no	no
	76-3-203.11 (2018)	*"Mitigation only" statute – not included in data calculations*				
Vermont	T.18, Sec.4254 (2018)	caller and OD victim	either drugs or alcohol	no	yes	yes
Virginia	18.2-251.03 (2018)	caller	either drugs or alcohol	yes	no	no
Washington	69.50.315 (2018)	caller and OD victim	drugs	no	no	no
	9.94A.535 (2018)	*"Mitigation only" statute – not included in data calculations*				
West Virginia	16-47-1 *et seq.* (2017)	caller and OD victim	either drugs or alcohol	no	no	yes
Wisconsin	961.443 (2018)	caller	drugs	yes	no	yes

*No provision as defined in this paper.

**In Maine, the penalty is a civil forfeiture and the statute provides immunity for that penalty.

*** In Maine, a minor who violates this statute commits a civil violation.

Table 3 – Limitations on protections and complexity of each MAL

		Prosecutorial Discretion				Accessibility	
STATE	**MAL Citation**	**Is mitigation possible if full amnesty is not granted?**	**Immunity require evidence from OD event?**	**Immunity for certain distribution crimes?**	**Specific requirements to receive immunity?**	**Overdose Definition Provided?**	**Number of other statutes referenced**
Alabama	20-2-281 (2017)	no provision	yes	no	yes	no	1
Alaska	11.71.311 (2017)	no provision	yes	no	yes	yes	4
Arizona	13-3423 (2018)	Yes	yes	no	no	no	0
Arkansas	20-13-1701 *et seq.* (2018)	no provision	yes	no	no	yes	3
California	Health/Safety 11376.5 (2018)	no provision	no	no	yes	yes	4
Colorado	18-1-711 (2018)	no provision	yes	drug only	yes	yes	6
Connecticut	21a-267 (2017)	no provision	yes	no	no	no	2
	21a-279 (2017)	no provision	yes	no	no	no	2
Delaware	T. 16 S. 4769 (2018)	no provision	no	yes	yes	yes	7
D. of Columbia	7-403 (2018)	Yes	yes	alcohol only	no	yes	7
Florida	893.21 (2018)	no provision	yes	no	no	no	0
Georgia	3-3-23 (2018)	no provision	yes	alcohol only	no	yes	4
	16-13-5 (2018)	no provision	yes	no	yes	yes	3
Hawaii	329-43.6 (2017)	Yes	yes	alcohol only	no	yes	3
Idaho	37-2739 C (2018)	no provision	yes	no	no	no	3
Illinois	720 ILCS 646/115 (2018)	no provision	yes	no	no	yes	0
	720 ILCS 570/414 (2018)	no provision	yes	no	no	yes	0
Iowa	124.418 (2018)	Yes	yes	drug only	yes	yes	4
Kentucky	218A.133 (2018)	no provision	yes	no	yes	yes	0
	244.992 (2018)	no provision	yes	alcohol only	yes	no	4

Louisiana	14:403.10 (2017)	no provision	yes	no	no	no	1
	14:403.9 (2017)	no provision	no	no	yes	no	1
Maine	28-A Section 2087 (2018)	no provision	yes	no	no	yes	2
	28-A Section 2051 (2018)	no provision	yes	no	no	no	2
Maryland	Crim Proc 1-210 (2018)	Yes	yes	yes	no	no	6
Massachusetts	Ch94C, Section 34A (2017)	mitigation for drug, not alcohol offenses	yes	no	no	no	3
Michigan	333.7403 (2018)	no provision	yes	no	no	yes	8
	333.7404 (2018)	no provision	yes	no	no	yes	8
Minnesota	604A.05 (2018)	mitigation for drug, not alcohol offenses	yes	drug only	yes	yes	4
Mississippi	41-29-149.1 (2018)	no provision	yes	no	no	yes	4
Missouri	195.205 (2017)	no provision	yes	alcohol only	no	yes	8
Montana	50-32-608 *et seq.* (2017)	mitigation for drug, not alcohol offenses	yes	no	no	yes	4
Nebraska	53-180.05 (2018)	no provision	no	yes	yes	no	1
	28-472 (2018)	no provision	yes	no	yes	yes	2

Nevada	453C.150 (2017)	mitigation for drug, not alcohol offenses	yes	no	no	yes	9
New Hampshire	318-B: 28-b (2018)	no provision	yes	no	yes	yes	1
New Jersey	2C:35-31-8 (2018)	no provision	yes	no	no	no	6
	2C:35-30-7 (2018)	no provision	yes	no	no	no	6
New Mexico	30-31-27.1 (2018)	mitigation for drug, not alcohol offenses	yes	no	no	no	1
New York	220.78 (2018)	no provision	yes	yes	no	yes	5
	220.03 (2018)	no provision	yes	no	no	no	2
N. Carolina	18B-302.2 (2017)	no provision	yes	no	yes	no	1
	90-96.2 (2017)	no provision	yes	no	yes	yes	2
N. Dakota	19-03.1-23.4 (2017)	no provision	yes	no	yes	no	6
Ohio	2925.11 (2016)	no provision*	yes	no	yes	no	4
Oregon	475.898 (2017)	no provision	yes	no	no	yes	11
	475B.393 (2017)	no provision	yes	yes	no	yes	3
Pennsylvania	35PA Stat. 780-113.7 (2018)	no provision	yes	drug only	yes	yes	7
Rhode Island	21-28.8-4 (2018)	mitigation for drug, not	yes	no	no	no	0

		alcohol offenses					
South Carolina	44-53-1910 *et seq.* (2018)	Yes	yes	yes	yes	yes	9
South Dakota	34-20A-109 *et seq.* (2018)	mitigation for drug, not alcohol offenses	yes	no	yes	yes	0
Tennessee	63-1-156 (2018)	Yes	yes	drug only	no	yes	4
Texas	Alc. Bev. T. 4 106.04 (2017)	no provision	no	no	yes	no	1
Utah	58-37-8-16 (2018)	no provision	yes	no	yes	no	2
Vermont	T.18, Sec.4254 (2018)	Yes	yes	alcohol only	yes	yes	4
Virginia	18.2-251.03 (2018)	no provision	yes	no	yes	yes	8
Washington	69.50.315 (2018)	no provision	yes	no	no	no	2
West Virginia	16-47-1 *et seq.* (2017)	Yes	no	no	yes	yes	6
Wisconsin	961.443 (2018)	no provision	no	no	no	no	3

*No provision for mitigation as defined in this paper.

CHAPTER 3 - COMPARISON OF DRUG POISONING DEATH RATES IN NINE STATES WITH A MEDICAL AMNESTY LAW

Abstract

Background: Timely medical attention could decrease mortality during drug overdose events, but overdose victims and witnesses alike often delay or fail to seek professional help because they fear police involvement. Statutes that provide immunity from criminal action can have an important impact on the likelihood of seeking timely treatment.

Methods: We examined those states with at least five years of data available before and after enactment of Medical Amnesty Laws (also known as Good Samaritan Laws) to determine whether such laws corresponded with decreased drug overdose death rates. Sufficient data exist for nine states to allow the comparison.

Results: New Mexico was the first state to enact a Medical Amnesty Law (on June 15, 2007), and exhibited declining overdose death rates for some age groups during the period analyzed. In Washington, overdose death rates decreased for most age groups following that state's medical amnesty law becoming effective (on June 10, 2010). In Connecticut, overdose deaths continued to rise for all age groups for the five year period following enactment of that state's Medical Amnesty Law on October 1, 2011. Similarly, New York's overdose death rates significantly increased for the five year period following enactment of that state's Medical Amnesty Law on

September 18, 2011. Five states enacted Medical Amnesty Laws in 2012: Colorado (May 29), Florida (October 1), Illinois (June 1), Massachusetts (August 2), and Rhode Island (June 18). Drug poisoning death rates increased for the five year period following 2012 for all five states.

Conclusions: Correlations between overdose deaths and Medical Amnesty Laws do not mean either the presence or absence of causative effects, but may be helpful as policy makers craft laws that address overdose deaths. Recommendations are made concerning statutory language and educational interventions.

Background

Over the past 20 years, the increased availability of controlled prescription drugs (CPDs) and inexpensive heroin has led to a dramatic increase in overdose deaths in the United States. Since 2008, drug overdoses have killed more people each year in the United States than either motor vehicle crashes or the misuse of firearms. (The U.S. Drug Enforcement Agency, 2015) Despite leading in many areas of medical technology, the United States has the highest drug-related mortality rate in the world (Cochran et al., 2014).

While street drugs posed the greatest risk of overdose for past generations, since 2002, CPD abuse has resulted in more deaths than cocaine and heroin combined. However, increased law enforcement pressure on the diversion of CPDs from legitimate channels has prompted drug cartels to increase the supply of heroin and other illicit drugs to the American market (The U.S.

Drug Enforcement Agency, 2015). Today, heroin is more readily available and drives more overdose deaths than in 2007 (The U.S. Drug Enforcement Agency, 2015).

Heroin carries well-known risks, and overdoses occur frequently among its users. Research of illicit drug use conducted by Tracy and colleagues, found that approximately one-half (50%) of respondents had a minimum of one non-fatal drug overdose event (Tracy et al., 2005). Among intravenous drug users, those experiencing a non-fatal overdose have ranged between 50% and 70% (Warner-Smith et al., 2001). Moreover, those who quit using heroin have a much higher likelihood of overdose if they renew usage, because tolerance levels usually diminish (The U.S. Drug Enforcement Agency, 2015).

Whether a lethal opioid overdose involves CPDs or street drugs, the time from initial injection or consumption to death may leave a one-to-three (1 – 3) hour window for an overdose witness to intervene and seek medical attention for the victim (Enteen et al., 2010). Naloxone (Narcan ®), the first therapeutic drug overdose reversal agent, is easy to administer and is commonly used by medical professionals to counteract the effects of heroin and other opiates (Sporer & Kral, 2007). Some states allow police officers, paramedics, and first responders to carry and administer Naloxone to avoid the delay in treatment that would otherwise occur while transporting an overdose victim to a hospital. While published research has demonstrated the effectiveness of this approach (Banta-Green et al., 2013), other studies show that emergency medical services (EMS) are activated in fewer than half of overdose events (Seal et al., 2003; Sporer, 1999; Warner-Smith et al., 2001). The low rate of EMS activation occurs in part because

witnesses to overdose are often drug abusers themselves, and fear legal consequences such as arrest and prosecution for drug offenses, violations of probation or bond conditions, or violations of Temporary Protective Orders (Banta-Green et al., 2013; Darke & Zador, 1996; Davidson et al., 2003; Sherman et al., 2008; Tobin et al., 2005).

Some states permit the dissemination of Naloxone to drug users' family members, friends, and others who may be in the best position to respond directly to witnessed overdose events (Davis & Carr, 2015; Galea et al., 2006; Phillips, 2013; Seal et al., 2003; Sporer & Kral, 2007). While effective in many cases, this approach is not without potential problems. Because Naloxone is generally safe and effective against opioid based overdoses, some may rely too much on its ameliorating effects and fail to seek professional help following an overdose. Further, Naloxone is only effective with opioid-based overdoses. Overreliance on Naloxone or simply not knowing what drugs are taken by a victim could prove disastrous with a poly-drug overdose or when the overdose agent is not an opioid, because Naloxone does not ameliorate the effects of non-opioid drugs or alcohol. Naloxone may also be perceived as a "safety net" which enables opioid drug users to take risks with dosage levels.

Encouraging more frequent and timely reporting of overdose emergencies to trained personnel could turn the tide of overdose deaths in the United States. Many states have enacted statutes that provide immunity to the reporter of an overdose emergency, the overdose victim, or both. Often called "Good Samaritan Laws" or "Medical Amnesty Laws", these statutes are

meant to encourage calls for medical assistance during overdose emergencies with the overall goal of saving lives.

State legislatures may enact Medical Amnesty legislation because of an increase in drug poisoning deaths. In other words, at the time such legislation is passed, a given state may already be in the throes of an increase in deaths brought about for a number of reasons. Legislators seek to enact legislation to address existing or anticipated problems. One goal would be to study whether Medical Amnesty Laws (also known as "Good Samaritan Laws") have had the intended effect of saving lives by encouraging victims and witnesses to overdose events to contact authorities for professional assistance. However, a lack of direct data hinders accomplishing this research. Because the motivation behind passing a MAL may be to address an existing problem, sufficient time must elapse because one can determine whether a MAL has carried its intended effect. One problem is, however, that there is a lack of direct information concerning whether 9-1-1 calls for emergency assistance have increased based upon a particular state's MAL.

Further, a variety of factors could act as confounding variables that confuse the relationship between passage of a MAL and drug poisoning deaths. Law enforcement pressure, a shortage or overage of either the illicit drug supply or diversion of legitimate pharmaceuticals, population changes, public service announcements and a plethora of other factors make direct measurement of the effect of a MAL on drug poisoning deaths bewildering. Rather than seek a direct measure, therefore, the goal of this research is simply to determine whether drug poisoning

deaths have increased, decreased, or remained the same during the five-year period following enactment of a state's MAL. The election of a five-year period is to ensure examination of any existing trends, and to allow any effect of an MAL sufficient time to work. No representation is made that the MAL would have a causative effect.

Knowledge of MALs

A study among Washington police officers and paramedics by Banta-Green (Banta-Green et al., 2013) in the Fall of 2011 found that few had knowledge of the state's "Good Samaritan Law" (MAL), which had been passed in June of 2010. Although the majority of respondents had been present at an overdose during the prior year, only 16% of the officers and 7% of the paramedics surveyed were aware of the new law. Knowledge increased following an informational intervention.

A survey by Evans (Evans et al., 2016) among young adult users of non-prescription opioids found that fewer than half (45.5%) were aware of Rhode Island's "Good Samaritan Law" (MAL). Participants were recruited from January 2015 through February 2016 and were surveyed about, among other things, knowledge of the 2012 GSL. Awareness of Rhode Island's MAL was associated with older age (age range was 18 to 29), being white, a history of incarceration, a history of injection drug use, lifetime heroin use, witnessing or experiencing an overdose, having heard of naloxone, knowing where to obtain naloxone, and experience administering naloxone (all $p < 0.05$). The final explanatory regression model showed an

association between awareness of Rhode Island's GSL and lifetime injection drug use, having heard of naloxone, and knowing where to obtain naloxone. An informational intervention was recommended.

Efficacy of MALs

Little research has attempted to determine whether Medical Amnesty Laws have actually been effective in accomplishing the goal of reducing overdose deaths by encouraging calls for professional assistance. Rees and others attempted to measure the effects of naloxone access and "Good Samaritan Laws" on opioid-related deaths. (Rees et al., 2017) Drawing upon mortality data obtained from the National Vital Statistics System multiple cause-of-death mortality files for the period 1999 – 2014, they found evidence that adoption of a NAL leads to a reduction in opioid-related deaths of 9 to 11 percent, but failed to find statistically significant effects of GSLs (MALs) at conventional levels. In their fully specified model, Rees and others estimated a Poisson regression using the presence or absence of a NAL, GSL (MAL), State, Year, and a vector of controls that included the natural log of police officers per capital by state and year, an indicator for whether medical marijuana was legal, the natural log of the beer taxes by state and year, the natural log of the cigarette tax, and the natural log of the employment rate, natural log of the number of college graduates, the natural log of per capita income, and the natural log of the minimum wage. The natural log of population and of police per capita, and the natural log of beer taxes were significant at the 5% level. Other controls were not statistically significant.

Interestingly, Rees and others determined that the effect of a NAL improved 2 or more years after enactment.

McClennan and others used 2000 – 2014 National Vital Statistics System data, 2002 – 2014 National Survey on Drug Use and Health data, and primary datasets of the location and timing of NALs and MALs nationwide and reported that states with a MAL had a 15% ($p = 0.050$) lower incidence of opioid-overdose mortality. (McClellan et al., 2018) However, use of this time frame means that seven (7) states would present less than 1 year of data following enactment of a MAL in 2014. Six (6) states would present less than 2 years of data following enactment of a MAL in 2013. Five (5) states would present less than 3 years of data following enactment of a MAL in 2012. Only four (4) states would present 3 or more years of data following enactment of a MAL (MAL enacted in 2011 or earlier).

The project presented here presents a comparison of drug poisoning death data from the five year periods before and after nine (9) states with MALs enacted in 2012 or earlier. Including these nine states in the analysis allows for the controlling of numerous variables that could not be explained otherwise. These states cover a broad section of the country, from East to West and North to South and encompass approximately 25% of the nation's population. This analysis includes two of the five most populous states (New York and Florida) and sparsely populated states (New Mexico and Rhode Island). See Table 1.

Table 1: Population and rank of nine states

State	National Rank by Population **	Estimated Population (July 1, 2017)*
Colorado	21st	5,607,154
Connecticut	29th	3,588,184
Florida	3rd	20,984,400
Illinois	6th	12,802,023
Massachusetts	15th	6,859,819
New Mexico	36th	2,088,070
New York	4th	19,849,399
Rhode Island	44th	1,059,639
Washington	13th	7,405,743
Total		80,244,431
United States		325,719,178

*Source: U.S. Census Bureau - statistics accessed from https://www.census.gov 3/30/19.)

** Source: Worldpopulationreview.com – accessed 3/30/19.

Methodology

All states with at least five (5) years of data available both before and after enactment of Medical Amnesty Laws (MALs) were examined. The Centers for Disease Control (CDC) currently have published overdose death data available from 1999 through 2017. Nine states (Colorado, Connecticut, Florida, Illinois, Massachusetts, New Mexico, New York, Rhode Island, and Washington) have sufficient data available for measurement of the five year periods before and after enactment of respective medical amnesty laws. See Appendix, Exhibit 1.

Data were downloaded from CDC's WISQARS™ resource, (Centers for Disease Control and Prevention, National Centers for Injury Prevention and Control, Web-based Injury Statistics

Query and Reporting System (WISQARS)) available at www.cdc.gov/injury/wisqars). WISQARS provides data concerning fatal and nonfatal injury, violent death, and cost of injury from a variety of sources, such as death certificate data reported to the National Center for Health Statistics (NCHS). SAS 9.4 was used to compare drug poisoning death rates for the five (5) year periods before and after each state enacted its Medical Amnesty Law, using age-adjusted rates with 2000 as the reference year. This study involves data available to the public and thus is exempt from Institutional Review Board approval.

For each state, the age-adjusted death rates for the five year period before ("before period") and after ("after period") enactment of respective state Medical Amnesty Laws were obtained, tabulated, and compared. The age-adjusted death rate for the year each state's MAL was enacted was not included in any calculations. Next, unweighted averages of the before period were compared with the after period to determine whether data suggest an increase or decrease in drug poisoning deaths following enactment of each state's MAL. Because the before and after periods involve the population of each respective state over a period of several years, a paired-samples t-test is appropriate. Assumptions for a valid t-test are: (1) the dependent variable (drug poisoning deaths) involves an interval or ratio scale; (2) the raw score populations are at least approximately normally distributed; and (3) the populations have homogeneous variance. Further, two data points are available for each study year. (Heiman, 2006) As shown elsewhere, plotting the data demonstrates that the drug poisoning death data used in this study is

not normally distributed. Data are in the form of counts and so a Poisson distribution is an appropriate probability distribution to utilize.

Results

Nationwide results and comparison with the nine states with at least five years with a medical amnesty law are shown graphically in Exhibit 3. As shown, drug poisoning deaths among the 20 – 64 age range generally increased from 2000 – 2017.

Non-fatal injury data

Nationwide data from CDC WISQARS is also available for non-fatal injury poisoning deaths, but is not provided through the WISQARS program for individual states. The definition provided by CDC for poisoning includes drug overdoses and also other categories of poisoning:

> *Poisoning: Ingestion, inhalation, absorption through the skin, or injection of so much of a drug, toxin (biologic or non-biologic), or other chemical that a harmful effect results, such as drug overdoses. This category does not include harmful effects from normal therapeutic drugs (i.e., unexpected adverse effects to a drug administered correctly to treat a condition) or bacterial illnesses.*

As shown in the graph in the Appendix, nationwide non-fatal drug poisoning rates per 100,000 have increased markedly for all age groups within the 20-64 age range from 2007 through 2017. See Appendix, Exhibit 4.

Results by state

Colorado

Colorado's Medical Amnesty Law went into effect on May 29, 2012. The measured age-adjusted rates of drug poisoning deaths for the five year periods before (2007-2011) and after (2013-2017) the statute's enactment date were as follows: before period (2007: 14.67; 2008: 14.79; 2009: 14.94; 2010: 12.63; 2011: 16.04); and after period (2013: 15.54; 2014: 16.26; 2015: 15.30; 2016: 16.51; 2017: 17.52). The age-adjusted death rate for 2012, the year Colorado's MAL was enacted (14.95) was not included in any calculations. Comparing simple averages of the before period (14.61) with the after period (16.23) strongly suggests an increase in drug poisoning deaths despite enactment of Colorado's MAL. See Table 2.

Table 2: Comparison of 5 year periods before and after enactment of medical amnesty law in Colorado

Colorado Before 2012 – Drug Poisoning Deaths/100,000		Colorado After 2012 – Drug Poisoning Deaths/100,000	
2007	14.67	2013	15.54
2008	14.79	2014	16.26
2009	14.94	2015	15.30
2010	12.63	2016	16.51
2011	16.04	2017	17.52
Unweighted average of five years before 2012: 14.61		Unweighted average of five years after 2012: 16.23	
One-tailed Paired t-test: P= 0.028			

Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC WISQRS, available at https://webappa.cdc.gov, downloaded 3/19/19. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

Connecticut

Connecticut's Medical Amnesty Law went into effect on October 1, 2011. The measured age-adjusted rates of drug poisoning deaths for the five year periods before (2006-2010) and after (2012-2016) the statute's enactment date were as follows: before period (2006: 11.47433; 2007: 12.21314; 2008: 10.802; 2009: 10.98094; 2010: 9.999823); and after period (2012: 12.10869; 2013: 15.97769; 2014: 17.56275; 2015: 22.0457; 2016: 27.32979). The age-adjusted death rate for 2011, the year Connecticut's MAL was enacted (11.19768) was not included in any calculations. Comparing simple averages of the before period (11.09) with the after period (19.00492) strongly suggests an increase in drug poisoning deaths despite enactment of Connecticut's MAL. See Table 3.

