

University of Nevada, Reno

**The Proof's in the Pot: Are There Relationships between Statewide Cannabis Legislation
and Child Maltreatment Substantiation?**

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts in
Criminal Justice

by

Kim D. Bradshaw

Emily R. Berthelot, Ph.D./Thesis Advisor

December 2020



THE GRADUATE SCHOOL

We recommend that the thesis
prepared under our supervision by

KIM D. BRADSHAW

entitled

**The Proof's in the Pot: Are There Relationships between
Statewide Cannabis Legislation and Child Maltreatment
Substantiation?**

be accepted in partial fulfillment of the
requirements for the degree of

MASTER OF ARTS

Emily R. Berthelot, Ph.D.

Advisor

Timothy Griffin, Ph.D.

Committee Member

Mariah Evans, Ph.D.

Graduate School Representative

David W. Zeh, Ph.D., Dean

Graduate School

December 2020

Abstract

The legalization of cannabis, in the form of medical marijuana laws (MML) and recreational marijuana laws (RML), has proliferated in the United States over the past ten years. The impact of these laws, especially regarding how they affect the well-being of children, is not well understood. Research has consistently correlated caregiver substance abuse with higher rates of child maltreatment (CM), although the specific mechanism that contributes to this correlation is less explicit. This study took advantage of the variations in state-level cannabis laws to compare the rates of CM, and case disposition outcomes of caregiver drug and alcohol abuse risk factors, between different legal statuses. The results of multiple and binary logistic regression analyses support initial increases in the rates of CM in RML states. Additionally, MML and RML substantiated cases demonstrate an increased probability of caregiver alcohol misuse but decreased odds of cases containing, caregiver drug use and economic risk factors.

Keywords: Child Maltreatment, Alcohol misuse, Substance misuse, Medical Marijuana Laws, Recreational Marijuana Laws, Social Disorganization

Table of Contents

Introduction.....	1
Child Maltreatment Risk Factors.....	5
Drugs and Alcohol and Child Abuse.....	8
Social Disorganization and Protective Policies.....	13
Status/History of Cannabis Laws in the U.S.....	16
MML/RML Effects.....	18
Literature Review Summary.....	21
Methods.....	22
Results	
Part 1.....	28
Part 2.....	34
Discussion.....	43
Conclusion.....	50
References.....	51
Appendix.....	65

The Proof's in the Pot: Are There Relationships between Statewide Cannabis Legislation and Child Maltreatment Substantiation?

Child maltreatment (CM) in the United States (U.S.) continues to be a significant public health concern. In 2018, 678,000 children were victims of abuse or neglect, with 1,770 of these children dying as a result (Maltreatment, C, 2018). Although overall rates of maltreatment declined from 1992 to 2015 (Sexual Abuse by 65%, Physical Abuse by 53%, Neglect by 12%), the most recent data indicates CM may now be on the rise. The rates of physical abuse and child maltreatment fatalities rose by five and eight percent respectively from 2015 to 2016, while neglect rates declined slightly (Finkelhor, Saito, Jones, 2018). Prevent Child Abuse America (2012), a federally funded study examined costs such as investigations, foster care, and medical and mental health treatments, and estimated the annual, national cost of child maltreatment at over 80 billion dollars. Longitudinal studies provide evidence that child abuse victims suffer from higher rates of mental health disorders, lower educational outcomes, greater rates of physical illness, and lower lifetime economic outcomes (Blakemore, Herbert, Arney, & Parkinson, 2017; Hussey, Chang, & Kotch, 2006; Finkelhor, D. & Hashima, P.Y., 2001).

Victims of child abuse are also more likely to engage in maladaptive parenting techniques with their children. (Milner & Chilamkurti, 1991; Assink, Spruit, Schuts, Lindauer, Van der Put, & Stams, 2018). A longitudinal study found evidence to support the hypothesis that mothers with histories of victimization as children would have higher rates of substance abuse problems, which manifest in higher rates of their children suffering abuse (Appleyard, Berlin, Rosanbalm, & Dodge, 2011). This intergenerational

pathway is even more profound, given the gaps in our understanding of the causal mechanisms that lead to CM.