Table 3: Comparison of 5 year periods before and after enactment of medical amnesty law in Connecticut

Connecticut Before 2011 – Drug Poisoning Deaths/100,000		Connecticut After 2011 – Drug Poisoning Deaths/100,000	
2006	11.47	2012	12.11
2007	12.21	2013	15.97
2008	10.80	2014	17.55
2009	10.98	2015	22.03
2010	10.00	2016	27.31
Unweighted average of five years before 2011: 11.09		Unweighted average of five years after 2011: 19.00	

* Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC WISQRS, available at https://webappa.cdc.gov, downloaded 3/13/18. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

Levene's test for equal variances was applied to compare the variances for the five year before and after periods. The result was statistically significant (p=0.0022). This supports the conclusion that the variance of the five-year before period significantly differed from the variance of the five-year after period. Next, two independent samples t-tests were applied to compare means for the before period (2005 – 2010) and the after period (2012 – 2016). The unpooled t-test was statistically significant (p= 0.0192). (Centers for Disease Control and Prevention (CDC)., n.d.) These measurements support the conclusion that adjusted drug poisoning death rates have increased despite the enactment of Connecticut's MAL.

Next, the data were graphed to determine whether drug poisoning death rates may have decreased for certain age groups despite an overall increase. Graphing the data shows that drug poisoning deaths continued to rise throughout the period studied for each of the following commonly studied age groups: 20-24 years, 25-29 years, 30-34 years, 35-39 years, 40-44 years, 45-49 years, 50-54 years, and 55-59 years (See Appendix, Graph 1).

Florida

Florida's Medical Amnesty Law went into effect on October 1, 2012. The measured age-adjusted rates of drug poisoning deaths for the five year periods before (2007-2011) and after (2013-2017) the statute's enactment date were as follows: before period (2007: 15.40; 2008: 16.18; 2009: 16.71; 2010: 16.38; 2011: 15.37); and after period (2013: 12.51; 2014: 13.16; 2015: 16.20; 2016: 23.63; 2017: 25.04). The age-adjusted death rate for 2012, the year Florida's MAL was enacted (13.22) was not included in any calculations. Comparing simple averages of the before period (16.00) with the after period (18.12) strongly suggests an increase in drug poisoning deaths despite enactment of Florida's MAL. See Table 4.

Table 4: Comparison of 5 year periods before and after enactment of medical amnesty law in Florida

Florida Before 2012 – Drug Poisoning Deaths/100,000		Florida After 2012 – Drug Poisoning Deaths/100,000	
2007	15.40	2013	12.51
2008	16.18	2014	13.16

2009	16.71	2015	16.20
2010	16.38	2016	23.63
2011	15.37	2017	25.04
Unweighted average of five years before 2012: 16.00		Unweighted average of five years after 2012: 18.12	
One-tailed Paired t-test p= 0.236			

* Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC WISQRS, available at https://webappa.cdc.gov, downloaded 3/19/19. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

Illinois

Illinois' Medical Amnesty Law went into effect on June 1, 2012. The measured age-adjusted rates of drug poisoning deaths for the five year periods before (2007-2011) and after (2013-2017) the statute's enactment date were as follows: before period (2007: 9.37; 2008: 10.60; 2009: 10.79; 2010: 9.98; 2011: 10.92); and after period (2013: 12.03; 2014: 13.09; 2015: 14.08; 2016: 18.81; 2017: 21.58). The age-adjusted death rate for 2012, the year Illinois's MAL was enacted (12.51) was not included in any calculations. Comparing simple averages of the before period (10.33) with the after period (15.91) strongly suggests an increase in drug poisoning deaths despite enactment of Illinois' MAL. See Table 5.

Table 5: Comparison of 5 year periods before and after enactment of medical amnesty law in Illinois

Illinois Before 2012 – Drug Poisoning Deaths/100,000		Illinois After 2012 – Drug Poisoning Deaths/100,000	
2007	9.37	2013	12.03
2008	10.60	2014	13.09
2009	10.79	2015	14.08
2010	9.98	2016	18.81
2011	10.92	2017	21.58
Unweighted average of five years before 2012: 10.33		Unweighted average of five years after 2012: 15.91	
One-tailed Paired t-test p= 0.0156			

* Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC WISQRS, available at https://webappa.cdc.gov, downloaded 3/19/19. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

Massachusetts

Massachusetts' Medical Amnesty Law went into effect on August 2, 2012. The measured age-adjusted rates of drug poisoning deaths for the five year periods before (2007-2011) and after (2013-2017) the statute's enactment date were as follows: before period (2007: 13.97; 2008: 11.91; 2009: 12.20; 2010: 11.03; 2011: 12.67); and after period (2013: 15.95; 2014: 19.01; 2015: 25.66; 2016: 32.79; 2017: 31.65). The age-adjusted death rate for 2012, the year Massachusetts' MAL was enacted (12.71) was not included in any calculations. Comparing simple averages of the before period (12.36) with the after period (25.01) strongly suggests an increase in drug poisoning deaths despite enactment of Massachusetts' MAL. See Table 6.

Table 6: Comparison of 5 year periods before and after enactment of medical amnesty law in Massachusetts

Massachusetts Before 2012 – Drug Poisoning Deaths/100,000		Massachusetts After 2012 – Drug Poisoning Deaths/100,000	
2007	13.97	2013	15.95
2008	11.91	2014	19.01
2009	12.20	2015	25.66
2010	11.03	2016	32.79
2011	12.67	2017	31.65
Unweighted average of five years before 2012: 12.36 One-tailed Paired t-test p= 0.013		Unweighted average of five years after 2012: 25.01	

* Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC WISQRS, available at https://webappa.cdc.gov, downloaded 3/19/19. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

New Mexico

New Mexico was the first state to enact a Medical Amnesty Law, which went into effect on June 15, 2007. Age-adjusted rates of drug poisoning deaths for the five year periods before (2002 - 2006) and after (2008 - 2012) the statute's enactment date were measured as follows: before period (2002: 16.09855; 2003: 19.72859; 2004: 16.92997; 2005: 20.02567; 2006: 21.73169); and after period (2008: 26.72703; 2009: 22.09201; 2010: 23.75318; 2011: 26.35467; 2012: 24.79519). The age-adjusted death rate for 2007, the year New Mexico's MAL was enacted (23.39049) was not included in any calculations. Comparing simple averages of the

before period (18.90289) with the after period (24.74442) strongly suggests an increase in drug poisoning deaths despite enactment of New Mexico's MAL. (See Table 7).

Table 7: Comparison of 5 year periods before and after enactment of medical amnesty law in New Mexico

New Mexico Before 2007 – Drug Poisoning Deaths/100,000		New Mexico After 2007 – Drug Poisoning Deaths/100,000	
2002	16.10	2008	26.73
2003	19.73	2009	22.09
2004	16.93	2010	23.75
2005	20.03	2011	26.35
2006	21.73	2012	24.80
Unweighted average of five years before 2007: 18.90		Unweighted average of five years after 2007: 24.74	

* Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC WISQRS, available at https://webappa.cdc.gov, downloaded 3/13/18. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

Next measured was the probability that the variances of the five year before and after periods were not significantly different. An F-test comparison of the five-year before and after periods resulted in a probability of 0.707651, which supports the conclusion that the variance of the five-year before period is not significantly different from the variance of the five-year after period. A T-test comparison of the before period (2002 – 2006) versus the after period (2008 – 2012) using 1-tailed, 2-sample equal variance parameters resulted in a measurement of 0.00124. A T-test using 1-tailed, paired test parameters resulted in a measurement of 0.00847. (Centers for Disease Control and Prevention (CDC)., n.d.) These measurements support the conclusion that

adjusted drug poisoning death rates have increased despite the enactment of New Mexico's MAL.

Next, the data were graphed to determine whether drug poisoning death rates may have decreased for certain age groups despite an overall increase. Graphing the data depicts an unclear result for the 5 years before and after New Mexico's medical amnesty law was enacted. While drug poisoning deaths per 100,000 may have declined for some age ranges, death rates may have increased for other age ranges. However, data concerning female deaths for several years are missing, particularly for 2002, and also as follows: 35-39 year old females – 2007 data missing, 40-44 year old females - 2000 data missing, 45-49 year old females – 1999 and 2002 data missing; 50-54 year old females – 2003 and 2005 data missing.

An examination of the crude rate of deaths per age group indicates that drug poisoning deaths have continued to rise throughout the period studied for each of the following commonly studied age groups: 20-24 years, 25-29 years, 30-34 years, 35-39 years, 40-44 years, 45-49 years, 50-54 years, and 55-59 years (See Appendix, Graph 2).

New York

New York's Medical Amnesty Law went into effect on September 18, 2011. The age-adjusted death rates for the five years before and the five years after 2011 were as follows: before period (2006: 8.583147 ; 2007: 8.652867; 2008: 8.517334; 2009: 7.969664; 2010:

7.778711); and after period (2012: 10.35329; 2013: 11.21153; 2014: 11.22377; 2015: 13.55951; 2016: 17.86108). The age-adjusted death rate for 2011, the year New York's MAL was enacted (9.632934) was not included in any calculations. Comparing simple averages of the before period (8.300345) with the after period (12.84184) strongly suggests an increase in drug poisoning deaths despite enactment of New York's MAL. (See Table 8).

Table 8: Comparison of 5 year periods before and after enactment of New York MAL

New York Before 2011 – Drug Poisoning Deaths/100,000		New York After 2011 – Drug Poisoning Deaths/100,000	
2006	8.58	2012	10.35
2007	8.65	2013	11.21
2008	8.52	2014	11.22
2009	7.97	2015	13.56
2010	7.78	2016	17.86
Unweighted average of 5 years before 2011: 8.30		Unweighted average 5 years post-MAL: 12.84	

* Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC WISQRS, available at https://webappa.cdc.gov, downloaded 3/13/18. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

The probability that the variances of the five year before and after periods were not significantly different was measured. Levene's test for equal variances was rejected (p=0.0142). Thus, a one-tailed independent samples t-test was found to be statistically significant (p=0.0206). (Centers for Disease Control and Prevention (CDC), n.d.) These measurements support the conclusion that adjusted drug poisoning death rates have increased despite the enactment of New York's MAL. Finally, the data were graphed to determine whether drug poisoning death rates

may have decreased for certain age groups despite an overall increase. Graphing the data shows a clear increase for all age groups (20 – 59) from the 5 years before and after New York's medical amnesty law was enacted. (See Appendix, Figure 3).

Rhode Island

Rhode Island's Medical Amnesty Law went into effect on June 18, 2012. The measured age-adjusted rates of drug poisoning deaths for the five year periods before (2007-2011) and after (2013-2017) the statute's enactment date were as follows: before period (2007: 12.39; 2008: 17.32; 2009: 14.71; 2010: 15.68; 2011: 17.56); and after period (2013: 22.40; 2014: 23.51; 2015: 28.19; 2016: 30.90; 2017: 31.20). The age-adjusted death rate for 2012, the year Rhode Island's MAL was enacted (18.11) was not included in any calculations. Comparing simple averages of the before period (15.53) with the after period (27.24) strongly suggests an increase in drug poisoning deaths despite enactment of Rhode Island's MAL. See Table 9.

Table 9: Comparison of 5 year periods before and after enactment of medical amnesty law in Rhode Island

Rhode Island Before 2012 – Drug Poisoning Deaths/100,000		Rhode Island After 2012 – Drug Poisoning Deaths/100,000	
2007	12.39	2013	22.40
2008	17.32	2014	23.51
2009	14.71	2015	28.19
2010	15.68	2016	30.90
2011	17.56	2017	31.20
Unweighted average of five years before 2012: 15.53 One-tailed paired t-test: p= 0.00097		Unweighted average of five years after 2012: 27.24	

* Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC

WISQRS, available at https://webappa.cdc.gov, downloaded 3/19/19. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

Washington

Washington's Medical Amnesty Law went into effect on June 10, 2010. Age-adjusted rates of drug poisoning deaths for the five year periods before (2005-2009) and after (2011-2015) the statute's enactment date were measured. The age-adjusted death rates for these years were as follows: before period (2005: 12.96102; 2006: 13.54069; 2007: 14.3514; 2008: 14.72573; 2009: 14.34624); and after period (2011: 14.03146; 2012: 13.69048; 2013: 13.38226; 2014: 13.23332; 2015: 14.72154). The age-adjusted death rate for 2010, the year Washington's MAL was enacted (13.11901) was not included in any calculations. Comparing simple averages of the before period (13.98502) with the after period (13.81181) suggests that drug poisoning deaths did not increase following enactment of Washington's MAL. (See Table 10).

Table 10: Comparison of 5 year periods before and after enactment of medical amnesty law in Washington

Washington Before 2010 – Drug Poisoning Deaths/100,000		Washington After 2010 – Drug Poisoning Deaths/100,000	
2005	12.96	2011	14.03
2006	13.54	2012	13.69
2007	14.35	2013	13.38
2008	14.73	2014	13.23
2009	14.35	2015	14.72
Unweighted average of five years before 2010: 13.98		Unweighted average of five years after 2010: 13.81	

* Drug Poisoning Deaths and Rates per 100,000. All Races, Both Sexes, All Ages. International Classification of Diseases, Tenth Revision (ICD-10) Codes: X40-X44, X60-X64, X85, Y10-Y14. Source: CDC WISQRS, available at https://webappa.cdc.gov, downloaded 3/13/18. Age-adjusted Rate using 2000 as reference year, all races, both sexes, per 100,000 using the direct method.

Levene's test was not statistically significant, so the pooled variance estimate was used. The independent samples t-test comparing the means for the before period (2005 – 2009) and the after period (2011 – 2015) was not statistically significant (p= 0.6884). (Centers for Disease Control and Prevention (CDC)., n.d.) We failed to find a difference in poisoning death rates following enactment of Washington's MAL.

Next, the data were graphed to determine whether drug poisoning death rates may have decreased for certain age groups despite an overall increase. Graphing the data shows that drug poisoning deaths rates among some age groups increased while rates among other age groups decreased from the 5 years before and after Washington's medical amnesty law was enacted. (See Appendix, Figure 4).

As shown in Table 11, Washington is the only state that did not exhibit an increase in drug poisoning deaths when comparing the five-year period before enactment of a MAL with the five-year period after enactment of a MAL. Florida had a non-significant increase, but the remaining seven states had a statistically significant increase in drug poisoning deaths.

Table 11: Summary of 5 year periods before and after respective enactment of medical amnesty law in nine states

State	**Unweighted average of five years before MAL**	**Unweighted average of five years after MAL**	**Difference in 5-year average deaths per 100,000**	**t-test values**
Colorado	Unweighted average of five years before 2012: 14.61	Unweighted average of five years after 2012: 16.23	+1.62	One-tailed paired t-test: p= 0.02816
Connecticut	Unweighted average of five years before 2011: 11.09	Unweighted average of five years after 2011: 19.00	+7.91	One-tailed, paired t-test: p= 0.027
Florida	Unweighted average of five years before 2012: 16.00	Unweighted average of five years after 2012: 18.12	+2.12	One-tailed paired t-test: p= 0.237
Illinois	Unweighted average of five years before 2012: 10.33	Unweighted average of five years after 2012: 15.91	+5.58	One-tailed paired t-test: p= 0.0156
Massachusetts	Unweighted average of five years before 2012: 12.36	Unweighted average of five years after 2012: 25.01	+12.65	One-tailed paired t-test: p= 0.013
New Mexico	Unweighted average of five years before 2007: 18.90	Unweighted average of five years after 2007: 24.74	+5.84	One-tailed, paired t-test p= 0.00847
New York	Unweighted average of five years before 2011: 8.30	Unweighted average of five years after 2011: 12.84	+4.54	One-tailed, paired t- test: p=0.0206
Rhode Island	Unweighted average of five years before 2012: 15.53	Unweighted average of five years after 2012: 27.24	+11.71	One-tailed paired t-test: p= 0.00097

Washington	Unweighted average of five years before 2010: 13.98	Unweighted average of five years after 2010: 13.81	-0.17	Two-tailed paired t-test: p= 0.728

Washington – examination by age group

Because Washington appears to be the only one of the nine states that did not increase in drug poisoning deaths, further analysis by age group was conducted.

For the 20-24 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was not statistically significant (p= 0.674737).

For the 25-29 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was not statistically significant (p= 0.274035).

For the 30-34 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was not statistically significant (p=0.892222).

For the 35-39 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was not statistically significant (p= 0.621263).

For the 40-44 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was statistically significant (p=0.012275), *suggesting a significant decrease in poisoning deaths within this age group.*

For the 45-49 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was not statistically significant (p= 0.098647).

For the 50-54 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was not statistically significant (p= 0.540306).

For the 55-59 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was statistically significant (p= 0.010035), *suggesting a significant increase in poisoning deaths within this age group.*

For the 60-64 year age group, change from the before period (2005 – 2009) to the after period (2011 – 2015) was statistically significant (p= 0.010035), *suggesting a significant increase in poisoning deaths within this age group.*

Washington: Analysis by gender among age groups with significant change in drug poisoning deaths following enactment of MAL

40-44 year age group among gender: decrease among males accounts for the difference

Because a significant decrease in drug poisoning deaths occurred in the 40-44 year age group, further examination was conducted by gender. For the 40-44 year age group, among females, change comparing the before period (2005 – 2009) with the after period (2011 – 2015) was not statistically significant (p= 0.144291), *suggesting no significant change in poisoning deaths among females in this age group.*

For the 40-44 year age group, among males, change from the before period (2005 – 2009) to the after period (2011 – 2015) was statistically significant (p= 0.001665), *suggesting a significant decrease in poisoning deaths among males in this age group.*

55-59 year age group by gender: increase among males accounts for the difference

Because a significant increase in drug poisoning deaths occurred in the 55-59 year age group, further examination was conducted by gender. For the 55-59 year age group, among females, change from the before period (2005 – 2009) to the after period (2011 – 2015) was not statistically significant (p= 0.179089), *suggesting no significant increase in poisoning deaths among females in this age group.* For the 55-59 year age group, among males, change from the before period (2005 – 2009) to the after period (2011 – 2015) was statistically significant (p= 0.026662), *suggesting a significant increase in poisoning deaths among males in this age group.*

60-64 year age group by gender: an increase in both males and females

Because a significant decrease in drug poisoning deaths occurred in the 60-64 year age group, further examination was conducted by gender. For the 60-64 year age group, among females, change from the before period (2005 – 2009) to the after period (2011 – 2015) was statistically significant (p= 0.014287), *suggesting a significant increase in poisoning deaths among females in this age group.*

For the 60-64 year age group, among males, change from four years of the before period (2006 – 2009) with four years of the after period (2011 – 2014) was statistically significant (p= 0.000545), *suggesting a significant increase in poisoning deaths among males in this age group.* Missing data for age groups 65 and older makes continuing this analysis difficult for these important age groups.

Regression Equation

A regression model was fitted to explore associations between potential independent variables and the dependent variable of age-adjusted rates of drug poisoning deaths for the five year period before and after the enactment date of each respective state's medical amnesty law. The null hypothesis is that drug poisoning deaths have not improved in the five-years following passage of MALs. Data for all nine states were included in the model together to increase statistical power.

This analysis is limited by design to the five-year time periods before and after each state's respective MAL passage year. The theory is that the influence of a MAL on a population's behavior may require several years to take effect. Some states had a large amount of missing data for certain age groups, especially among age-groups younger than 30 and older than 59. Particularly, females were underrepresented disproportionately among some age groups in New Mexico. See Appendix, Figure 1 (Connecticut), Figure 2 (New Mexico), and Figure 3 (New York and Washington) for missing data breakdown by age-group and gender. Rhode Island had missing data for numerous age groups among numerous years.

Thus, regression analysis was run on age groups spanning 30 – 59 for all nine states to optimize available data. Restricting the regression analysis to the 30 – 59 age range allows the model to include 100% of the necessary data for Colorado, Florida, Illinois, Massachusetts, New York, Washington, and 100% of the data for males in all years in Connecticut, and 100% of data

for 6 of 10 years for females in Connecticut. For New Mexico, data for males was present in 9 out of 10 years and for 7 out of 10 years for females. Rhode Island was plagued with missing data, especially among females. Data was missing for females in the 30-34 and 40-44 age groups for 8 out of 10 years, for the 35-39 age group for 9 out of 10 years, for the 55-59 age group in 5 out of 10 years, and for the 45-49 and 50-54 age groups for 2 out of 10 years. Among males, data was missing for the 30-34 year age group for 4 out of 10 years, for the 35-39 year age group for 2 out of 10 years, and for the 55-59 year age group, for 1 out of 10 years. See Appendix, Exhibit 5.

The Poisson distribution is characterized by count data collected in a well-defined time interval which is the same for each individual. (Hayat & Higgins, 2014) Histograms of drug poisoning deaths among all nine states are displayed in Appendix Figures 4 and 5.

Based upon available data, a generalized linear model with a Poisson distribution and log link function were fitted as follows:

$$\ln(\mu) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k$$

ln (Deaths) = Bo + B1 (Sex) + B2 (Age Group) + B3 (State) + B4 (Year) + B5 (MAL) + B6 (Sex * Age Group) + B7(State * MAL) + B8 (Sex*MAL) + B9 Age_Group*MAL

Offset: ln (population)

Variables are as follows:

“Deaths” = drug poisoning deaths;

"Sex" = gender (males/females);

"Age Group" = Age Groups (30-34, 35-39, 40-44, 45-49, 50-54, 55-59);

"Year" = class variable (2002 – 2017)

"State" = Colorado, Connecticut, Florida, Illinois, Massachusetts, New Mexico, New York, Rhode Island, Washington;

"MAL" = 0 (before period), 1 (after period);

"Sex * Age Group" = interaction between Sex and Age Group;

"State*MAL" = interaction between State and MAL;

"Sex*MAL" = interaction between Sex and MAL;

N = 1025.

The null hypothesis is that there is no association between the passage of a medical amnesty law and drug poisoning deaths. In other words, that drug poisoning deaths have not decreased but, rather, have either remained the same or increased in the five years following enactment of a MAL among those nine states.

H_0: Drug poisoning deaths after 5 years >= drug poisoning deaths before 5 years

H_A: Drug poisoning deaths after 5 years < drug poisoning deaths before 5 years

The model explores the relationship between counts of age-adjusted deaths (dependent variable) and covariates, including Sex, Age Group, State, Year (as a class variable), MAL (5 years before and 5 years after), and interaction terms between Sex and Age Group, State and MAL, Sex and MAL, and Age Group and MAL. An offset on population was included in the model to treat population changes as a rate.

The theory supporting the interaction between Sex and Age Group is that males and females probably have drug poisoning deaths that differ at different age ranges. The theory supporting the interaction between State and MAL is that differences may exist between states and their respective MALs as they relate to drug poisoning deaths. The theory supporting the interaction between Sex and MAL is that male and females within the same age-group may respond differently to the presence or absence of a MAL. The theory supporting the interaction between Age Group and MAL is that people of different age groups may respond differently to the presence or absence of a MAL. Calculations were preformed using SAS 9.4.

In assessing the goodness of fit of the model, the scaled deviance and scaled Pearson chi-square statistics are considered. Values closer to one (1) signify a better model. Here, the scaled deviance value is 0.9850, indicating a good fit. (Hayat & Higgins, 2014) The lower-is-best AIC value (9070.7235) is lower than all other models tested, further signifying a good fit to the data. Results displayed in Appendix, Figure 6.

As shown by the summary statistics in the Appendix, Figure 7, all variables and interaction terms are significant predictors in the model. Full results for the model are shown in the Appendix, Figure 8.

Discussion

MALs are designed to help decrease, not increase, drug poisoning deaths by encouraging calls for professional assistance during overdose events. Rather, this research suggests that MALs might have largely failed to carry the intended effect, or that other factors have overpowered any effect that MALs have carried. Indeed, state legislatures may enact MALs because of growing drug poisoning deaths brought about by extraneous factors. The positive association between a MAL and increasing drug poisoning deaths is likely an artifact of other factors that influence drug poisoning deaths.

Effect moderation

The following statistics are reproduced from the full results, shown in the Appendix, in Figure 8:

Analysis of Maximum Likelihood Parameter Estimates

	Estimate	Standard Error	95% Confidence Limits		Wald Chi-Square	Pr>ChiSq
Females	-0.4903	0.0350	-0.5589	-0.4217	196.26	<.0001
Males	0.0000	0.0000	0.0000	0.0000	.	.

Sex*MAL (Females/0)	0.1003	0.0264	0.0486	0.1520	14.47	0.0001
Sex*MAL (Females/1)	0.0000	0.0000	0.0000	0.0000	.	.
Sex*MAL (Males/0)	0.0000	0.0000	0.0000	0.0000	.	.
Sex*MAL (Males/1)	0.0000	0.0000	0.0000	0.0000	.	.

These results suggest that, generally, females have lower drug poisoning deaths than males. The interaction between Sex and MAL, suggests that MALs may have a protective effect for females, but not for males. Other comparisons from the full results in the Appendix, Figure 8 seem evident: drug poisoning deaths vary among Age Group and also among States. The trend of increasing drug poisoning deaths is reflected by different values of the variable Year. The Sex by Age Group interaction demonstrates that females and males of different age groups carry different drug poisoning death rates. Differences in interactions between State and MAL indicate a moderation effect, such that the presence of a MAL carries a different effect among the different states involved in this analysis. Interactions between Age Group and MAL indicate that different age groups may respond differently to the presence or absence of a MAL.

Missing Data

Rhode Island was particularly impacted by missing data. Among females aged 30-34 and 40-44, data were missing for 8 out of 10 of the relevant years (2007 – 2011, 2013 – 2017).

Among females aged 35-39, data were missing for 9 out of 10 years. Among females aged 45-49 and 50-54, data were missing 2 out of 10 years. Among females aged 55-59, data were missing for 5 out of the relevant 10 years. Male age ranges were remarkable more complete, with the following results: 30-34 (missing 4 out of 10 years, 35-39 (missing 2 out of 10 years), and 55-59 (missing 1 out of 10 years). These results are shown in the Appendix, Exhibit 5.

Washington is the only state of the four examined that has not had a significant increase, or non-significant decrease or a non-significant indication of no change in drug-related poisoning deaths within the 5 years following passage of a Medical Amnesty Law. A closer look reveals that no significant change occurred between the two five-year spans for each of the following age groups: 20-24, 25-29, 30-34, 35-39, 45-49, and 50-54. Missing data for age groups 65 and older hampers continuing this analysis for these important age groups.

Comparison of MAL features among the nine states

Washington outperforms the other states concerning drug poisoning deaths. Could this distinction be explained by differences in legal language among MALs in the nine states? Is it possible that Washington's MAL is different enough from MALs in the other states that overdose victims and witnesses are more likely to contact authorities during overdose events? Using the rubric described in the first paper in this dissertation, common features among MALs

in the four states are compared (See Appendix, Figures 9a and 9b, for Features of Medical Amnesty Laws from Nine States).

Essentially, no significant differences exist among the nine states in who receives immunity from prosecution under the respective Medical Amnesty Laws. In Colorado, Connecticut, New York, and Rhode Island, both drug or alcohol overdoses are included in statutory provisions, while only drug overdoses are contemplated in Florida, Illinois, Massachusetts, New Mexico and Washington. Colorado, Connecticut, New York, and Rhode Island allow for immunity concerning drug paraphernalia charges, and in none of the nine states will immunity provisions be granted for civil asset forfeiture proceedings. In all states but Rhode Island, no immunity provision exists for those on court supervision, such as probation or parole. Thus, no state stands apart from the others in terms of legal protections on these characteristics, except for Rhode Island's grant of immunity for those on court supervision. This provision should tend to have more of an encouraging effect on witnesses to overdose to contact authorities. See Appendix, Figure 9a.

No provisions exist to allow the use of evidence of overdose as mitigation at a sentencing hearing if full amnesty is not granted among the nine states, except for Massachusetts, New Mexico, and Rhode Island. All nine states require evidence from the overdose event to exist for immunity to be provided. None of the four states convey immunity for distribution crimes related to drugs or alcohol, except for Colorado (drug only) and New York. Only Colorado imposes specific requirements to receive immunity, such as providing a name or other

identifying information to a police officer on scene. Only Colorado, Illinois, and New York provide a definition of "overdose" within the statutory language of its Medical Amnesty Law. MALs from all nine states except Florida, Illinois, and Rhode Island make references to other statutes. In short, no significant differences in statutory language among MALs from the nine states examined seem to provide adequate explanation for Washington's lack of a significant increase in drug poisoning deaths. See Appendix, Figure 9b.

Perhaps citizens of Washington are more aware of that state's MAL, understand the parameters of legal protections against prosecution, and thus are more inclined to contact authorities during overdose events. According to the University of Washington, Alcohol and Drug Abuse Institute, Washington held a press conference when their "Good Samaritan Law" took effect. Thereafter, radio public service announcements included messages from the state's Attorney General, the medical director of the Washington Poison Center, and the parent of a teen-ager who died of an opiate overdose. References are made to the educational website http://stopoverdose.org, explaining the law. Informational wallet cards have been distributed at needle exchange programs and at other venues, and posters have been displayed about the law at drug treatment programs. Links to the website have also been included on other websites and on educational materials such as those distributed with opiate prescriptions. Ongoing media reports of drug overdoses occasionally refer to the website. Whether these efforts are significantly different from strategies in other states could be the subject of future study.

Limitations and Future Research

Because correlation does not mean causation, the significance of MAL as a predictor of drug poisoning deaths in the regression model does not mean that medical amnesty laws have exerted an effect of increasing drug poisoning deaths. In fact, drug poisoning rates might be higher within any given state but for the medical amnesty laws that exist. Medical amnesty laws may have carried the intended effect of encouraging bystanders to contact authorities during overdose events. Many other factors play a part in statistics related to drug poisoning deaths that the overall trends exhibited may simply outweigh any improvement effect on MALs. Many potential variables likely affect drug poisoning deaths that could affect the results of this study or nullify the effect of a MAL. This model is based upon drug poisoning deaths, while a more direct measure of a MALs efficacy may include comparing yearly calls to 9-1-1 emergency centers, or annual requests for assistance at hospital emergency departments. Qualitative studies may help delineate the thought process of what occurs among those at or near the site of an overdose. Further, the quantity of missing data available limits this study to the 30-59 age range. Possibly, younger or older age groups may respond differently to the presence or absence of MALs that the age groups studied here.

Conclusion

The association between the enactment of Medical Amnesty Laws and increasing or decreasing drug poisoning deaths does not mean that such laws either caused or prevented such

deaths. More investigation is warranted to explain these differences. This paper explored certain distinguishing features in MALs among these nine states and how the enactment of policies and informational campaigns in Washington may have led to greater success in combatting drug poisoning deaths. Some limitations, however, may skew the data in favor of reporting overdose deaths in more populous jurisdictions. (Centers for Disease Control and Prevention, National Centers for Injury Prevention and Control. (CDC). 2005) Importantly, this research is consistent with other research that suggests that members of the population may be unaware of legislation designed to encourage calls for professional assistance during overdose events.

Appendix – Chapter 3 – Comparison of Drug Poisoning Death Rates in Nine States with a Medical Amnesty Law

Exhibit 1 - States with Medical Amnesty Laws enacted prior to 2012

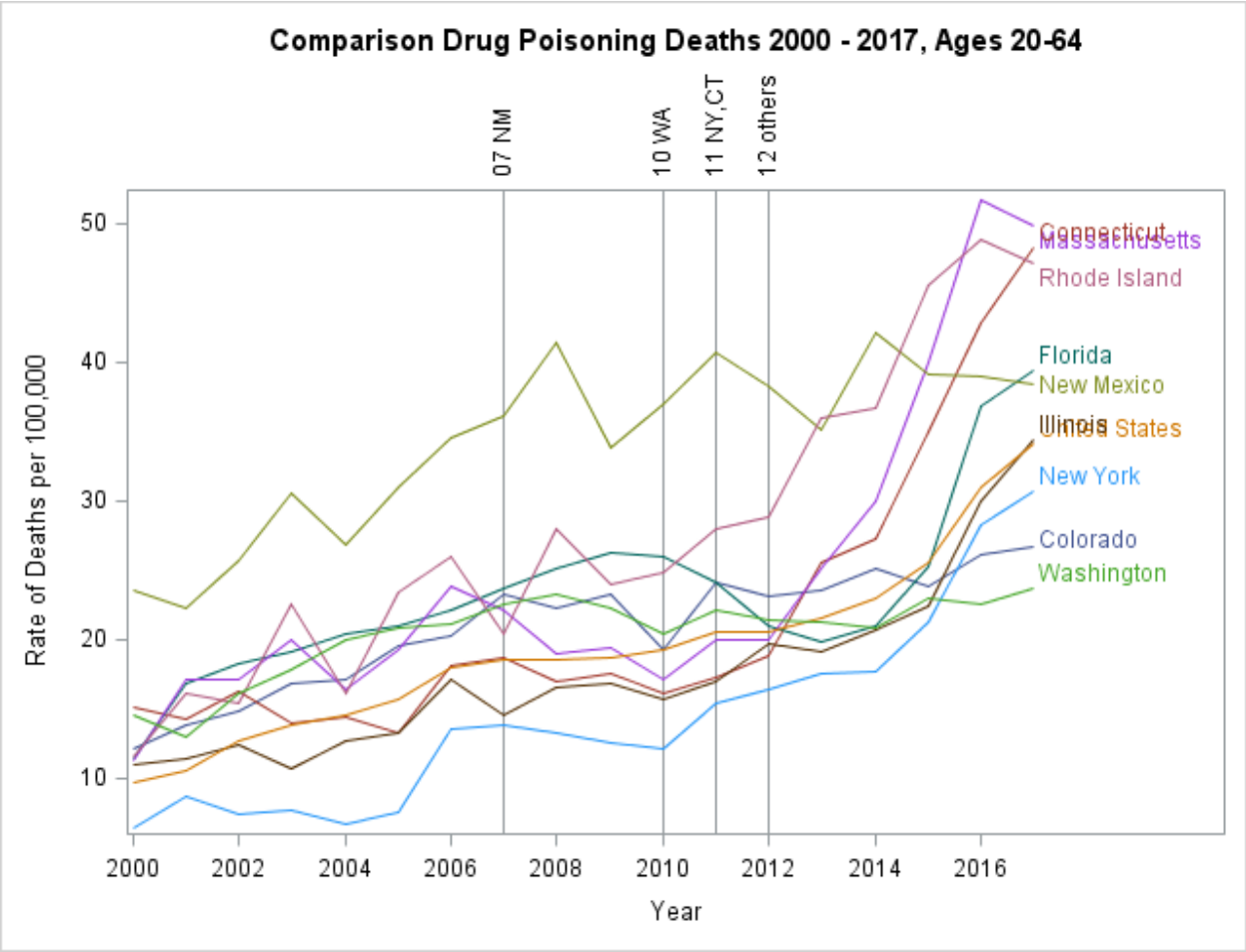
State	**Effective Date of MAL** **Source: Rees, et al.**
Colorado	May 29, 2012
Connecticut	October 1, 2011
Florida	October 1, 2012
Illinois	June 1, 2012
Massachusetts	August 2, 2012
New Mexico	June 15, 2017
New York	September 18, 2011
Rhode Island	June 18, 2012
Washington	June 10, 2010

Exhibit 2 - Drug Poisoning Rates for 2000 – 2017 for 9 states and the U.S.

	Drug Poisoning Deaths 2000-2017	Population Total for 2000-2017	Crude Rate
United States	**637,886**	**3,272,940,342**	**19.49**
Colorado	11,598	54,950,592	21.11
Connecticut	8,262	38,031,828	21.72
Florida	45,841	194,403,714	23.58
Illinois	24,044	137,012,529	17.55
Massachusetts	17,724	71,972,414	24.63
New Mexico	7,185	20,864,629	34.44
New York	30,470	211,904,756	14.38
Rhode Island	3,184	11,463,902	27.77
Washington	14,893	72,583,457	20.52

Source: CDC – WISQARS, downloaded 3/2/19

Exhibit 3 - Comparison of Drug Poisoning Deaths for U.S. and Nine States for Age Ranges 20-64, and Years 2000 - 2017



Source: CDC WISQARS, downloaded 3/2/19. All Intents, drug poisoning, 2007-2017, no metro indicator, all races, both sexes, age groups 30-59, standard year: 2000.

Exhibit 4 - Nationwide Non-fatal Drug Poisoning Rates per 100,000 – 2007 to 2017

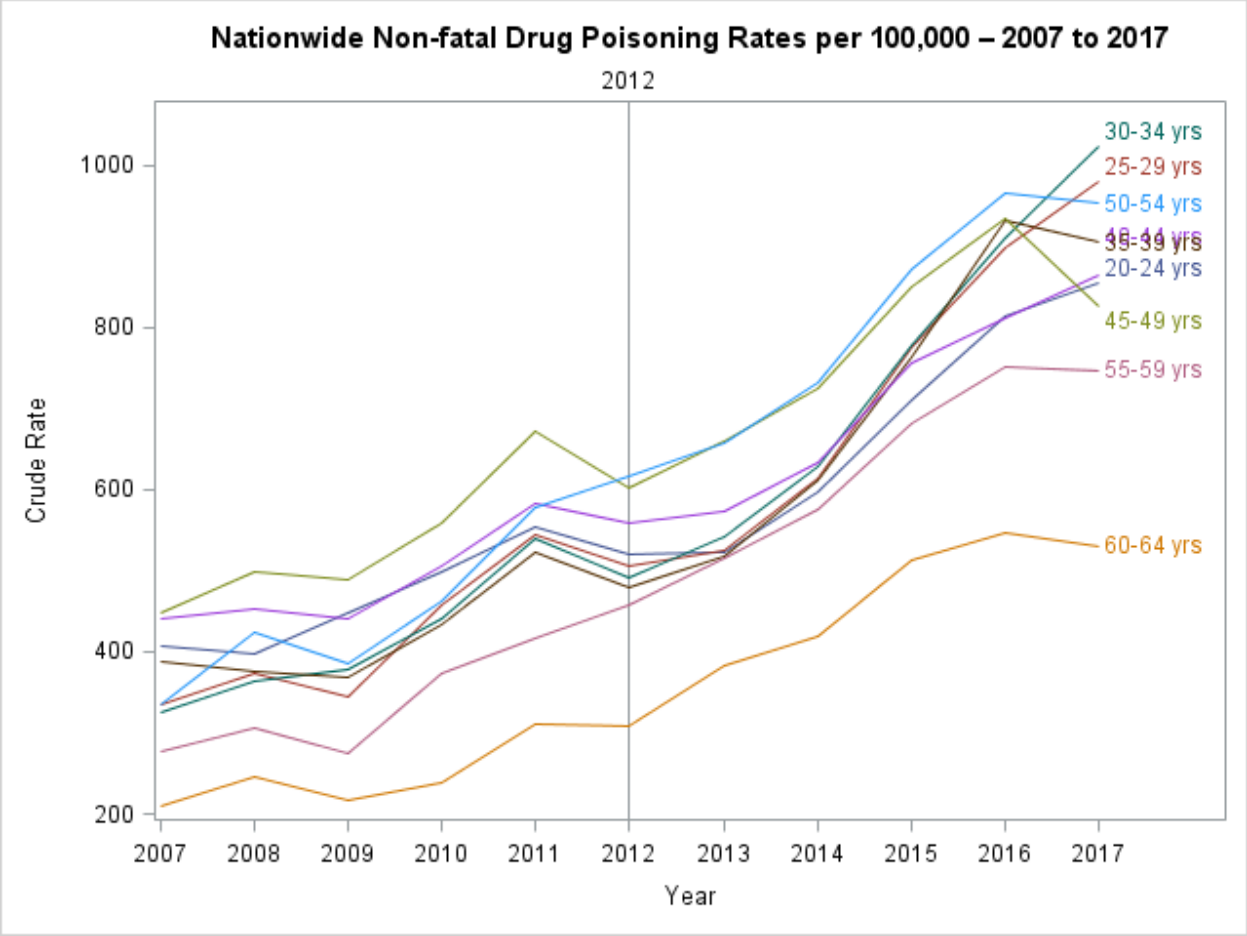


Exhibit 5 – Missing Data for States Examined

CONNECTICUT
MAL year: 2011
Years examined: 2006-2010/2012-2016

Connecticut Gender/Age groups with missing data by year			Percentage of total population missing for indicated year for ages 30-59
Females	30-34	2006, 2009, 2010	2006: 105,250/780,869 = 0.135 2009: 103,752/772,284 = 0.134 2010: 104,194/770,777 = 0.135
Females	35-39	2006	2006: 129,584/780,869 = 0.166
Females	55-59	2006, 2007	2006: 117,843/780,869 =0.151 2007: 115,579/774,753 = 0.149

NEW MEXICO
MAL year: 2007
Years examined: 2002-2006/2008-2012

New Mexico Gender/Age groups with missing data by year			Percentage of total population missing for indicated year for ages 30-59
Females	30-34	2002	2002: 59,123/381,770 = 0.155
Females	35-39	2007	2007: 62,626/402,612 = 0.156
Females	45-49	2002	2002: 70,018/381,770 = 0.183
Females	50-54	2002	2002: 63,464/381,770 = 0.166
Males	55-59	2002	2002: 47,949/367,805 = 0.130
Females	55-59	2002, 2003, 2005	2002: 50,849/381,770 = 0.133 2003: 53,746/384,992 = 0.139 2005: 60,828/394,094 = 0.154

RHODE ISLAND
MAL year: 2012
Years examined: 2007-2011/2013-2017

Rhode Island Gender/Age groups with missing data by year			Percentage of total population missing for indicated year for ages 30-59
Females	30-34	2007, 2008, 2009, 2010, 2013, 2014, 2015, 2016	MISSING 8 OUT OF 10 YEARS
Females	35-39	2007, 2008, 2009, 2010, 2011, 2013, 2014, 2015, 2016	MISSING 9 OUT OF 10 YEARS
Females	40-44	2007, 2009, 2010, 2011, 2013, 2014, 2015, 2016	MISSING 8 OUT OF 10 YEARS
Females	45-49	2007, 2015	MISSING 2 OUT OF 10 YEARS
Females	50-54	2007, 2014	MISSING 2 OUT OF 10 YEARS
Females	55-59	2007, 2008, 2009, 2010, 2011	MISSING 5 OUT OF 10 YEARS
Males	30-34	2007, 2009, 2010, 2011	MISSING 4 OUT OF 10 YEARS
Males	35-39	2009, 2011	MISSING 2 OUT OF 10 YEARS
Males	55-59	2007	MISSING 1 OUT OF 10 YEARS

NEW YORK
MAL year: 2011
Years examined: 2006-2010/2012-2016

NO DATA MISSING FOR THESE YEARS AND 30-59 AGE GROUPS FOR MALES AND FEMALES

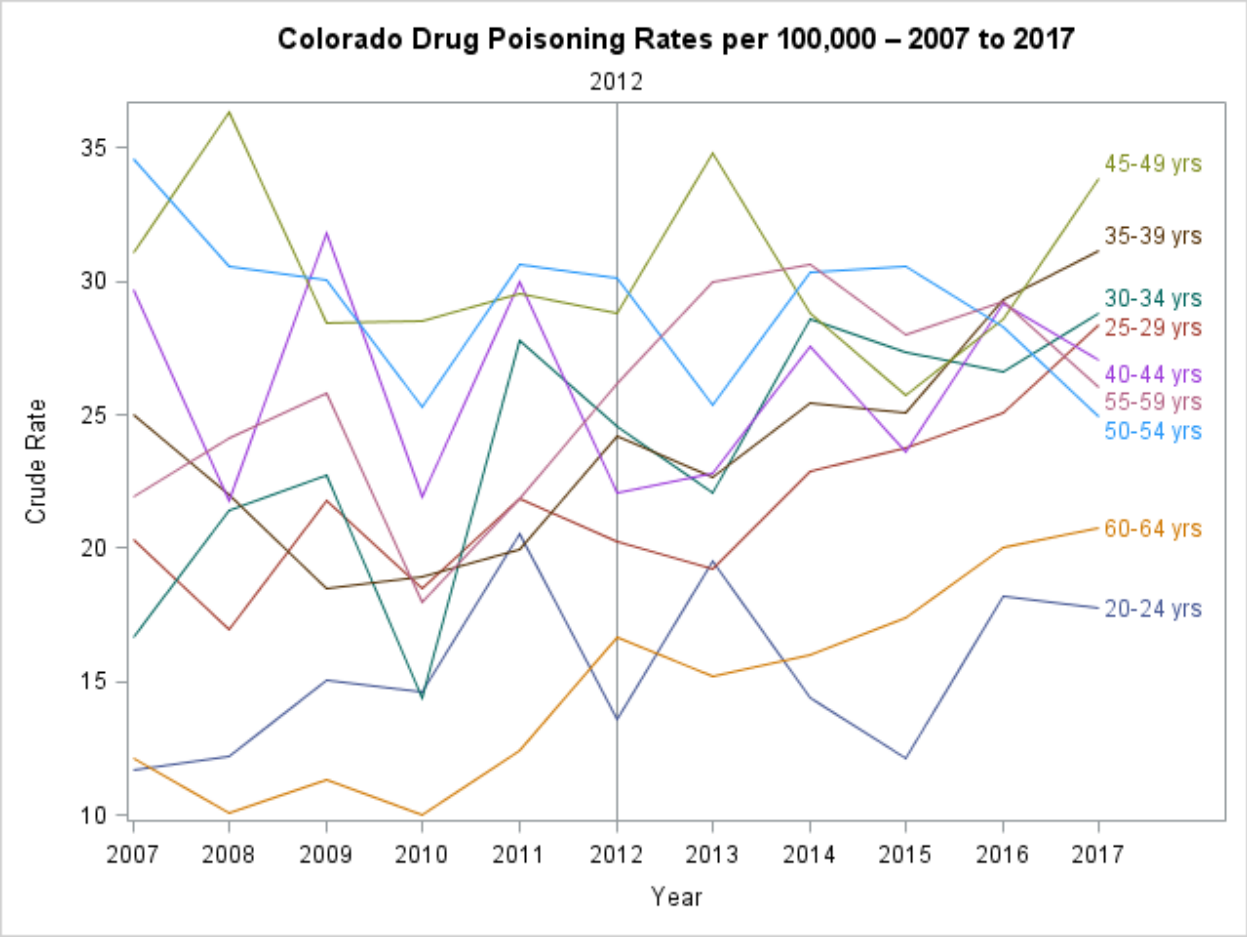
WASHINGTON
MAL year: 2010
Years examined: 2005-2009/2011-2015