Identifying important causal mechanisms to explain fluctuations in the rates of child maltreatment is a tricky endeavor. The known predictors of CM are highly correlated, making it difficult to disentangle the contribution of individual variables. However, one consistent predictor of CM is caregivers with substance abuse disorders (Milner & Chilamkurti, 1991; Young, Boles, & Otero, 2007). As an example, the most recent National Incidence Survey (NIS) indicated that caregiver drug use was a risk factor in 9.5% of physical abuse and 12.5% of child neglect cases substantiated by Child Protective Services (CPS) (Sedlak, A. J., Mettenburg, J., Basena, M., Peta, I., McPherson, K., & Greene, A., 2010). However, CPS records and research typically lump drugs of all types into one category. Resultantly, we have gaps in the research into understanding how specific types of drugs, including legal and illegal, impact CM. Cannabis is a drug that we not only have little research on CM impact(s) but is also swiftly undergoing decriminalization.

The decriminalization of cannabis in the U.S. has rapidly expanded over the last decade. California enacted a medical cannabis law (MML) in December of 1996, making the possession of cannabis legal with a prescription. Colorado and Washington State legalized the purchase, possession, and use of cannabis in 2012 with Recreational Marijuana Laws (RML), and Oregon and Alaska followed suit in 2015. As of November 2020, eleven states and the District of Columbia and Puerto Rico have RMLs in use and 33 states have MMLs (Glasser & Emanuelson, 2020). Additionally, four states approved RML, two states approved MML, and Oregon decriminalized most recreational street

drugs during the November 2020 election cycle. Early research indicates that states with MML or RML have higher rates of cannabis use (Pacula, Powell, Heaton, Sevigny, 2013; Maxwell & Mendelson, 2016). Research into other direct outcomes, such as traffic accidents, economic impacts, abuse rates/overdoses, accidental ingestions, and juvenile cannabis use is just beginning (Maxwell & Mendelson, 2016). An understanding of secondary effects that are known to impact child welfare, such as caregiver arrest/incarceration rates, drug market violent crime rates, neighborhood social cohesion, caregiver unemployment rates, overdose/abuse rates of other drugs and alcohol, and caregiver stress is scarce. The few studies that have been conducted have shown conflicting results and have hypothesized that cannabis use among caregivers might replace alcohol consumption, although this theory has yet to be examined.

Mahatma Gandhi's said, "A nation's greatness is measured by how it treats its weakest members." The societal value of children is evidenced in our legal system with age restrictions built into many laws, including MML/RMLs. Nevertheless, If CM were viewed as a disease, such as childhood cancer, the incidence, prevalence, and intergenerational contagion would be viewed as a public health pandemic. It has been over 11 years since the first MML and eight years since the first RML, and we have only a limited understanding of the impact of this legislation on our most treasured members of society. In an expanding era of legalization, research into caregiver cannabis use and CM is an urgent need.

The number and distribution of MML and RML states and the length of time that has passed since the first MMLs and RMLs allow for a natural comparison between states without MMLs or RMLs and an intra-state analysis of pre- and post-CM rates while

controlling for established risk factors in an attempt to address some of these gaps. Specifically, this study will examine differences in CM rates between states with RML and without RML. Additionally, a comparison between RML, MML, and states without legalization regarding caregiver alcohol and drug risk factors that result in a substantiation decision will contribute to a better understanding of the impact of the legalization era on children.

Literature Review

The Center for Disease Control (CDC) defines Child Maltreatment (CM) as acts of a parent, caregiver, or custodial person who either cause harm, are likely to cause harm or have the potential for harm to a person under the age of 18 under their care (CDC, 2016). CM is divided into four major categories: physical abuse, neglect, sexual abuse, and psychological maltreatment. Information on the incidence rates of child maltreatment (CM) in the U.S. is obtained primarily from two main sources. The first source, the National Child Abuse and Neglect Data System (NCANDS), is the origin of the data used in the current study and is discussed in more detail in the methods section of this paper. NDCAN data are derived from referrals of suspected child abuse cases reported to state-wide Child Protective Services (CPS) agencies. All fifty states and the Districts of Columbia and Puerto Rico have state CPS agencies who investigate reports of child maltreatment. The second main source of CM data is the National Incidence Studies of Child Abuse and Neglect (NIS), which has been conducted four times since 1974 and used mixed methods including a sentinel survey methodology to estimate the rates of child maltreatment, taking into account reports not investigated by CPS (NIS-4). Unfortunately, the most recent NIS study is somewhat dated for the purposes of the

current study, having been conducted in 2010. Nevertheless, it is a good reference to confirm trends and cross-reference NDCAN findings because each of the four surveys has used consistent definitions and methodology. Although a direct causal mechanism for CM has not been identified, some of the most predominant risk factors or predictors have been well established in the literature.