NO DATA MISSING FOR THESE YEARS AND 30-59 AGE GROUPS FOR MALES AND FEMALES

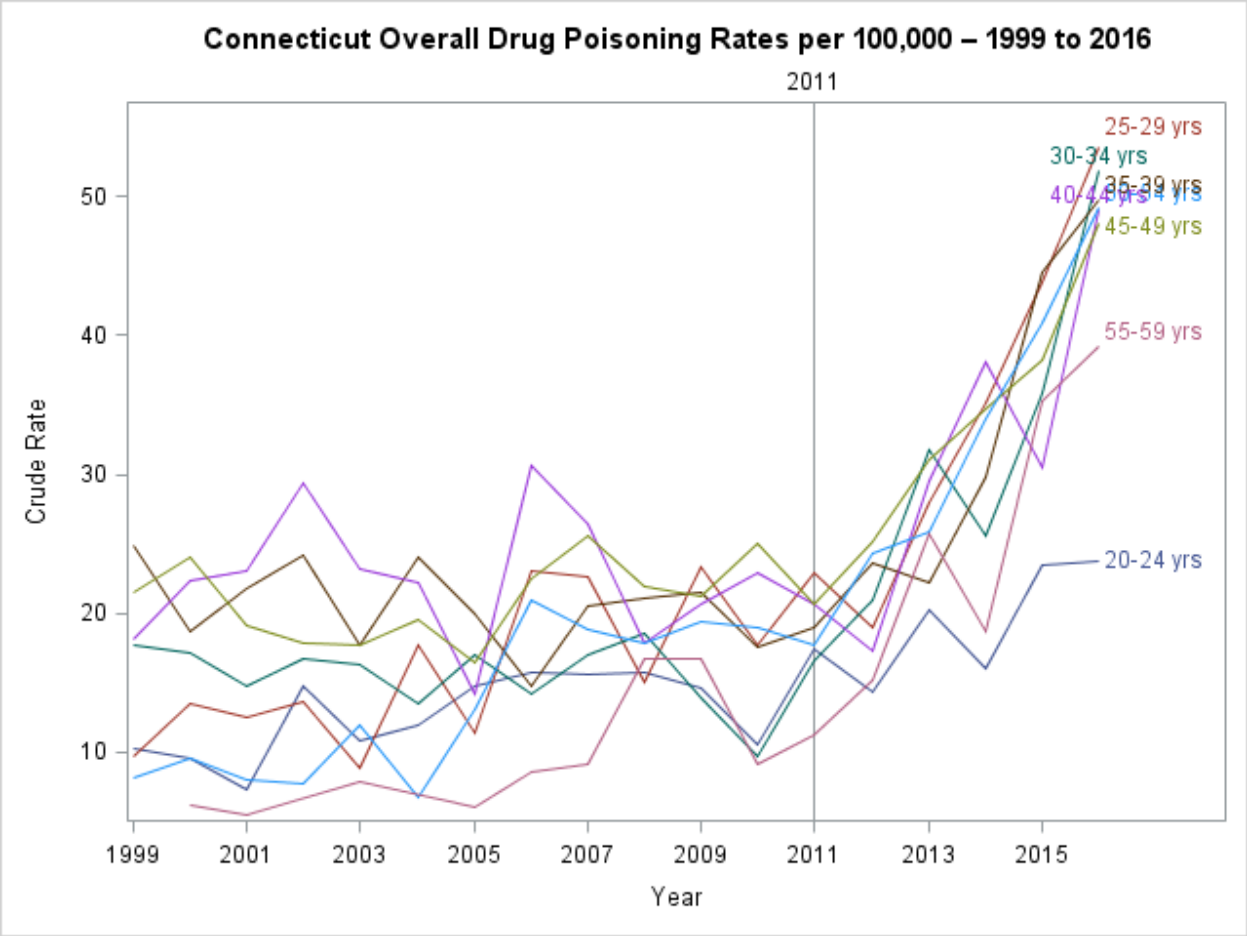
COLORADO, FLORIDA, ILLINOIS, MASSACHUSETTS
MAL year: 2012
Years examined: 2007-2011/2013-2017

NO DATA MISSING FOR THESE YEARS AND 30-59 AGE GROUPS FOR MALES AND FEMALES

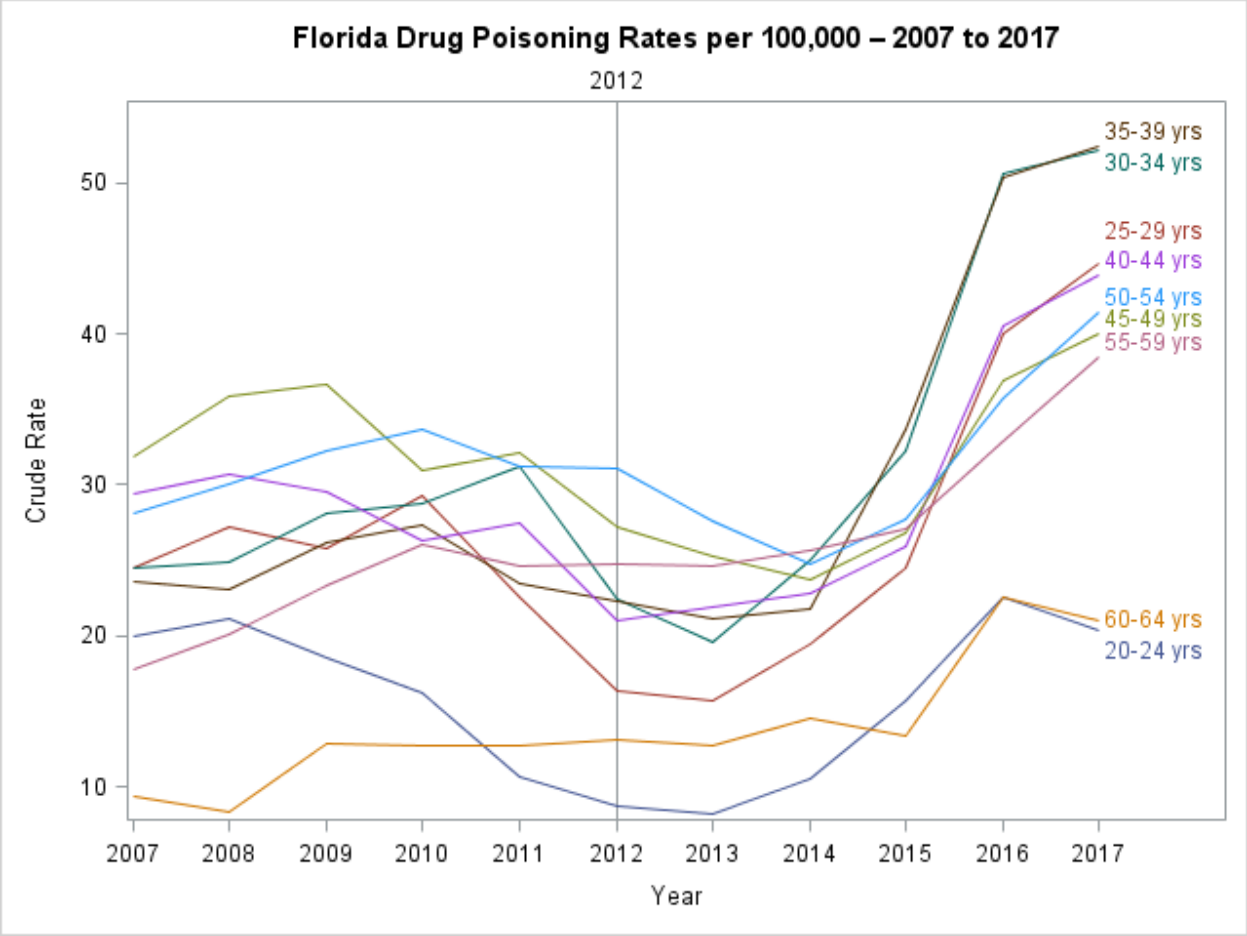
Graph 1 - Colorado



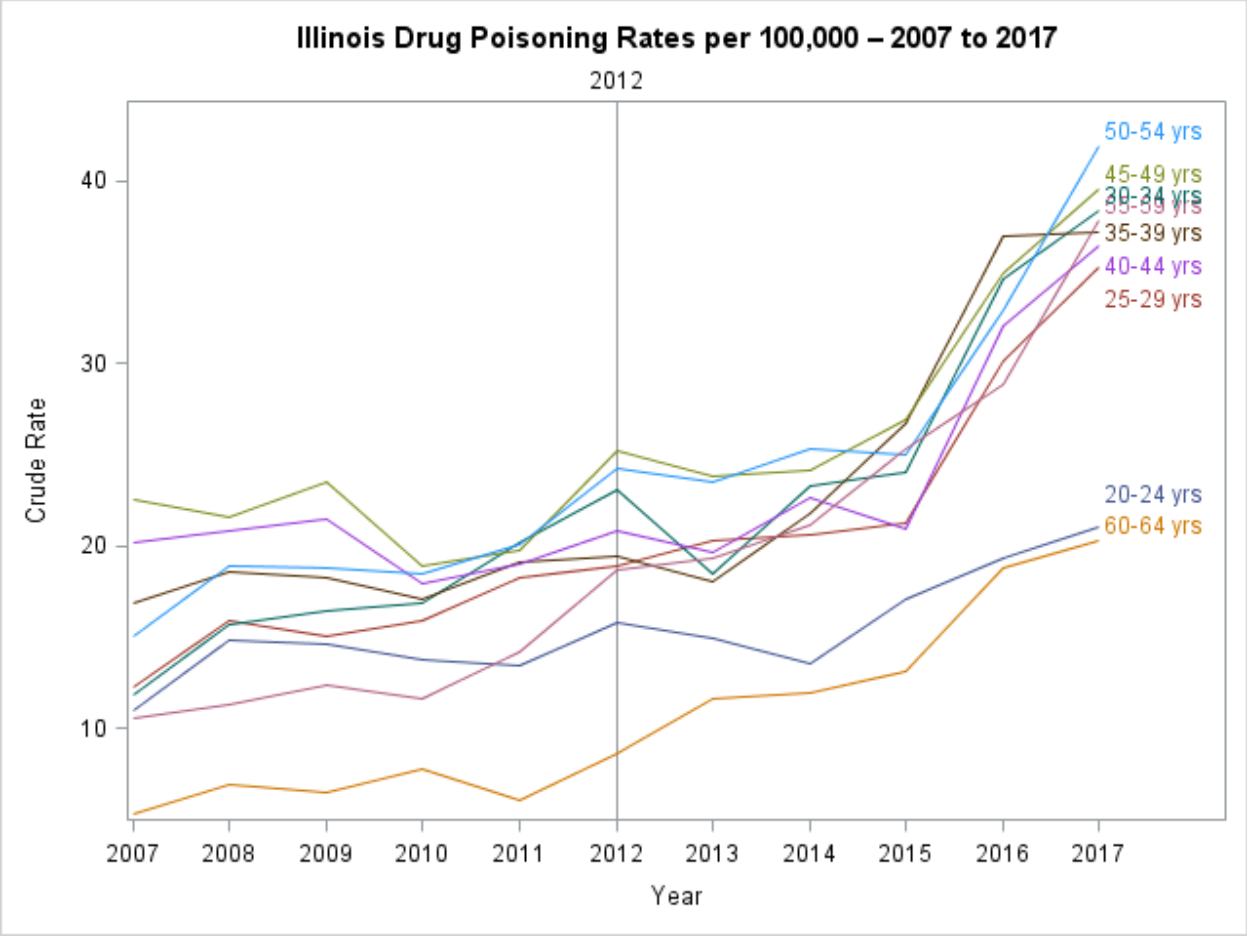
Graph 2 – Connecticut



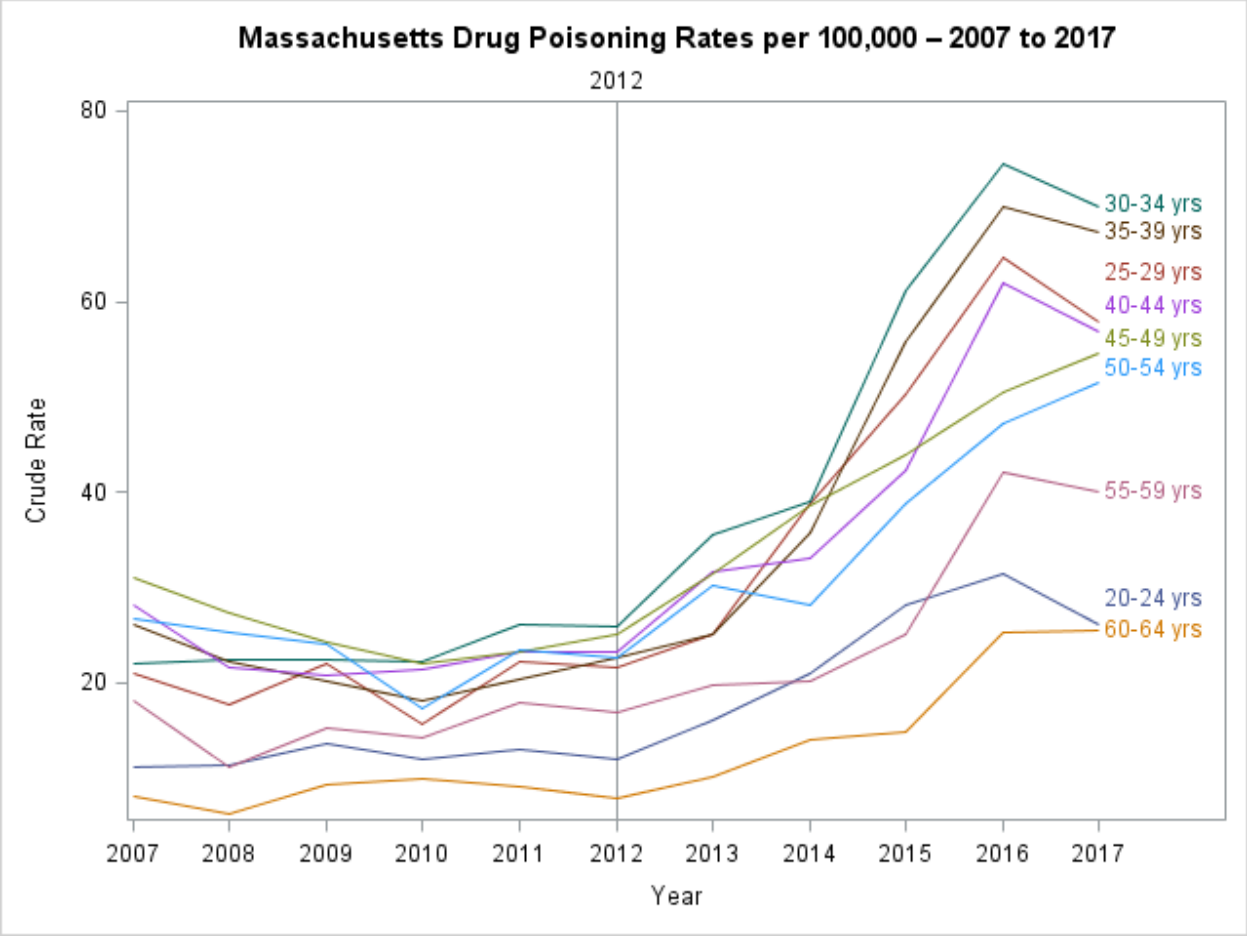
Graph 3 – Florida



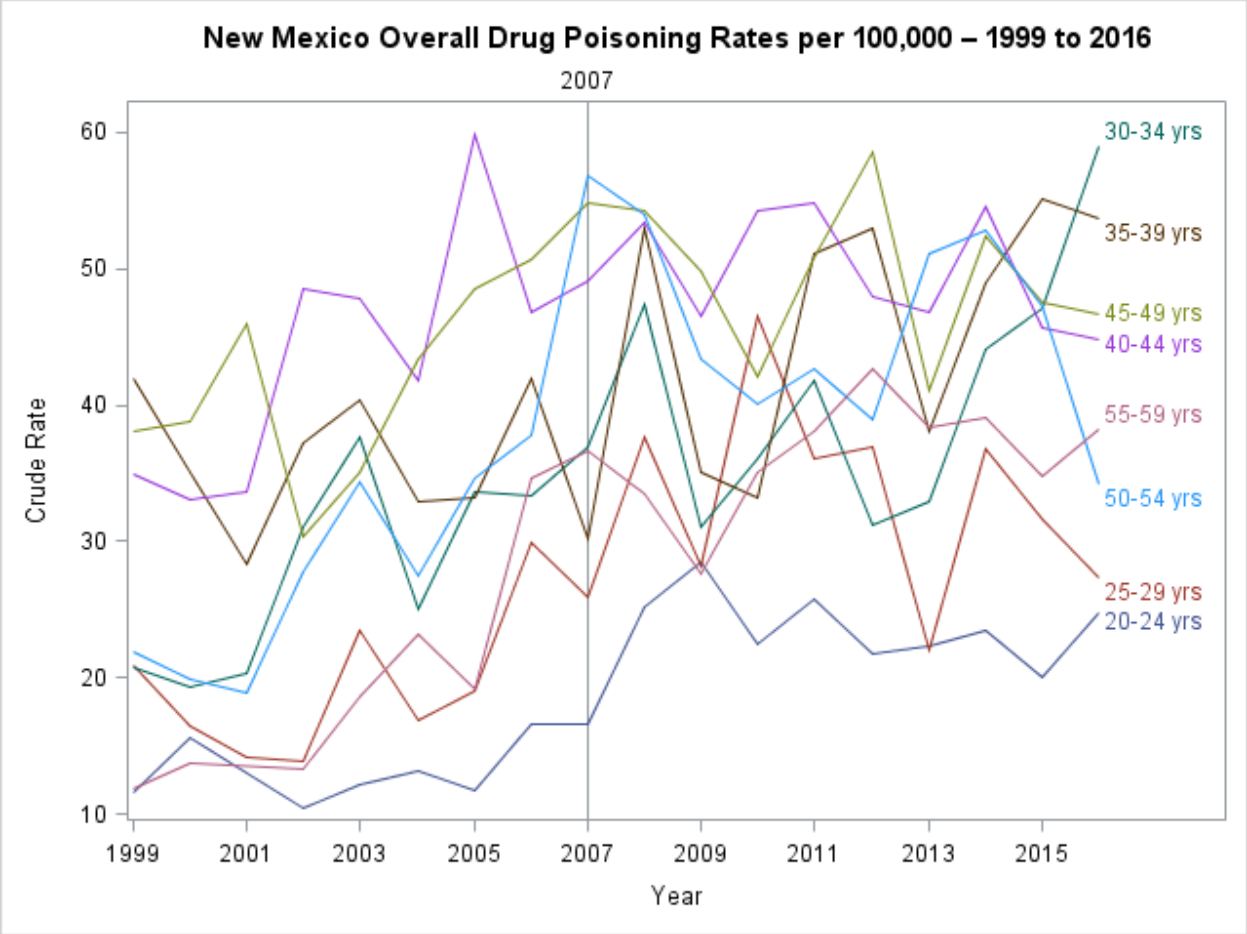
Graph 4 – Illinois



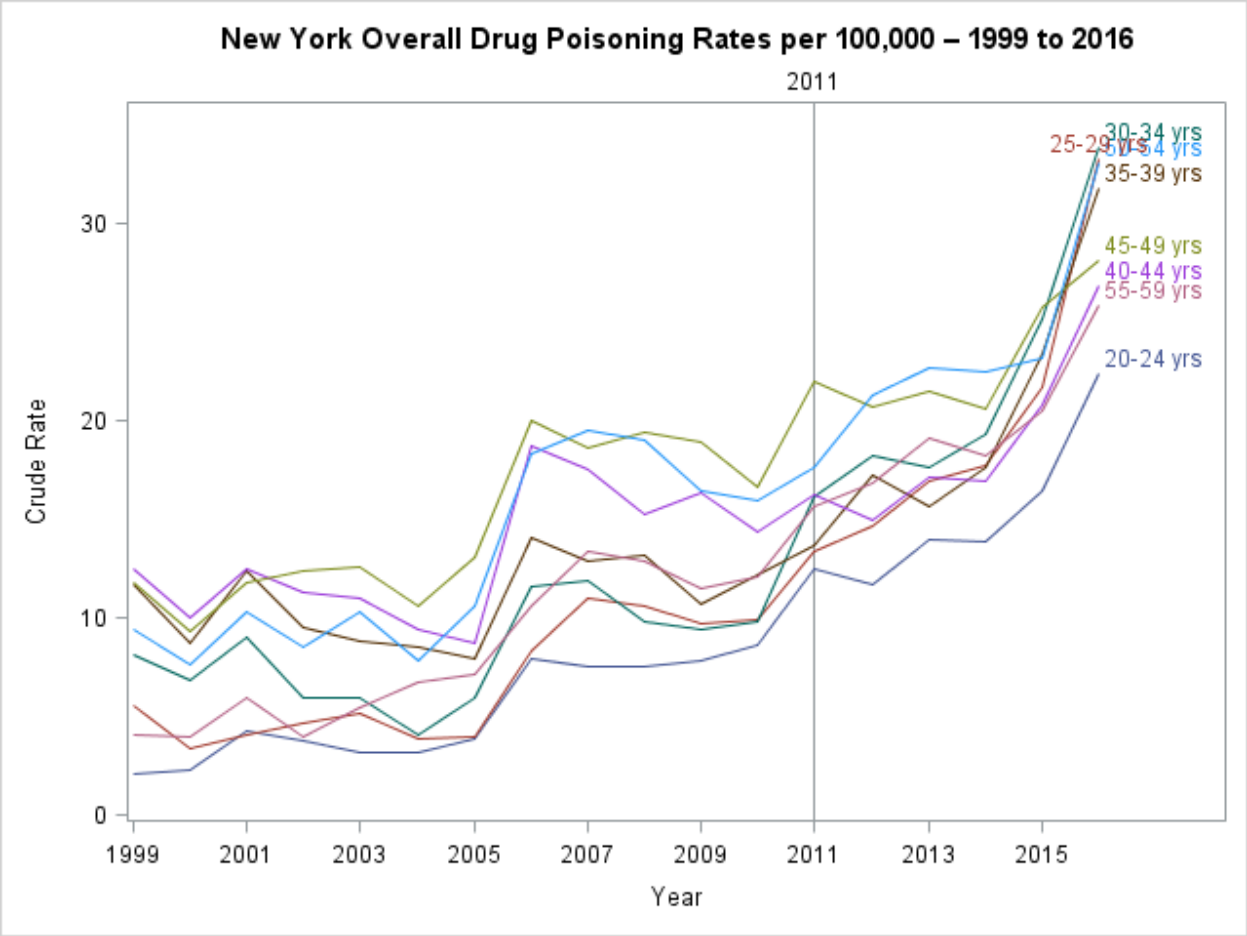
Graph 5 – Massachusetts



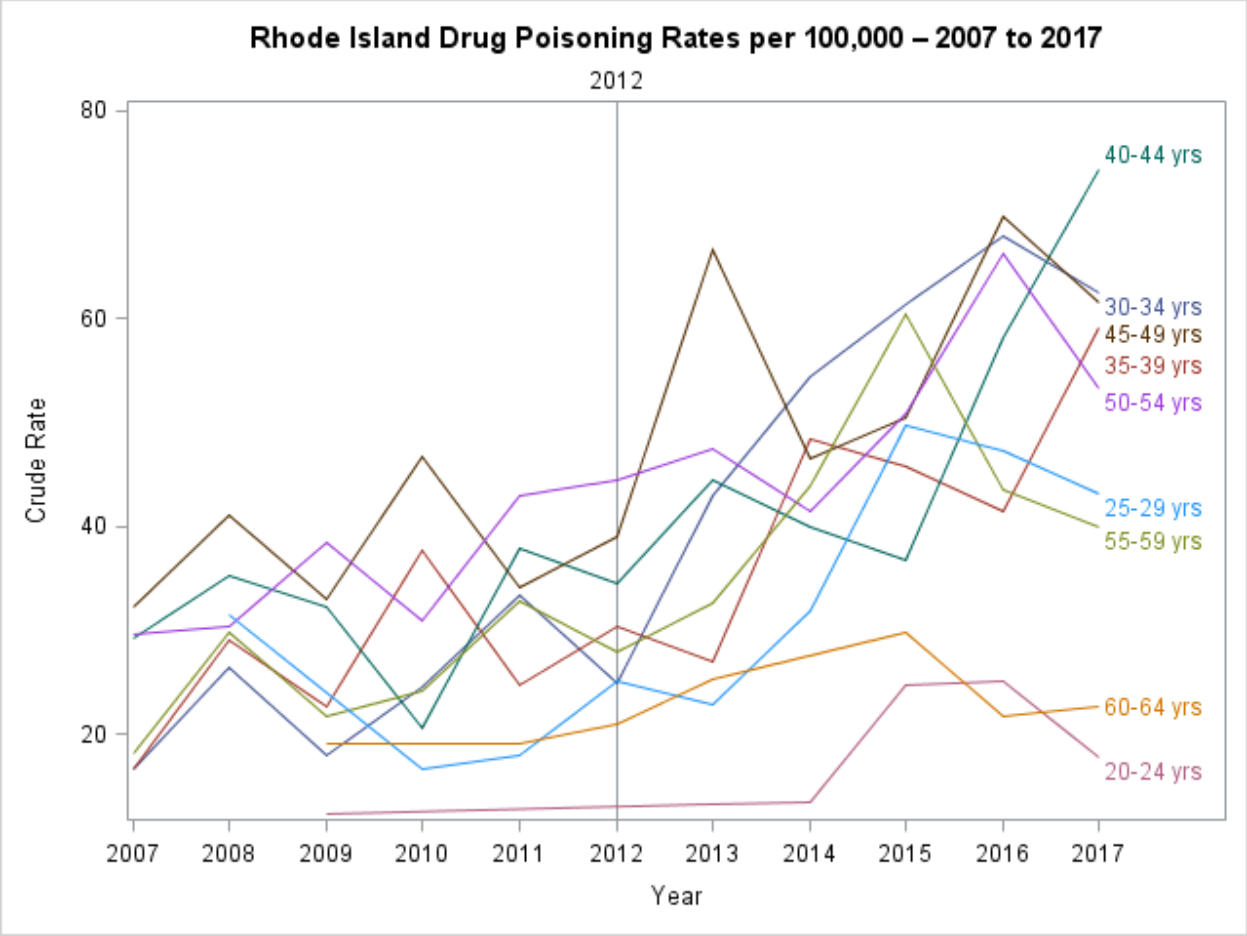
Graph 6 – New Mexico



Graph 7 – New York



Graph 8 – Rhode Island



Note missing data limitation

Graph 9 – Washington

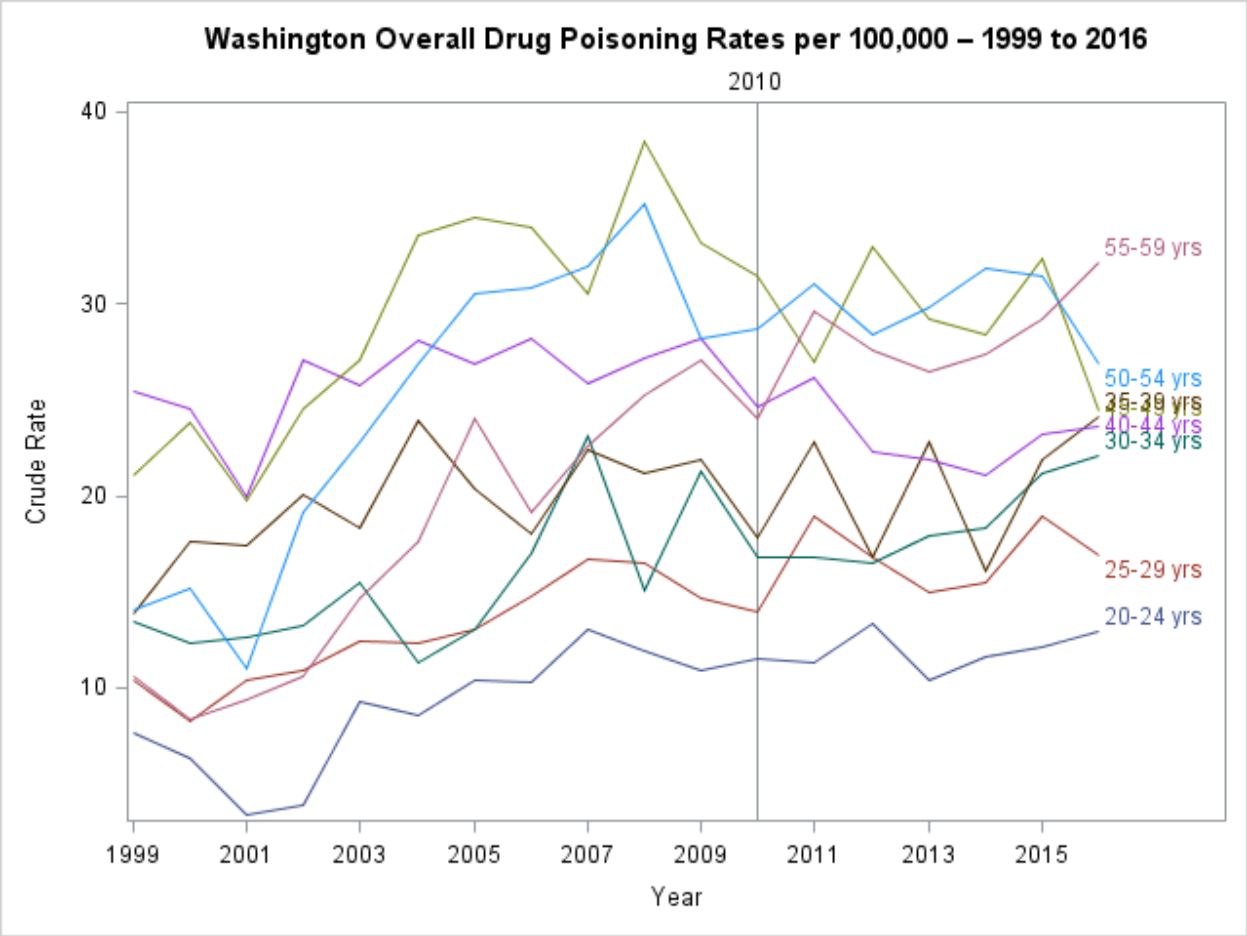


Figure 1 - Available data for 30 – 59 age group in Connecticut

Connecticut – available data for 30 - 59 age groups (MAL = 2011)

Year	Males	Females
2006	100%	54.8 %
2007	100%	85.1 %
2008	100%	100 %
2009	100%	86.6 %
2010	100%	86.5 %
2012	100%	100 %
2013	100%	100 %
2014	100%	100 %
2015	100%	100 %
2016	100%	100 %

Figure 2 - Available data for 30 – 59 age group in New Mexico

New Mexico – available data for 30 - 59 age groups (MAL = 2007)

Year	Males	Females
2002	87.0 %	36.3 %
2003	100%	86.1 %
2004	100%	100 %
2005	100%	84.6 %
2006	100%	100 %
2008	100%	100 %
2009	100%	100 %
2010	100%	100 %
2011	100%	100 %
2012	100%	100 %

Figure 3 - Available data for 30 – 59 age group in New York and Washington

Figure 4 – Distribution of Drug Poisoning Deaths for Nine states show a Poisson distribution

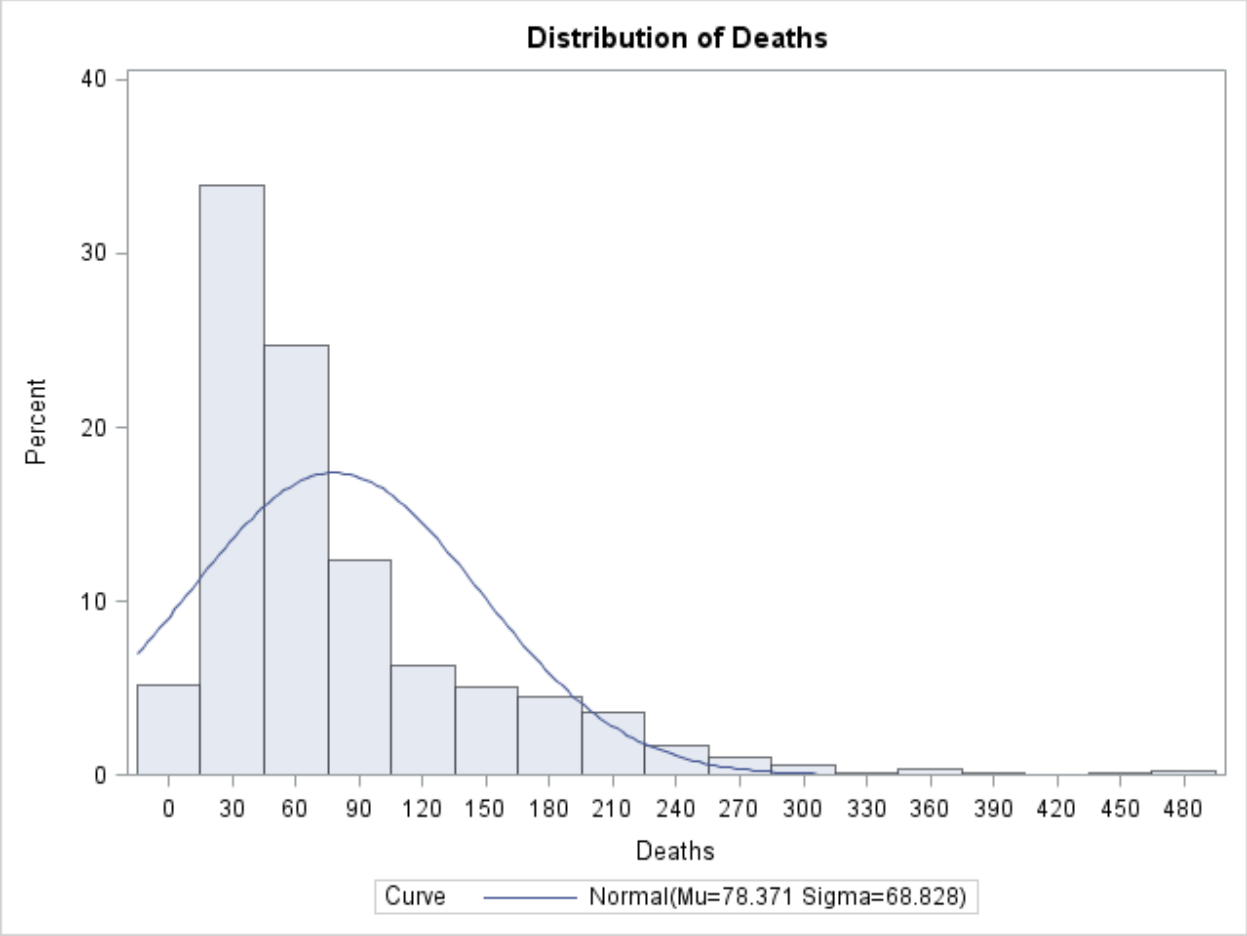


Figure 5 – Probability Plot of Drug Poisoning Deaths for Nine states show a Poisson Distribution

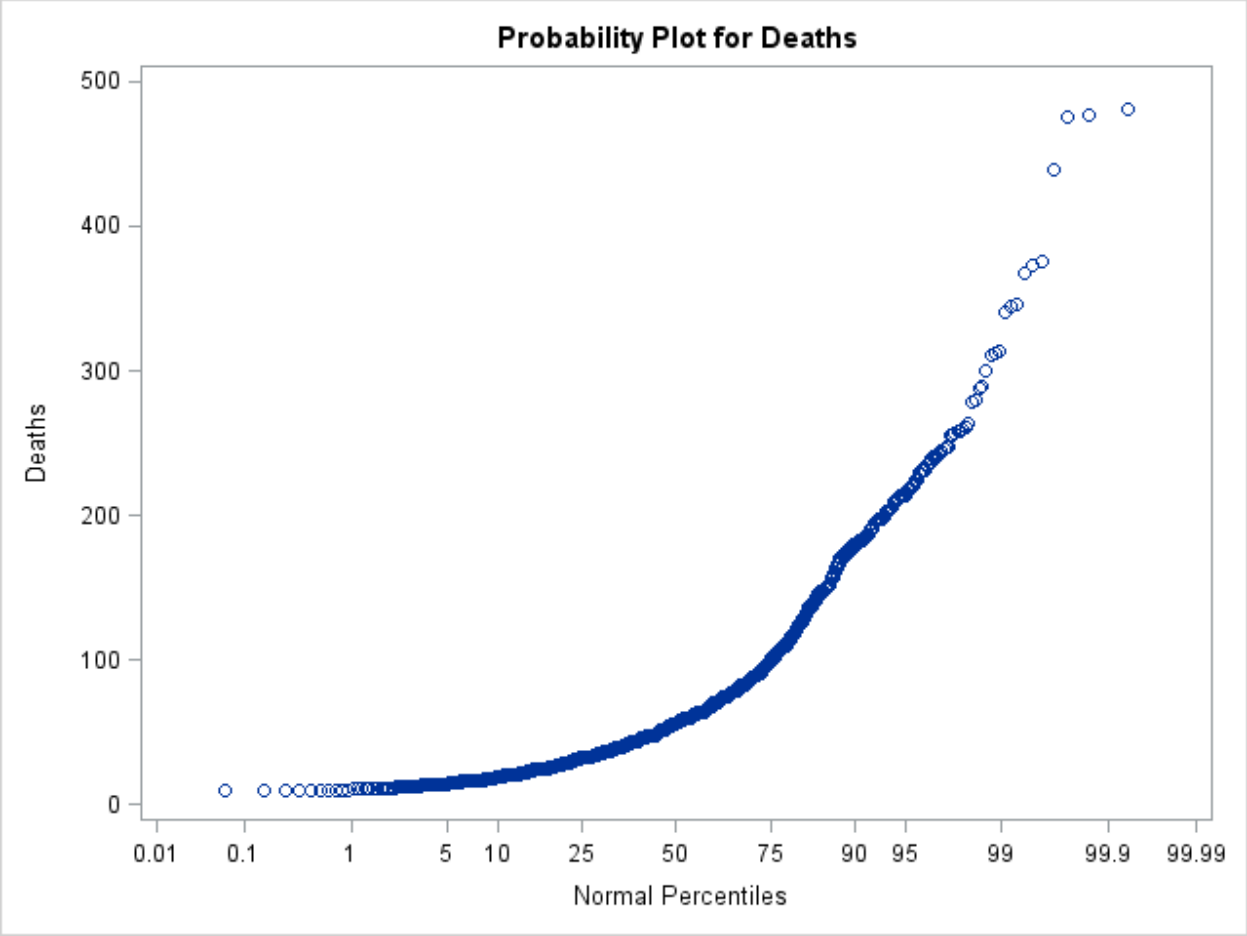


Figure 6 - Criteria for Assessing Goodness of Fit

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
Deviance	975	2950.3141	3.0260
Scaled Deviance	975	960.3615	0.9850
Pearson Chi-Square	975	2995.2848	3.0721
Scaled Pearson X2	975	975.0000	1.0000
Log Likelihood		95626.7778	
Full Log Likelihood		-4485.3618	
AIC (smaller is better)		9070.7235	

Criteria For Assessing Goodness Of Fit			
Criterion	**DF**	**Value**	**Value/DF**
AICC (smaller is better)		9075.9597	
BIC (smaller is better)		9317.3459	

Figure 7 - Summary Statistics for Model

LR Statistics For Type 3 Analysis						
Source	**Num DF**	**Den DF**	**F Value**	**Pr > F**	**Chi-Square**	**Pr > ChiSq**
Sex	1	990	1307.72	<.0001	1307.72	<.0001
Age_Group	5	990	27.83	<.0001	139.16	<.0001
State	8	990	92.18	<.0001	737.42	<.0001
MAL	1	990	193.04	<.0001	193.04	<.0001
State*MAL	8	990	21.63	<.0001	173.03	<.0001
Sex*MAL	1	990	8.47	0.0037	8.47	0.0036
Age_Group*MAL	5	990	14.43	<.0001	72.16	<.0001
Sex*Age_Group	5	990	18.24	<.0001	91.19	<.0001

Figure 8 – Full Statistics for Model

Analysis Of Maximum Likelihood Parameter Estimates							
Parameter		**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**	**Wald Chi-Square**	**Pr > ChiSq**
Intercept		1	-7.6845	0.0471	-7.7768 -7.5922	26614.1	<.0001
Sex	**Females**	1	-0.4903	0.0350	-0.5589 -0.4217	196.26	<.0001
Sex	**Males**	0	0.0000	0.0000	0.0000 0.0000	.	.
Age_Group	**30-34 yrs**	1	0.2904	0.0327	0.2262 0.3545	78.75	<.0001
Age_Group	**35-39 yrs**	1	0.2315	0.0335	0.1659 0.2972	47.75	<.0001
Age_Group	**40-44 yrs**	1	0.1223	0.0340	0.0556 0.1890	12.92	0.0003

Analysis Of Maximum Likelihood Parameter Estimates								
Parameter		**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Age_Group	**45-49 yrs**	1	0.1661	0.0331	0.1013	0.2309	25.25	<.0001
Age_Group	**50-54 yrs**	1	0.1345	0.0330	0.0698	0.1992	16.62	<.0001
Age_Group	**55-59 yrs**	0	0.0000	0.0000	0.0000	0.0000	.	.
State	**Colorado**	1	-0.1306	0.0467	-0.2221	-0.0391	7.82	0.0052
State	**Conn**	1	0.1804	0.0483	0.0859	0.2750	13.98	0.0002
State	**Florida**	1	0.0395	0.0378	-0.0345	0.1135	1.09	0.2956
State	**Illinois**	1	-0.1060	0.0401	-0.1845	-0.0274	7.00	0.0082
State	**Massachusetts**	1	0.3416	0.0412	0.2609	0.4223	68.87	<.0001
State	**Nmex**	1	0.6222	0.0656	0.4935	0.7508	89.88	<.0001
State	**Nyork**	1	-0.2217	0.0375	-0.2951	-0.1483	35.04	<.0001
State	**Rhode Island**	1	0.5463	0.0660	0.4170	0.6757	68.52	<.0001
State	**Wash**	0	0.0000	0.0000	0.0000	0.0000	.	.
Year	**2002**	1	-0.5749	0.1720	-0.9120	-0.2378	11.17	0.0008
Year	**2003**	1	-0.6331	0.1534	-0.9337	-0.3326	17.05	<.0001
Year	**2004**	1	-0.7527	0.1559	-1.0582	-0.4472	23.31	<.0001
Year	**2005**	1	-0.5690	0.0986	-0.7623	-0.3757	33.30	<.0001
Year	**2006**	1	-0.5174	0.0821	-0.6783	-0.3565	39.73	<.0001
Year	**2007**	1	-0.5416	0.0740	-0.6866	-0.3966	53.61	<.0001
Year	**2008**	1	-0.5293	0.0732	-0.6727	-0.3859	52.33	<.0001
Year	**2009**	1	-0.5324	0.0732	-0.6759	-0.3890	52.92	<.0001
Year	**2010**	1	-0.5943	0.0736	-0.7385	-0.4501	65.24	<.0001
Year	**2011**	1	-0.5043	0.0678	-0.6371	-0.3714	55.35	<.0001
Year	**2012**	1	-0.5940	0.0442	-0.6807	-0.5073	180.27	<.0001
Year	**2013**	1	-0.5562	0.0296	-0.6142	-0.4982	353.44	<.0001
Year	**2014**	1	-0.5084	0.0292	-0.5657	-0.4511	302.38	<.0001
Year	**2015**	1	-0.3504	0.0282	-0.4056	-0.2952	154.86	<.0001

Analysis Of Maximum Likelihood Parameter Estimates								
Parameter			**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Year	**2016**		1	-0.0693	0.0268	-0.1218	-0.0168	6.69	0.0097
Year	**2017**		0	0.0000	0.0000	0.0000	0.0000	.	.
MAL	**0**		1	-0.0950	0.0784	-0.2488	0.0587	1.47	0.2256
MAL	**1**		0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*Age_Group	**Females**	**30-34 yrs**	1	-0.4548	0.0484	-0.5498	-0.3599	88.15	<.0001
Sex*Age_Group	**Females**	**35-39 yrs**	1	-0.3007	0.0478	-0.3944	-0.2071	39.61	<.0001
Sex*Age_Group	**Females**	**40-44 yrs**	1	-0.1831	0.0465	-0.2743	-0.0919	15.48	<.0001
Sex*Age_Group	**Females**	**45-49 yrs**	1	-0.0637	0.0445	-0.1508	0.0235	2.05	0.1521
Sex*Age_Group	**Females**	**50-54 yrs**	1	-0.0064	0.0446	-0.0938	0.0811	0.02	0.8864
Sex*Age_Group	**Females**	**55-59 yrs**	0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*Age_Group	**Males**	**30-34 yrs**	0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*Age_Group	**Males**	**35-39 yrs**	0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*Age_Group	**Males**	**40-44 yrs**	0	0.0000	0.0000	0.0000	0.0000	.	.

Analysis Of Maximum Likelihood Parameter Estimates									
Parameter			**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Sex*Age_Group	**Males**	**45-49 yrs**	0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*Age_Group	**Males**	**50-54 yrs**	0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*Age_Group	**Males**	**55-59 yrs**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Colorado**	**0**	1	0.1100	0.0675	-0.0222	0.2422	2.66	0.1031
State*MAL	**Colorado**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Conn**	**0**	1	-0.4786	0.0749	-0.6253	-0.3318	40.84	<.0001
State*MAL	**Conn**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Florida**	**0**	1	0.0455	0.0542	-0.0608	0.1518	0.70	0.4017
State*MAL	**Florida**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Illinois**	**0**	1	-0.2701	0.0590	-0.3858	-0.1543	20.92	<.0001
State*MAL	**Illinois**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Massachusetts**	**0**	1	-0.4987	0.0627	-0.6216	-0.3758	63.26	<.0001
State*MAL	**Massachusetts**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Nmex**	**0**	1	-0.1714	0.1044	-0.3760	0.0331	2.70	0.1005
State*MAL	**Nmex**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Nyork**	**0**	1	-0.3088	0.0544	-0.4154	-0.2023	32.26	<.0001
State*MAL	**Nyork**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Rhode Island**	**0**	1	-0.2846	0.1093	-0.4988	-0.0704	6.78	0.0092
State*MAL	**Rhode Island**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Wash**	**0**	0	0.0000	0.0000	0.0000	0.0000	.	.
State*MAL	**Wash**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*MAL	**Females**	**0**	1	0.1003	0.0264	0.0486	0.1520	14.47	0.0001

Analysis Of Maximum Likelihood Parameter Estimates									
Parameter			**DF**	**Estimate**	**Standard Error**	**Wald 95% Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
Sex*MAL	**Females**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*MAL	**Males**	**0**	0	0.0000	0.0000	0.0000	0.0000	.	.
Sex*MAL	**Males**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Age_Group*MAL	**30-34 yrs**	**0**	1	-0.0358	0.0478	-0.1294	0.0578	0.56	0.4532
Age_Group*MAL	**30-34 yrs**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Age_Group*MAL	**35-39 yrs**	**0**	1	0.0060	0.0473	-0.0868	0.0988	0.02	0.8989
Age_Group*MAL	**35-39 yrs**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Age_Group*MAL	**40-44 yrs**	**0**	1	0.2620	0.0461	0.1716	0.3523	32.30	<.0001
Age_Group*MAL	**40-44 yrs**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Age_Group*MAL	**45-49 yrs**	**0**	1	0.2929	0.0445	0.2058	0.3801	43.39	<.0001
Age_Group*MAL	**45-49 yrs**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Age_Group*MAL	**50-54 yrs**	**0**	1	0.2119	0.0450	0.1237	0.3000	22.20	<.0001
Age_Group*MAL	**50-54 yrs**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Age_Group*MAL	**55-59 yrs**	**0**	0	0.0000	0.0000	0.0000	0.0000	.	.
Age_Group*MAL	**55-59 yrs**	**1**	0	0.0000	0.0000	0.0000	0.0000	.	.
Scale			0	1.7527	0.0000	1.7527	1.7527		

Figure 9a - Features of Medical Amnesty Laws from Nine States – Part 1

STATE	STATUTE	Receiver of Immunity	Overdose Substance	Immunity provision regarding paraphernalia charges?	Immunity provision regarding civil asset forfeiture?	Immunity provision regarding Probation or parole violation?
Colorado	18-1-711 (2018)	caller and OD victim	either drugs or alcohol	yes	no	no
Connecticut	21a-267 (2017)	caller and OD victim	either drugs or alcohol	yes	no	no
	21a-279 (2017)	caller and OD victim	either drugs or alcohol	no	no	no
Florida	893.21 (2018)	caller and OD victim	drugs	no	no	no
Illinois	720 ILCS 646/115 (2018)	caller and OD victim	specific drug/combination	no	no	no
	720 ILCS 570/414 (2018)	caller and OD victim	drugs	no	no	no
Massachusetts	Ch94C, Section 34A (2017)	caller and OD victim	drugs	no	no	no
New Mexico	30-31-27.1 (2018)	caller and OD victim	drugs	no	no	no
New York	220.78 (2018)	caller and OD victim	either drugs or alcohol	yes	no	no
	220.03 (2018)	caller	either drugs or alcohol	no	no	no
Rhode Island	21-28.8-4 (2018)	caller and OD victim	either drugs or alcohol	yes	no	yes
Washington	69.50.315 (2018)	caller and OD victim	drugs	no	no	no

Figure 9b - Features of Medical Amnesty Laws from Nine States – Part 2

STATE	STATUTE	Is mitigation possible if full amnesty is not granted?	Does Immunity require evidence from OD event?	Immunity for certain distribution crimes?	Specific requirements to receive immunity?	Overdose Definition Provided?	Number of other statutes referenced
Colorado	18-1-711 (2018)	no provision	yes	drug only	yes	yes	6
Connecticut	21a-267 (2017)	no provision	yes	no	no	no	2
	21a-279 (2017)	no provision	yes	no	no	no	2
Florida	893.21 (2018)	no provision	yes	no	no	no	0
Illinois	720 ILCS 646/115 (2018)	no provision	yes	no	no	yes	0
	720 ILCS 570/414 (2018)	no provision	yes	no	no	yes	0
Massachu-setts	Ch94C, Section 34A (2017)	mitigation for drug, not alcohol offenses	yes	no	no	no	3
New Mexico	30-31-27.1 (2018)	mitigation for drug, not alcohol offenses	yes	no	no	no	1
New York	220.78 (2018)	no provision	yes	yes	no	yes	5
	220.03 (2018)	no provision	yes	no	no	no	2
Rhode Island	21-28.8-4 (2018)	mitigation for drug, not alcohol offenses	yes	no	no	no	0
Washington	69.50.315 (2018)	no provision	yes	no	no	no	2

CHAPTER 4 - PRACTICAL BARRIERS TO OBTAINING NALOXONE IN GEORGIA

Study Title: Barriers for Laypersons Wanting to Purchase Narcan® in Georgia

Abstract

BACKGROUND: In Georgia, various legal measures have been enacted to make naloxone products like Narcan® more accessible to laypersons to combat the wave of opioid-related overdose deaths. Now, laypersons may legally purchase naloxone products without a prescription for use during opioid-related overdose events. This study sought to identify common barriers that still exist for the purchase of Narcan®, a nasally-administered form of naloxone.

METHODS: A randomized telephone survey of pharmacies was conducted in select counties with high drug poisoning deaths by volume and high overdose death rates compared to controls within the State of Georgia. Variables of interest included the current price, availability, and required documentation for purchase.

RESULTS: Slightly more than one-half of pharmacy representatives contacted stated they had Narcan® in stock at the time of contact. Prices for Narcan® ranged from $65.00 to $201.00. Approximately one-half of the pharmacy representatives questioned stated that a physician's prescription was required to purchase Narcan®, despite a Standing Order and a change in

Georgia law that removed this formerly mandated requirement. Of representatives who stated that a prescription was not necessary, more than two-thirds described specific requirements for purchase of naloxone, such as the need to verify that opioid medication was prescribed for the potential overdose victim.

CONCLUSIONS: In Georgia, certain barriers to the purchase of Narcan® exist, making it less likely that those who may need a safe, easily administered form of naloxone will obtain the product. An informational intervention is recommended.

Background

Reports of the nation's current drug overdose crisis are ubiquitous, although some states fare better than others. For instance, from 2008 – 2014, Georgia's annualized, age-adjusted poisoning death rate for all ages (11.82/100,000) is substantially less that the nationwide rate (14.45/100,000). [ii] Like many states, however, Georgia's drug overdose death rates have risen each year. From 2010 to 2017, Georgia's overall drug poisoning deaths increased by 52%, while the population increased 7.6%. [iii] The characteristics of Georgia's drug overdose deaths have also changed. The percentage of opioid-related deaths among all drug overdose deaths increased from 40.1% in 2010 to 64.4% in 2017. See Appendix Table 1. Drug poisoning deaths are also distributed unevenly across Georgia: out of 159 counties, 42 reported higher poisoning death rates than the national average during 2008 - 2014. Georgia's most populous 20 counties account for more than 50% of all statewide drug poisoning deaths. [iv]

Understanding factors related to the distribution of drug overdose deaths in Georgia and elsewhere may help policymakers focus efforts on interventions that do the most good. One strategy that has received wide support is to make naloxone products like Narcan®, an opioid antagonist drug, more available to those who may witness an overdose or come into contact with overdose victims. The United States Surgeon General supports such a measure [v] as does the Georgia Department of Public Health (GADPH). For example, the GADPH provides information on its webpage concerning "Emergency Help for Opioid Overdoses" with information on "Signs of Opioid Overdose", and "How to Administer Naloxone". The website

also details how to use different Naloxone products, such as Narcan® and Evzio®, and how to recognize withdrawal symptoms.[vi] The value of bystanders having access to naloxone has also been reported in the academic literature. (Davis, Webb, & Burris, 2013)

Georgia policymakers have acted to remove previous barriers to laypersons acquiring Naloxone. On January 12, 2017, Brenda C. Fitzgerald, Commissioner of Public Health and State Health Officer of the Georgia Department of Public Health, authorized the execution of a Standing Order that serves as a prescription for laypersons to obtain Naloxone from a licensed pharmacy. The policy goal behind the Standing Order is stated clearly:

> "The purpose of this Standing Order is to facilitate the widest possible availability of Naloxone among the residents of this State, in order to ensure that family members, friends, co-workers, first responders, schools, pain management clinics, harm reduction organizations, and *any other persons or entities* (Eligible Persons or Entities) are in a position to provide assistance to person[s] experiencing an opioid-related overdose through the timely administration of the opioid antagonist Naloxone."

The Georgia General Assembly demonstrated its support of the Department of Public Health's Standing Order by enacting O.C.G.A. § 26-4-116.2 (f), which requires that "Every pharmacy in this state shall retain a copy of the standing order issued under Code Section 31-1-10" (Effective July 1, 2017). Lawmakers also amended Georgia's Dangerous Drug Act (effective July 1, 2017) to exempt Naloxone from the list of drugs that require a physician's prescription, if the Naloxone is used for drug overdose prevention and supplied by a dispenser in a specified manner. [vii] Thus, at the time of this study, Georgia pharmacists have authority that allows the dispensation of Naloxone products without a prescription from a physician.

Determining whether barriers continue to exist for those who wish to purchase naloxone may inform policymakers and assist in allocating resources for the best measures in combatting the opioid overdose crisis, designing more effective public service announcements, and adopting measures necessary to implement existing law. Cressman, and others studied whether members of the Canadian public continued to have difficulty procuring naloxone despite legislation that made naloxone available without prescription. (Cressman et al., 2017) Those researchers utilized a cross-sectional study of Canadian pharmacists and found that only 24% had naloxone available and that availability varied significantly by region. Further, nearly 1 in 7 pharmacists incorrectly stated that a prescription was required or were uncertain about whether one was required. That research also reported that of those pharmacies with naloxone available when contacted, nearly half charged a fee, ranging from $25 to $200 (median cost was $50.00).

This study sought to identify common barriers that still exist for the purchase of Naloxone products in Georgia. We focused on Narcan®, a form of Naloxone that is administered intra-nasally and requires little training for its use, because we believe that most laypersons would prefer this form to injectable forms of Naloxone, and would be more likely to seek this nasal-spray form from a pharmacy. [viii] At least one study supports this view, [ix] plus the Georgia Department of Public Health encourages Georgians to purchase Narcan® through its website tagline, "Love an Addict? Carry Narcan." [x] The lower price of Narcan® also makes it a more realistic product for the study of barriers to laypersons in purchasing Naloxone; Evzio®, an

auto-injectable brand described on the GADPH website, may cost several thousand dollars and thus be unaffordable for many. [xi]

Methodology

Comparison between Georgia and nationwide drug poisoning deaths in 2016

Using the Centers for Disease Control and Prevention Web-based Injury Statistics Query and Reporting System (WISQARS) system[xii], we generated fatal injury reports data that showed that in 2016 Georgia suffered 13.28/100,000 drug poisoning deaths, compared with 19.73/100,000 nationwide. [xiii] Georgia's metro areas suffered drug poisoning deaths of 13.48/100,000 versus 12.32/100,000 for non-metro areas in the state. [xiv] Georgia's metro areas comprise approximately 83% of the state's total population. Thus, exploring any existing differences in these more populous areas may prove helpful in addressing drug poisoning deaths. However, county-level data is not available from this CDC data base outside the years 2008 – 2014.

County-level data in Georgia to compare with nationwide drug poisoning deaths

Using the Centers for Disease Control and Prevention Web-based Injury Statistics Query and Reporting System (WISQARS) system, Fatal Injury Data, Fatal Injury Maps 2008-2014, an age-adjusted map (2000 as the standard year) of poisoning deaths in Georgia at the county level was generated. (Centers for Disease Control and Prevention, National Centers for Injury

Prevention and Control, 2005) The available data does not delineate between drug poisoning deaths and other types of poisoning deaths, such as from unintentional exposure to toxic chemicals. The annualized, age-adjusted poisoning death rate for Georgia was 11.82/100,000 poisoning deaths for all ages, compared with a nationwide annualized, age-adjusted rate of 14.45/100,000 for all ages, during 2008 – 2014.

Georgia has 159 counties. Of note, WISQARS only provides drug poisoning data for 76 counties. Drug poisoning death data for the remaining 83 Georgia counties may be missing because of a data suppression rule that provides that no figure, including totals, less than 10 in tabulations for sub-national geographic areas, regardless of the number of years combined with the data from 2008 and later.

Although Georgia exhibited a lower annualized, age-adjusted poisoning death rate for 2008-2014 than the nationwide average, 42 Georgia counties reported higher poisoning death rates than the nationwide average. Some Georgia counties, although not having death rates that exceeded the national average, contributed a large volume of poisoning deaths to the total number of deaths; twenty (20) counties had more than 100 total annual deaths on average for the time period 2008-2014.

The focus of the study is on contacting pharmacies in county seats of those counties with poisoning deaths rates that exceed the nationwide average of 14.45/100,000 from 2008 – 2014 ("high death rate counties", n=42), and with more than 100 total annual deaths on average for the same period ("high death volume counties", n=20). Carroll, Bartow, Paulding, Whitfield, Floyd,

and Richmond Counties (n=6) fit into both the high death rate and the high death volume categories. These 6 counties are included in the high death volume county list, but omitted from the high death rate county list to explore possible differences in drug poisoning deaths between metro and non-metro areas in Georgia. Thus, 56 counties ("eligible counties") fit either the high death rate county category, the high death volume category, or both. Pharmacies from the remaining 20 counties in Georgia for which drug poisoning death data are available were randomly surveyed to acquire comparison statistics for the state.

A list of pharmacies that service each county seat (largest city in each county) was obtained from Superpages.com, an online telephone and address directory which can be searched to provide pharmacy contact information by city. (superpages.com, n.d.) Each pharmacy was numbered, and a random sequence generator used to select pharmacies for contact. The question sequence was begun with the pharmacy representative who first answered the phone, and continued with subsequent representatives if the first respondent passed the call.

Anticipated Complications

Certain anticipated complications were addressed as follows:

1. Pharmacies were included in the sampling frame only if they are located in Georgia. It is unrealistic to expect pharmacists in adjoining states to be responsible for adhering to requirements for obtaining naloxone in Georgia. For example, Fannin County borders Tennessee, yet fewer than half of the 137 pharmacies listed by Superpages.com that provide service to Blue Ridge, Georgia, (the county seat for Fannin County) are located

in Georgia. Instead, the majority of pharmacies listed are located in nearby Chattanooga, Tennessee. We recognize that Blue Ridge residents may be willing to travel to Tennessee to obtain naloxone. However, expanding the survey to include pharmacies in other states would likely inject weaknesses into the study. Georgia is surrounded by Tennessee, North Carolina, South Carolina, Florida, and Alabama, and dispensing requirements and pharmacy training may differ widely among these states. Expanding the research to include pharmacies in these other states may result in the tabulation of dispensing requirements and policies irrelevant to the study.

2. Some pharmacies appear on more than county's list because some county seats are located close together. The final lists for inclusion in this study omitted any repetition, such that each pharmacy location was listed once in the sampling frame and was available for random selection only one time. For example, the cities of Toccoa (Stephens County) and Carnesville (Franklin County) are located approximately twenty miles apart. Some pharmacies are listed on both the Toccoa (Stephens County) and Carnesville (Franklin County) lists. Such pharmacies were included only one time in the sampling frame to ensure that each pharmacy had an equal probability for random selection. This process is further supported by the belief that many people would be willing to travel to a nearby city to obtain important medication. To further guard against multiple calls to the same pharmacy, the last 4 digits of phone numbers contacted were recorded in a database and then used to verify that new call attempts were unique.

3. The pharmacy directory service to be used, Superpages.com, often provides directory listings for individual pharmacy personnel in addition to pharmacy businesses. Personnel listings were excluded, so that the final sampling frame included only pharmacy businesses that would likely be contacted by prospective customers for pricing, availability, and other purchase requirements concerning Narcan®.

4. To avoid influencing the results of each call through the display of caller-identifying information, the lead author's personal cell phone was used to make all calls to pharmacies rather than phones traceable to organizations through which the authors are affiliated, such as Georgia State University or the lead author's law firm.

From the sampling frame compiled, a total of 120 pharmacies were randomly selected without replacement and contacted by telephone during a two month period in Fall, 2018 as follows:

1) **High death rate counties** (poisoning death rate exceeding 14.45/100,000) - 40 pharmacies randomly selected without replacement (36 counties– 588 pharmacies).

2) **High death volume counties** (more than 100 deaths from 2008 - 2014), 40 pharmacies randomly selected without replacement. (20 counties – 843 pharmacies). As noted elsewhere, 6 counties (Carroll, Bartow, Paulding, Whitfield, Floyd, and Richmond) qualify as either high death rate or high death volume counties. These 6 counties are

included in the high death volume county list, but omitted from the high death rate county list.

3) **Comparison counties** (neither high death rate nor high death volume), 40 pharmacies randomly selected to provide baseline data (20 counties - 335 pharmacies).

We systematically contacted pharmacies in Georgia and asked pharmacy representatives a series of questions to test the following four (4) potential barriers to the acquisition of Narcan®:

- Availability of Narcan®: *Do you have Narcan® nasal spray in stock?*
- Price of Narcan®: *How much does it cost?*
- Awareness that Narcan® does not require a prescription: *Can I buy it without a prescription?*
- Other barriers: *Are there any forms I have to fill out if I want to pay with cash?*

The Georgia State University Institutional Review Board designated this study as not Human Subject Research, therefore it was exempt from review.

Results

Pharmacy representatives in all 120 pharmacies contacted provided responses for the survey. The 120 pharmacies contacted constitute 6.8% of the total number of pharmacies (1,766) eligible for the study.

Whether Narcan® in stock and its price

Of the pharmacy representatives questioned in High Rate counties, 55% stated that they had Narcan® in stock at the time of contact, compared with 64% of High Volume counties and 62.5% of Comparison counties. The average price for Narcan® in High Rate counties was $128.17 (Range: 71.69 to 180.00), compared with $133.40 (Range: 71.69 to 171.95) in High Volume counties, and$128.11 (Range: 65.00 to 201.00) in Comparison counties. Prices of Narcan® in High Rate counties did not differ significantly from prices in Comparison counties ($p = 0.99$, alpha = 0.05). Prices of Narcan® in High Volume counties did not differ significantly from prices in Comparison counties ($p=0.46$, alpha = 0.05) Similarly, prices of Narcan® did not differ significantly between High Rate and High Volume counties. ($p = 0.22$, alpha = 0.05)

Because one pharmacy representative in one High Volume county refused to answer whether Narcan® was in stock, this response was removed from the database for the purpose of determining whether county category and stock percentage were statistically independent. A Chi-Square test was performed, which supported the null hypothesis that county category is statistically independent from having Narcan® in stock ($p= 0.6753$). Therefore, there is not a significant difference among High Volume, High Rate, or Comparison counties in the price or availability of Narcan® among the pharmacies contacted, as presented in Table 1.

Table 1: Results among Georgia counties by category: availability and price of Narcan®

	Percentage in stock	Average Price (low – high)	Difference in price from Comparison Counties (p-value)*
High Rate Counties N=40	55% (22/40)	128.17 (71.69 – 180.00)	$0.06 (p=0.99)
High Volume Counties N=40	64% (25/39) (1 no answer)	133.40 (71.69 – 171.05)	$5.29 (p=0.46)
Comparison Counties N=40	62.5% (25/40)	128.11 (65.00 – 201.00)	
Total	60.5%		

*2-tailed, two-sample T-test with equal variance (homoscedastic)

Requirements to purchase Narcan®

Slightly more than half the pharmacy representatives questioned in High Rate counties (51.3%) and High Volume counties (55%) stated that a physician's prescription was not required for purchase of Narcan®, compared with 48.6% of those in Comparison counties. Of those who stated that a prescription was not required, most described specific requirements for purchase of naloxone, such as the need to verify that opioid medication was prescribed for the potential overdose victim or the need to see identification such as a driver's license and the need for a name and address from the purchaser (Table 2).

Table 2: Results among Georgia counties by category: Whether prescription required and additional requirements for purchase of Narcan®

	Accurate Requirement (n/%)Prescription correct	No additional requirements for purchase (among those answering prescription question correctly)
High Rate Counties	51.3% (20/39 – 1 no answer)	37% (7/19)
High Volume Counties	55.9% (19/34 – 6 no answer)	68% (13/19)
Comparison Counties	48.6% (18/37 – 3 no answer)	33% (5/15)
Total	51.8% (57/110 – 10 no answer)	47% (25/53)

Because several pharmacy representatives refused to answer whether a prescription was required to purchase Narcan®, those responses were removed from the database for the purpose of determining whether county category and correct answers were statistically independent. A Chi-Square test was performed, which supported the null hypothesis that county category is statistically independent from answering correctly that a doctor's prescription is unnecessary for purchasing Narcan® ($p = 0.8748$). Therefore, there is no significant difference among pharmacies contacted in High Volume, High Rate, or Comparison counties in answering correctly that a doctor's prescription is unnecessary for purchasing Narcan®.

Among those who answered that a doctor's prescription was not required to purchase Narcan®, more than half either refused to answer or did not know whether additional requirements existed to purchase Narcan®. These responses were removed from the database

for the purpose of determining whether county category and additional requirements were statistically independent. A Chi-Square test was performed, which supported the null hypothesis that county category is statistically independent from imposing additional requirements for purchasing Narcan® (n = 53, p= 0.0669, alpha = 0.05). Therefore, the evidence suggests no significant difference among pharmacies contacted in High Volume, High Rate, or Comparison counties in imposing additional requirements for purchasing Narcan®.

The six counties that could be categorized as either High Volume or High Rate counties

Of the 6 counties that could be included in either the high rate or high volume categories, a total of 157 pharmacies were listed in respective county seats. Ten (10) pharmacies from these counties were among those randomly contacted. We present the following summary statistics from these 6 counties in Table 3.

Table 3: Summary of results for 6 Georgia counties (Carroll, Bartow, Paulding, Whitfield, Floyd, and Richmond) that qualify as either "high rate" or "high volume" counties

	Narcan® in Stock	Average Price (low – high)	Prescription not required for purchase	Additional requirements for purchase (among those answering prescription question correctly)	Additional requirements for purchase
6 special counties	5/9; 1 N/A 55.5%	139.57 (129.99 – 150.00)	6/9 = 66.7% 1 NA	3/4 (2 no answer)	75%

A comparison of features of the "6 special" counties with features of other county categories, the "6 special" counties are more similar to High Volume counties (the category in which they were assigned) in price and requirements for purchasing Narcan® than with either High Rate or Comparison Counties. This supports the inclusion of these "6 special" counties within the High Volume county category rather than the High Rate county category. However, there was a significant price difference between the "6 special" counties and other High Rate counties (p=0.033) and with other High Volume counties (p=0.043). See Table 4.

Table 4: Summary of Results among all Georgia counties by category

	Narcan® in Stock	Average Price (low – high)	Price difference from Special 6 counties	Prescription not required for purchase of Narcan®	Additional requirements for purchase of Narcan® (among those answering prescription question correctly)
High Rate counties	55%	**128.17** (71.69 – 180.00)	(11.40)** p=0.033	51.3%	66.7% (12/18 - 2 no answer)
High Volume counties (w/ 6 Special counties removed)	64%	**131.60** (71.69 – 171.05)	(7.97) p=0.11	55.9%	77.7% (14/18 - 1 no answer)
Comparison counties	62.5%	**128.11** (65.00 – 201.00)	(11.46)** p=0.043	48.6%	75% (12/16 - 2 no answer)
6 Special Counties*	5/9; 1 N/A 55.5%	**139.57** (129.99 – 150.00)		6/9 = 66.7% 1 NA	75% (3/4 - 2 no answer)

* Summary of sub-analysis for 6 Georgia counties (Carroll, Bartow, Paulding, Whitfield, Floyd, and Richmond) that qualify as either "high rate" or "high volume" counties

**Special 6 Counties vs. Comparison Counties: T-test p=0.043, one-tailed, unequal variance F-test = 0.003

Special 6 Counties vs. High Rate Counties: T-test p=0.033, one-tailed, unequal variance F-test = 0.007

Special 6 Counties vs. High Volume Counties: T-test p=0.11, one-tailed, unequal variance F-test = 0.01

Chain store status as confounder

Additional analysis indicates that a potential confounder may be the influence of whether pharmacies contacted were part of a widely recognized chain store brand. "Chain stores" are defined in this work as widely recognized brands with more than 350 locations in the United States. Actual chain store names are on file with the lead author and are available upon request. More chain stores were represented among those pharmacies randomly selected than non-chain stores. In High Rate counties, chain stores represented 52.5% (21 of 40), in High Volume counties, chain stores represented 65% (26 of 40), and in Comparison counties, chain stores represented 65% (26 of 40) of those pharmacies contacted.

The average price of Narcan® was consistently lower in chain stores than in non-chain pharmacies across all county categories. In High Rate counties (overall average: $128.17), the average chain store price was $116.18 (Range: $71.69 to $143.38), compared with the average non-chain pharmacy price of $148.15 (Range: $85.00 to $180.00). In High Volume counties (overall average: $133.40), the average chain store price was $128.22 (Range: $71.69 to $171.95), compared with the average non-chain pharmacy price of $151.18 (Range: $145.00 to $161.25). In Comparison counties (overall average: $128.11), the average chain store price was $117.41 (Range: $65.00 to $171.95), compared with the average non-chain pharmacy price of

$150.50 (Range: $131.59 to $201.00). Differences between chain store pharmacies and non-chain store pharmacies were statistically significant across all categories, with chain store prices being markedly lower. See Table 5.

Table 5: Price of Narcan® among Georgia pharmacies sampled

	Chain Store	**Non-chain Store**	**Chain Store – Non-chain Store Difference (P value)**
High Rate Counties (average: 128.17)	2323.61/20 = **116.18** 1 no answer (Low: 71.69; High: 143.38)	1777.77/12= **148.15** 7 no answer (Low: 85.00; High: 180.00)	**($31.97)** F = 0.1055 T-test (p<0.001) One-tailed, 2-sample with equal variance
High Volume Counties (average: 133.40)	3077.18/24 = **128.22** 2 no answer (Low: 71.69; High: 171.95)	1058.25/7 = **151.18** 7 no answer (Low: 145.00; High: 161.25)	**($22.96)** F = 0.0006 T-test (p<0.001) One-tailed, 2-sample with unequal variance
Comparison Counties (average: 128.11)	2700.35/23 = **117.41** 3 no answer (Low: 65.00; High: 171.95)	1655.49/11 = **150.50** 3 no answer (Low: 131.59; High: 201.00)	**($33.09)** F=0.0723 T-test (p=0.002) One-tailed, 2-sample with equal variance
Overall Results	8101.14/67 = **120.91** overall average for chain stores (Low: 65.00, High: 171.95)	4491.51/30 = **149.72** overall average for non-chain stores (Low: 85.00, High 201.00)	**($28.81)** F-test = 0.000442 T-test (p<.001) One-tailed, 2-sample, with unequal variance

Across all three categories, chain stores consistently had Narcan® in stock more frequently than non-chain pharmacies. In High Rate counties, 76.2% of chain store pharmacies had Narcan® in stock, compared with only 31.6% of non-chain pharmacies (overall average was

55%). High Volume counties followed a similar pattern, with 76.9% of chain store pharmacies having Narcan® in stock versus 38.5% of non-chain stores (overall average was 64.1%). In Comparison counties, 76.9% of chain stores had Narcan® in stock versus 35.7% of non-chain pharmacies.

Because one pharmacy representative in one High Volume county refused to answer whether Narcan® was in stock, this response was removed from the database for the purpose of determining whether chain store status and stock percentage were statistically independent. A Chi-Square test was performed, which supported the idea that there is an association between chain store and having Narcan® in stock ($p< 0.001$).

Table 6: Pharmacy answer characteristics stratified by chain store status

	Narcan® in Stock	Prescription not required for purchase of Narcan®	No additional requirements for purchase of Narcan® (among those requiring prescription question)
Chain Store	76.7% (56/73)	59.7% (43/72)	50.0% (20/40)
Non-chain Store	34.7% (16/46)	37.8% (14/37)	38.5% (5/13)
Overall	**60.5% (72/119)**	**52.3% (57/109)**	**47.2% (25/53)**

Because several pharmacy representatives refused to answer whether a prescription was required to purchase Narcan®, those responses were removed from the database for the purpose of determining whether county category and correct answers were statistically independent. A Chi-Square test was performed, which supported idea that chain store status is associated with

answering correctly that a doctor's prescription is unnecessary for purchasing Narcan® (p= 0.03). The Fisher's exact test provides the same conclusion with a p-value of 0.0426. Therefore, the evidence indicates a significant difference among chain store pharmacies and non-chain pharmacies contacted in answering correctly that a doctor's prescription is unnecessary for purchasing Narcan®.

Among those who answered that a doctor's prescription was not required to purchase Narcan®, more than half either refused to answer or did not know whether additional requirements existed to purchase Narcan®. These responses were removed from the database for the purpose of determining whether county category and additional requirements were statistically independent. A Chi-Square test was performed, which supported the idea that no significant difference exists between chain stores and non-chain stores from imposing additional requirements for purchasing Narcan® (n = 53, p= 0.4691, alpha = 0.05). The Fisher's exact test provides the same conclusion with a p-value of 0.1963. Therefore, the evidence indicates no significant difference among chain store pharmacies and non-chain pharmacies contacted in imposing additional requirements for purchasing Narcan®.

Discussion

Prices for Narcan® did not differ significantly between High Rate counties (average $128.17; Range: 71.69 to 180.00), High Volume counties (average $133.40; Range: 71.69 to 171.95), or Comparison counties (average $128.11; Range: 65.00 to 201.00). The lack of

differences in price may mean than the price of Narcan® has no differential effect among county types. Such prices, however, likely make the purchase of Narcan® out of reach for many potential purchasers, especially among those who do not have health insurance or who are unwilling to submit such a pharmacy claim through existing insurance. These prices may also reflect laws of supply and demand, or shelf space constraints within retail pharmacies, and thus may respond to policy efforts to subsidize the purchase of Narcan®.

As noted, 55 % of pharmacies in High Rate counties had Narcan® in stock at the time of contact, compared with 64% of pharmacies in High Volume counties and 62.5% of those in Comparison counties. One explanation may be higher turnover of inventory because of higher sales of prices of Narcan® in High Rate counties. Further research may determine whether naloxone sales in high rate counties differ from other counties in Georgia and whether demand for Narcan® or other naloxone products outpaces supply.

Despite current legal measures designed to increase availability of Naloxone by removing the requirement for a prescription, barely more than half the pharmacy representatives questioned in High Rate counties (51.3%) or High Volume counties (55%) correctly stated that a physician's prescription was not required for purchase of naloxone nasal spray, compared with 48.6% of those in Comparison counties. Of pharmacy representatives who correctly stated that a prescription was not required, most described specific requirements for purchase of naloxone, such as the need to verify that opioid medication was prescribed for the potential overdose victim or the need to see identification such as a driver's license and the need for a name and address

from the purchaser. This may reflect a lack of knowledge about the current state of Georgia law, or it may relate more to pharmacy policies. Pharmacies have certain restrictions and policies governing drug dispensation, even with a prescription, and pharmacists may even refuse to fill a prescription on moral grounds. Policies that require a physician's prescription run counter to the stated goal of the Standing Order, and the current policy goals of the Georgia General Assembly, and the United States Surgeon General. Whether or not non-chain pharmacy policies differ from chain store pharmacy policies surrounding dispensation of Narcan® may be the subject of further research.

We postulate that a certain amount of stigma surrounds the purchase of Narcan® even if purchased for a legal and legitimate purpose such as the rescue of a third person. Some people may not wish to be seen purchasing Naloxone products by friends, co-workers, acquaintances, or others, because of its close association with drug overdoses, which are in turn often associated with illegal drug use or drug addiction. Some may not wish to pursue reimbursement for such a purchase through a health insurance provider, out of fear of rate increases, denial of coverage, or some other carryover effect.

Discomfort with possessing or purchasing Naloxone may be well-founded. Some research has indicated that ancillary problems may accompany possessing naloxone, such as confrontations with police, first responders, shelters, or treatment programs because subjects possessed naloxone. (Clark, Wilder, & Winstanley, 2014) (Enteen et al., 2010; Galea et al., 2006; Lankenau et al., 2013) (Doe-Simkins, Walley, Epstein, & Moyer, 2009; Piper et al., 2008;

Wagner et al., 2010) Some individuals may thus prefer to obtain naloxone discretely, to avoid embarrassment or revealing the presence of a narcotics addiction to others.

Pharmacy policies exist that will impose restrictions on the purchase of naloxone, such as requiring a prescription despite the current state of the law or requiring a purchaser to fill out a form that requests personal information. Anecdotally, a recent news story by CNN reported about a Walgreens pharmacist who refused to fill a woman's prescription to induce a miscarriage on moral grounds. [xv] Barriers to the purchase of naloxone products like Narcan® make it less likely that those who may need a safe, easily administered form of naloxone will seek to obtain the product. Of note, the six "special counties" that could qualify as either High Rate or High Volume counties exhibit some differences, but low counts limit further statistical analysis.

Chain store status as confounder

The most surprising results concerned the differences between chain store pharmacies (with more than 350 stores nationwide) and smaller, non-chain pharmacies. Chain store pharmacies had significantly lower average prices ($120.91 vs. 149.72; $p<0.001$) and had higher stock rates of Narcan® (76.6% vs. 34.7%, $p<0.001$). Chain store representatives were also significantly more likely to accurately state that a physician's prescription was not required to purchase Narcan® (59.7% vs. 37.8%, $p<0.001$). Chain store representatives were also significantly less likely to state that additional measures were required for the purchase of Narcan®, such as providing photo identification or verifying the existence of an opioid-containing prescription (50.0% vs. 38.5%, $p<0.001$). Whether or not these differences reflect

more accurate knowledge of the law or differences in store policies may be a subject for further research.

Limitations

This work has two notable strengths: the sample size of 120 of pharmacies across Georgia represents approximately 6.8% of the total number of pharmacies in the eligible counties, and is a higher percentage of pharmacies than a similar sample of pharmacies in Canada conducted by Cressman (Cressman et al., 2017). Further, 100% of pharmacy representatives contacted provided responses.

A number of factors exist that may limit the applicability of this study. Pricing does not account for insurance payment, although some may prefer not to file a claim for insurance reimbursement for reasons mentioned elsewhere. Data used for dividing counties by category were drawn from CDC data, which was limited to 2008-2014, while different rates may exist today. As mentioned elsewhere, Georgia has 159 counties, yet only 76 counties had data available for this research. Counties with unreported or suppressed data may be different from those counties with reported data. Naloxone may be available through other routes, such as harm reduction sites not considered by this research. We also assumed that county seats are representative of whole county, which may or may not be entirely accurate. Pharmacies may also serve residents from "high volume" locations like Macon or "high rate" locations and also residents from nearby "comparison" counties, which may skew the results. Some individuals may prefer to drive out of state to purchase Narcan®, and therefore use a pharmacy not eligible

for this study. Recorded responses were limited to knowledge and honesty of individual respondents and may vary from other pharmacy representatives at the same location. Future research may include interventions to better inform pharmacists of current law, reduce prices, increase the available supply of Narcan® and address the stigma that co-exists with the purchase of Narcan®. Pharmacy representatives should be trained to provide professional, accurate responses concerning this important naloxone product.

Conclusion

In Georgia, certain barriers to the purchase of Narcan® exist, making it less likely that those who may need a safe, easily administered form of naloxone will obtain the product. Pricing and availability constraints may prevent or restrain individuals from purchasing naloxone. Further, onerous dispensing requirements may also dissuade individuals from purchasing naloxone. The more barriers that exist, the less likely individuals will obtain naloxone products to store for emergency use. To the extent that higher prices, lower availability, and pharmacy policies make layperson purchase of naloxone more difficult, fewer will make such a purchase.

Appendix - Chapter 4 – Practical Barriers to Obtaining Naloxone in Georgia

Table 1 - Georgia - percentage of opioid-related deaths among all drug overdose deaths

Georgia –percentage of opioid-related deaths among all drug overdose deaths

Year	Deaths – Any Drug	Deaths – Any Opioid	Percentage of Opioid-related Deaths among all Drug Overdose Deaths
2017	1619	1043	64.4 %
2016	1393	928	66.6 %
2015	1373	890	64.8 %
2014	1260	739	58.7 %
2013	1131	536	47.4 %
2012	1063	549	51.6 %
2011	1068	430	40.3 %
2010	1062	426	40.1 %

Source: Georgia Department of Public Health Opioid Overdose Surveillance Report, Georgia, 2017.

Figure 1 – All Georgia Counties with Data Available

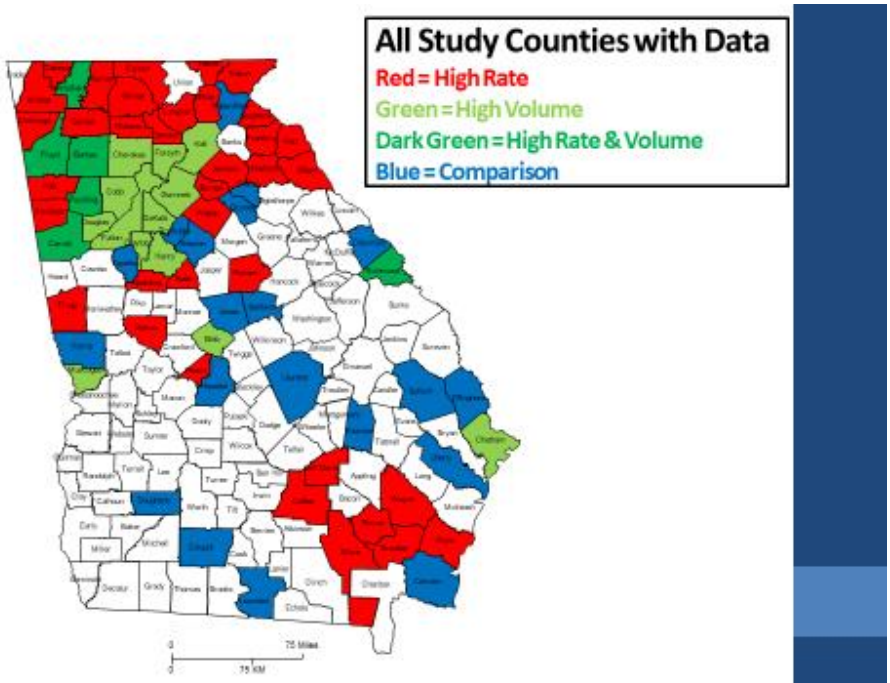


Figure 2 – Georgia Counties with Relevant Drug Poisoning Rates

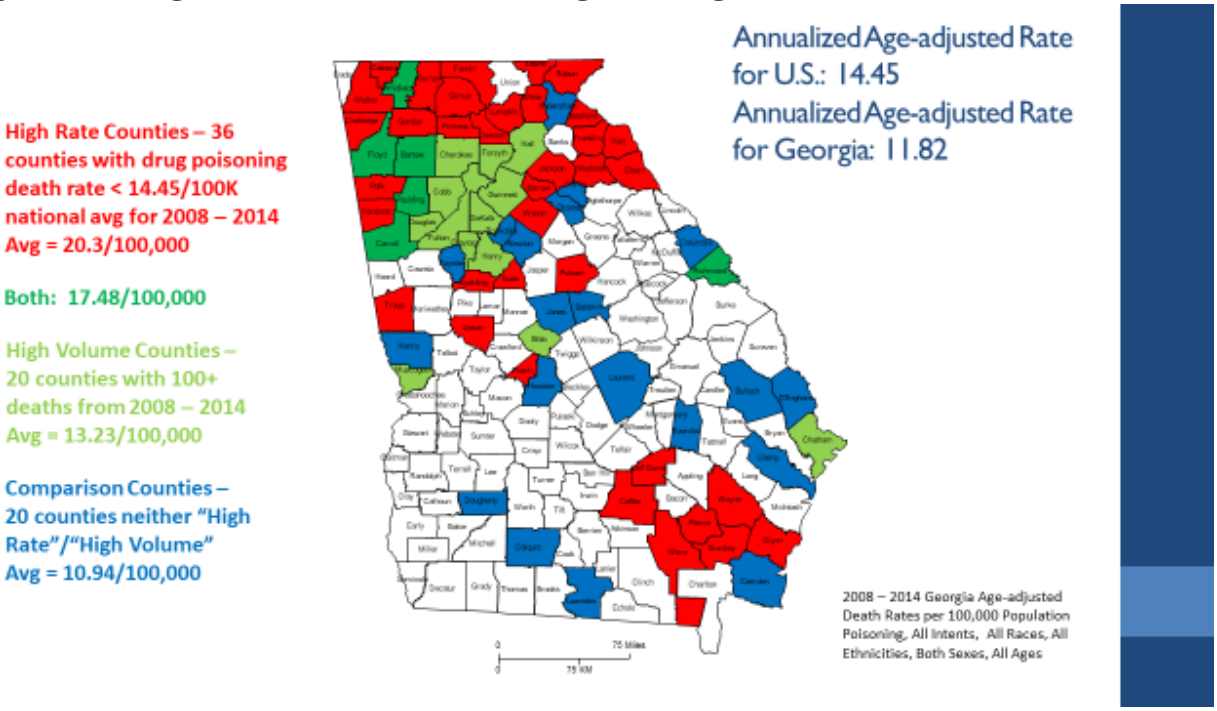


Figure 3 – Comparison of Study Selected Counties and Counties with any Opioid-Involved Overdose Emergency Department Visit and Hospitalization

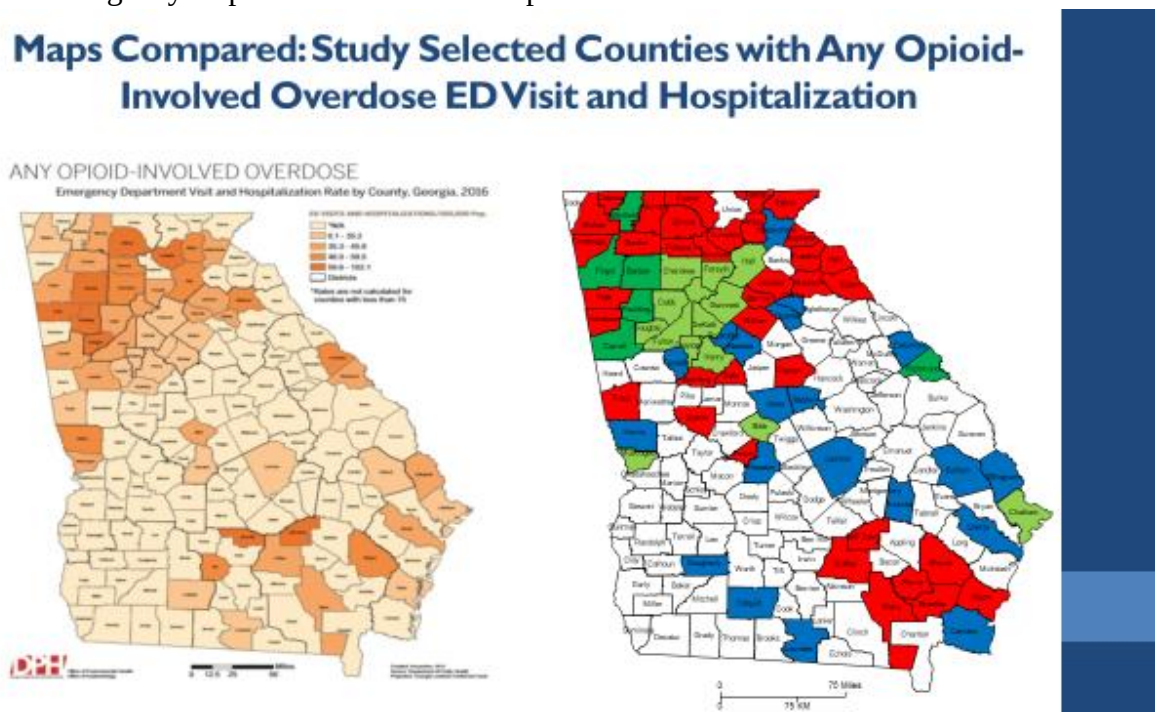


Table 2 – County Categories for Inclusion in Study

Category	Georgia County	Population	Deaths	Age-adjusted Rate per 100,000; unsmoothed	County Seat
High death rate counties (>14.45/100,000 poisoning deaths for 2008-2014) 36 Counties,	TOWNS	74214	23	36.96523	Hiawassee
	FANNIN	165230	48	36.95304	Blue Ridge
	MURRAY	276915	82	29.79573	Chatsworth
	FRANKLIN	154678	42	29.58093	Carnesville

588 pharmacies	JEFF DAVIS	104584	30	29.34592	Hazelhurst
	HARALSON	200225	60	29.03319	Buchanan
	RABUN	114006	28	26.03969	Clayton
	STEPHENS	180799	41	23.74747	Toccoa
	WHITE	191450	39	22.78253	Cleveland
	CARROLL*	779858	169	22.44246	Carrollton
	MADISON	196504	44	22.35197	Danielsville
	WAYNE	210890	45	21.82538	Jesup
	WARE	251572	54	21.36512	Waycross
	CATOOSA	451843	93	21.0085	Ringgold
	BRANTLEY	127985	24	20.27053	Nahunta
	WALKER	478808	90	20.05965	La Fayette
	BUTTS	164737	35	19.82342	Jackson
	JACKSON	423821	84	19.62884	Jefferson
	DAWSON	156804	30	19.61228	Dawsonville
	POLK	288988	55	19.23711	Cedartown
	PICKENS	206794	38	18.9254	Jasper
	ELBERT	139346	26	18.48645	Elberton
	CHATTOOGA	179495	35	18.36627	Summerville
	BARTOW*	702123	125	17.98511	Cartersville
	PAULDING*	1005214	183	17.74205	Dallas
	PIERCE	131029	22	17.66843	Blackshear
	GORDON	387823	65	16.96612	Calhoun
	GILMER	198578	30	16.84572	Elijay
	BARROW	489959	82	16.77498	Winder

	LUMPKIN	212104	34	16.53837	Dahlonega
	WHITFIELD*	717046	112	16.29824	Dalton
	SPALDING	447505	73	16.26202	Griffin
	UPSON	188170	29	16.00388	Thomaston
	COFFEE	298255	46	15.51988	Douglas
	FLOYD*	672958	104	15.41455	Rome
	HART	177300	27	15.30929	Hartwell
	PEACH	191305	25	15.23904	Fort Valley
	GLYNN	561469	81	15.22088	Brunswick
	WALTON	592633	91	15.1097	Monroe
	RICHMOND*	1402666	203	14.9688	Augusta
	TROUP	474047	68	14.50411	LaGrange
	PUTNAM	148396	22	14.49303	Eatonton

High death volume counties (>100 deaths for 2008-2014) 20 counties/843 pharmacies	CARROLL*	779858	169	22.44246	Carrollton
	BARTOW*	702123	125	17.98511	Cartersville
	PAULDING*	1005214	183	17.74205	Dallas
	WHITFIELD*	717046	112	16.29824	Dalton
	FLOYD*	672958	104	15.41455	Rome
	RICHMOND*	1402666	203	14.9688	Augusta
	HALL	1282022	179	14.38339	Gainesville
	HENRY	1438340	201	13.76811	McDonough
	CHEROKEE	1529387	201	13.34801	Canton
	FULTON	6624135	877	12.6505	Atlanta
	FORSYTH	1283674	154	12.45085	Cumming
	MUSCOGEE	1363596	160	12.31633	Columbus
	COBB	4907583	629	12.24573	Marietta
	DOUGLAS	935745	112	11.92685	Douglasville
	COWETA	904250	105	11.79587	Newnan
	CHATHAM	1893038	210	11.03353	Savannah
	BIBB	1085639	109	10.50239	Macon
	CLAYTON	1842871	163	9.085256	Jonesboro
	GWINNETT	5784398	427	7.315252	Lawrenceville
	DE KALB	4911550	361	6.935566	Decatur
Comparison counties: 20 remaining counties that did not meet either high death rate or high death volume category that **reported number of deaths** 335 pharmacies		10023647	993	10.94 Unweighted average	
83 remaining counties that did not meet either high death rate or high death volume category that **did not report number of deaths**		8309644	Did not report		
Total population of Georgia		23357499			

All data downloaded from cdc.com WISQARS 6/28/18.

Age-adjusted Death Rates per 100,000 Population; Standard Year = 2000.
Poisoning, All Intents, All Races, All Ethnicities, Both Sexes, All Ages
Annualized Age-adjusted Rate for Georgia: 11.82
Reports include unknown ages.

Table 3 - Georgia – Percent of opioid-related deaths among all drug overdose deaths 2010 - 2017

Georgia –Percent of opioid-related deaths among all drug overdose deaths

Year	Deaths – Any Drug	Deaths – Any Opioid	Percentage of Opioid-related Deaths among all Drug Overdose Deaths
2017	1619	1043	64.4 %
2016	1393	928	66.6 %
2015	1373	890	64.8 %
2014	1260	739	58.7 %
2013	1131	536	47.4 %
2012	1063	549	51.6 %
2011	1068	430	40.3 %
2010	1062	426	40.1 %

Source: Georgia Department of Public Health Opioid Overdose Surveillance Report, Georgia, 2017.

CHAPTER 5 – DISSERTATION SUMMARY and FUTURE DIRECTIONS IN RESEARCH

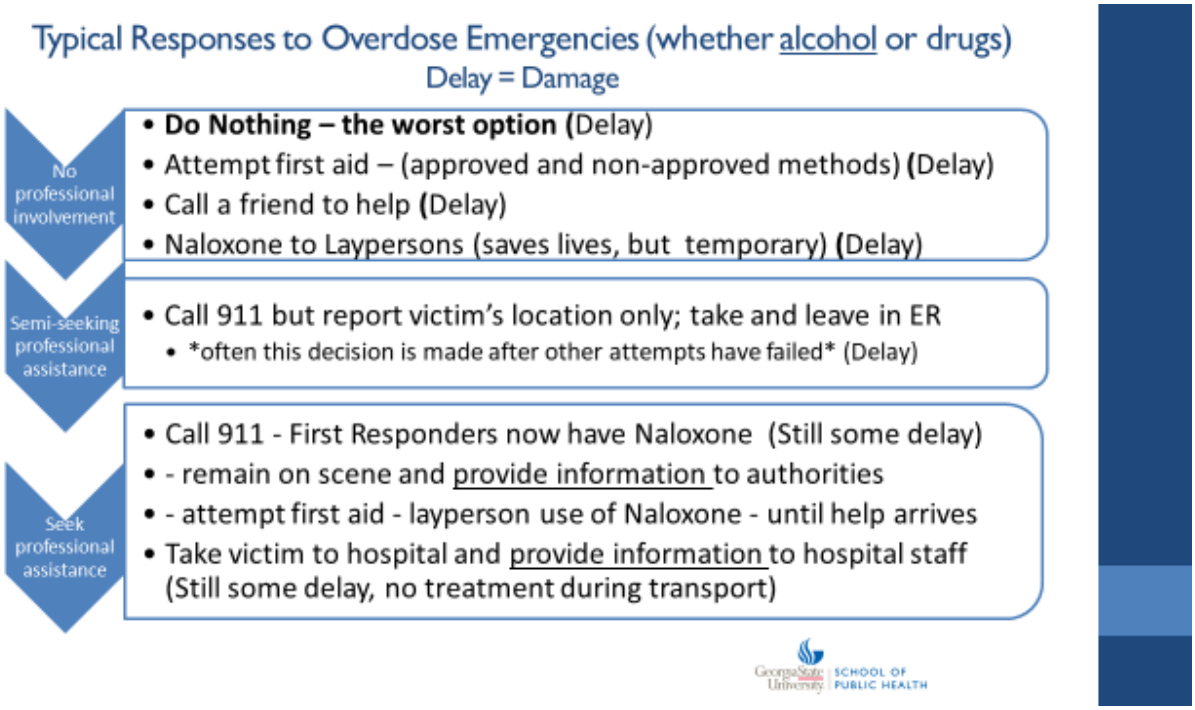
Most policy efforts to address overdose deaths have focused on either supply side measures or demand side measures. Supply side measures include law enforcement pressure on drug distribution, possession, and use, Prescription Drug Monitoring Programs (PDMP), regulating pharmaceutical manufacturers/distributors of drugs which could then be diverted to illegal or non-prescribed uses, monitoring medical professionals/doctors/dentists/pharmacists for overprescribing or over-dispensing, and providing education programs in schools and elsewhere. However, supply-side measures often shift demand from certain drugs to other drugs less affected by such measures.

Demand side measures include education policies in schools, public health messages, treatment for chemical dependency, and the use of probation/parole to mandate chemical dependency evaluations and treatment. The lag between such efforts and any reduction in demand of drugs can be difficult to measure.

In contrast to strictly supply-side or demand-side drug policies, this dissertation focuses on the point of overdose and what happens immediately thereafter. Policies that address the point of overdose include education concerning recognizing overdose, learning to treat overdose, and learning the importance of seeking professional help. Other measures include distributing naloxone to first responders, police, and other officials likely to be present and available to treat

an overdose victim. Still other measures include providing naloxone to laypersons, which necessitates appropriate training and assurances of protection from civil or criminal liability.

Typical responses to overdose by non-professionals are depicted below, and can be charted on a continuum that involves seeking no professional assistance (from first responders, an emergency department, police, doctors, etc.) to fully seeking professional assistance. Increasing contact between persons suspected of overdose and medical professionals will more likely save lives. To the extent that the public, including drug users, are encouraged to seek professional assistance during suspected overdose events, overdose victims stand a better chance at surviving the event and ultimately receiving long-term help for drug or alcohol abuse issues.



What often occurs, however, is individuals will fail to immediately seek professional assistance during an overdose event. Bystanders and/or the overdose victim may attempt first aid measures, such as slapping the victim, splashing water, or trying to revive the overdose victim in other ways. Bystanders may call a friend to ask for assistance or advice. More recently, naloxone may be available for use with an overdose victim. Even if effective, the overdose victim should still see a medical professional, as the effect of naloxone wears off.

Some bystanders undertake half-measures when dealing with an overdose, such as telephoning 9-1-1 to report a possible drug overdose but then leaving the overdose victim in a public location. This is problematic, because the victim may not be readily located by first responders. Further, first responders may not be informed about what potential intoxicants the victim received. More responsible bystanders will communicate quickly and fully with authorities, and provide information concerning the location, status, and possible substances consumed.

The crux of the issue is how to appropriately encourage bystanders to overdose to behave responsibly and quickly. Many distrust police involvement, and hesitate to contact authorities because they fear police. Some research disputes this notion, but other research highlights concerns about contacting authorities, harassment from first responders. Moreover, drug induced homicide statutes in some states, reports of felony murder prosecutions, DFACS investigations, contacting probation officers, and other measures intensify the fears of some people. Statutes

that provide immunity from criminal action can have an important impact on the likelihood of seeking treatment.

Medical amnesty laws are designed to alleviate these fears and are therefore critical to the success of any program designed to save lives by preventing overdose deaths. For this reason, this dissertation focuses on those measures most likely to immediately save lives during overdose. Importantly, this work does not focus on only one class of substance, such as opioids. Rather, the work is meaningful for any substance. During our nation's history, we have experienced overdose epidemics on different classes of drugs and, as noted above, as supply-side measures exert pressure on a given class of drugs, users will often switch to another class. An example concerns the recent opioid overdose epidemic, which began as a prescription drug epidemic. Law enforcement attention and PDMP's and other measures have exerted pressure on the diversion of prescription drugs, leading to the more widespread use of heroin. Pressure on heroin has caused some drug users to more recently switch to methamphetamine. Much of the work presented in this dissertation applies directly to an overdose involving any substance.

The three studies outlined in this dissertation address different, but interconnected, facets of combating drug poisoning deaths. The first study surveys medical amnesty laws nationwide in an effort to provide baseline data on existing statutory provisions. The second study measures the efficacy of MALs by analyzing the four states with the longest history of MALs: Connecticut, New Mexico, New York, and Washington. The third study examines barriers that may make purchasing Narcan® more difficult in Georgia. An examination of price, availability,

and pharmacy policies that may discourage the discrete purchase of Narcan® may illustrate barriers not addressed by legislation.

Determining how to appropriately encourage bystanders to overdose to behave responsibly and quickly is critical. Many distrust police involvement, and hesitate to contact authorities because they fear police. Statutes that provide immunity from criminal action can have an important impact on the likelihood of seeking treatment.

Medical amnesty laws are designed to alleviate these fears and are therefore critical to the success of any program designed to save lives by preventing overdose deaths. For this reason, this dissertation focuses on those measures most likely to immediately save lives during overdose. Importantly, this work does not focus on only one class of substance, such as opioids. Rather, the work is meaningful for any substance. During our nation's history, we have experienced overdose epidemics on different classes of drugs and, as noted above, as supply-side measures exert pressure on a given class of drugs, users will often switch to another class of drugs.

Except for the pharmacy study, presented as the second paper in this series, this dissertation work applies directly to overdoses involving any type of substance. The pharmacy study fits within the dissertation work because of the currently increasing importance of opioid overdose deaths in Georgia. From 2010 to 2017, drug poisoning deaths from any drug increased in Georgia by approximately 52%. During the same period, the percentage of opioid-related overdose deaths increased from approximately 40% to nearly 65%. See Appendix, Figure 8.

Failing to address the increasing importance of the opioid class of drugs in drug poisoning deaths would omit an important piece in the overall picture.

The first paper focuses on identifying existing features of MALs and advocating for those statutory provisions most likely to be effective at encouraging bystanders and overdose victims to contact authorities during overdose events. This work is critical to understanding how best to affect policy so that policymakers can be equipped with the tools necessary to write the most effective legislation possible.

The second paper seeks to determine whether medical amnesty laws are, in fact, working. While impossible to know precisely to what extent they may be working, legislators and policy makers should be made aware that the battle to inform the public is not over. Perhaps Washington's success may be attributed to educational campaigns in that state to disseminate information about medical amnesty laws. Future studies may examine public education efforts in different states to determine which efforts inform the public best.

The third paper suggests that barriers to the purchase of Narcan®, a popularly used form of naloxone, still exist in Georgia despite legal measures to make purchasing naloxone products easier for laypersons. Barriers that exist are less likely to be found in chain store pharmacies (those with more than 350 stores nationwide) that in smaller pharmacies. Barriers do exist: prices are high, stock rates of Narcan® are intermittent, and pharmacy representatives routinely describe requirements to purchasing Narcan® that are no longer required by law.

Fully addressing the current drug overdose crisis in the United States will not be accomplished with a single approach. Rather, policy makers should consider a range of multi-disciplinary approaches designed to educate and equip citizens and professionals everywhere with the knowledge of what to do during an overdose event. Acting swiftly and decisively during such an emergency will save lives, and that is the focus of this dissertation.

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Chapter 3 - Endnotes

[i] In 2010, Georgia overall drug poisoning deaths totaled 1,062 out of a population of 9,687,653 (10.96 per 100,000), while in 2017, drug poisoning deaths totaled 1,619 out of a population of 10,429,379 (15.52 per 100,000). Thus, overall drug poisoning deaths increased by 52%, while Georgia's population increased 7.6% from 2010 to 2017 (rate increase is 41.6%). Georgia Department of Public Health; https://www.census.gov/quickfacts/fact/table/ga/POP010210, accessed 12/13/18; https://www.census.gov/quickfacts/ga, accessed 12/13/18.

[ii] Centers for Disease Control and Prevention WISQARS system ***

[iii] In 2010, Georgia overall drug poisoning deaths totaled 1,062 out of a population of 9,687,653 (10.96 per 100,000), while in 2017, drug poisoning deaths totaled 1,619 out of a population of 10,429,379 (15.52 per 100,000). Thus, overall drug poisoning deaths increased by 52%, while Georgia's population increased 7.6% from 2010 to 2017 (rate increase is 41.6%). Georgia Department of Public Health; https://www.census.gov/quickfacts/fact/table/ga/POP010210, accessed 12/13/18; https://www.census.gov/quickfacts/ga, accessed 12/13/18.

[iv] Centers for Disease Control and Prevention WISQARS system

[v] Surgeon general advocates for the acquisition and storage of naloxone for easy use.

- https://www.surgeongeneral.gov/priorities/opioid-overdose-prevention/naloxone-advisory.html

[vi] Georgia Department of Public Health Website:
"How to Administer Naloxone" – page 10

"Love an Addict? Carry Narcan"Source:
https://dph.georgia.gov/sites/dph.georgia.gov/files/Administer%20Naloxone.pdf downloaded 10/13/18.

[vii] Under O.C.G.A. § 16-13-71, a "Dangerous drug" is defined as: (a) A "dangerous drug" means any drug other than a drug contained in any schedule of Article 2 of this chapter, which, under the federal Food, Drug, and Cosmetic Act (52 Stat. 1040 (1938)), 21 U.S.C. Section 301, et seq., as amended, may be dispensed only upon prescription.

HB 249: SECTION 1-4 was signed by Governor May 4, 2017, and became effective on July 1, 2017. H.B. 249 amended O.C.G.A. § 16-13-71 (c), relating to the definition of a dangerous drug, to read as follows:

- "(14.25) Naloxone–shall also be exempt from subsections (a) and (b) of this Code section when used for drug overdose prevention and when supplied by a dispenser as follows:

(A) Nasal adaptor rescue kits containing a minimum of two prefilled 2 ml. luer-lock syringes with each containing 1 mg./ml. of naloxone;
(B) Prepackaged nasal spray rescue kits containing single-use spray devices with each containing a minimum of 4 mg./0.1 ml. of naloxone;
(C) Muscle rescue kits containing a 10 ml. multidose fliptop vial or two 1 ml. vials with a strength of 0.4 mg./ml. of naloxone; or
(D) Prepackaged kits of two muscle auto-injectors with each containing a minimum of 0.4 mg./ml. of naloxone;"

[viii] Narcan® is distributed by Adapt Pharma, Inc., Radner, PA., 19087, USA nationwide.
[ix] people prefer non-injectable over injectable forms of naloxone https://doi.org/10.1016/j.addbeh.2018.03.011

[x] : https://dph.georgia.gov/sites/dph.georgia.gov/files/Administer%20Naloxone.pdf downloaded 10/13/18.
[xi] Priced at $3,732 (at Winn Dixie, Costco, Fred's Pharmacy) to $4,043 (at Kmart) according to GoodRx.com, accessed on 10/14/18.

[xiii] Georgia had 1,394 drug poisoning deaths from a population of 10,310,371 (age-adjusted rate with 2000 as standard year of 13.28 per 100,000) for all races, both sexes, and all ages (ICD-10 Codes: X40-44. X60-64, X85, Y10-Y14). This compares with 63,632 such deaths nationwide that same year, from a United States population of 323,127,513, for an age-adjusted rate of 19.73 per 100,000). CDC, WISQARS.
[xiv] Using the 2013 Urbanization (collapsed) Classification (standard population is 2000, all races, both sexes), Georgia metro areas suffered 1,178 drug poisoning deaths from a population of 8,532,248 (age-adjusted rate of 13.48 per 100,000) and non-metro areas suffered 216 deaths from a population of 1,778,123, for an age-adjusted rate of 12.32 per 100,000.

[xv] Walgreens pharmacist refuses to fill woman's prescription to induce a miscarriage. CNN. June 25, 2018. https://www.cnn.com/2018/06/25/health/arizona-prescription-walgreens-miscarriage/index.html