Child Maltreatment Risk Factors

Some consistent demographic trends in the CM literature are from studies finding that disabled children, children living in poverty, in communities with higher rates of unemployment, in single-family homes, and with non-biological male paramours suffer maltreatment at higher rates than their counterparts. Since the first studies of child abuse after the publication of “The Battered Child” by C. Henry Kempe, children living below the federal poverty line have consistently been found more likely to suffer from CM (Kempe, Silverman, Steele, Droegemueller, & Silver, 1962; Legano, McHugh, & Palusci, 2009; Kim & Drake, 2018). However, Kim and Drake (2018) and others concluded that race/ethnicity is not a good predictor of CM when controlling for poverty. Poverty appears to work both at the individual- (child) level and the neighborhood-level. Both poor children and children who live in poor neighborhoods suffer higher rates of CM (Coulton, Korbin, Su, & Chow, 1995). Given the information on poverty, unemployment rates are unsurprisingly a positive predictor of CM, as there is a correlation between parental unemployment rates and childhood poverty exposure. (Brown & De Cao, 2017). Brown et al. (2017) used natural variation in time and between counties of unemployment rates from 2004 to 2012 to examine the relationship to CM. They found that physical

abuse increased 12 percent, and neglect increased 25 percent with a one percent increase in unemployment. Household characteristics closely correlated with unemployment and poverty, such as single-parent households and children of parents with less than a high school diploma, show higher rates of CM (Berger, 2004). Berger (2004) also found that children living with a mother and a non-related male adult were at greater risk of CM.

Family characteristics closely associated with CM are single-parent households, households involving non-biological adults, households with domestic violence, and households with multiple children. Legano et al. (2009) found that female caregivers are responsible for more total cases of physical abuse and neglect. However, more severe CM cases, such as, abusive head trauma, fatalities, and fractures occur at a higher rate with male caregivers. Additionally, children living with non-family caregivers were over 47 times more likely to die from CM than children living with two biological parents (Schnitzer & Ewigman, 2005). A study using NDCAN data found that the most significant predictors for a child under the age of three suffering physical CM were having an unmarried, poor, 20 year or a younger mother, who did not obtain prenatal care, and who smoked during the pregnancy (Zhou, Hallisey, & Freymann, 2006). A longitudinal study that followed 332 families for ten years from when the children were two to 12 years old, determined that the five most predictive factors for CM were the child having a low developmental score on a standardized test, a mother without a high school education, maternal drug use, and maternal depression (Dubowitz, Kim, Black, Weisbart, Semiatin, & Magder, 2011). Additionally, the same study found that CM increased proportionally to the number of children in the family.

Some studies have attempted to delineate if risk factors differ depending upon the maltreatment type. One such study found that children three years of age and younger are at the greatest risk of being victims of child neglect, and the most predictive factors for neglect involved caregiver characteristics (Scannapieco & Connell-Carrick, 2005). A meta-analysis examining risk factors for child neglect found 15 significant factors, ranging from small effects; ($r = .110$) to large effect sizes ($r = .372$), with caregiver factors leading the list. Caregivers with a history of criminally offending (.372), caregivers with a history of mental health problems (.259), caregivers with a history of physical problems (.207), and caregivers with a history of CM as children (.182) had children who were at the highest risk of CM (Mulder, Kuiper, Van der Put, Stams & Assink, 2018). The most significant predictors of child neglect revolve around caregivers (Stith, Lui, Davies, Boykin, Alder, Harris, Som, McPherson, & Dees, 2009). Caregivers self-reported anger, the caregiver perceiving the child as a "problem," in addition to factors of parent self-esteem and the child's social competence were most predictive of neglect.

Risk factors unique to child physical abuse congregate around family factors. A meta-analysis review of the literature as of 2009 aimed to delineate risk factors between physical abuse and neglect. Predictive factors for physical abuse were family domestic violence, lack of family cohesion, caregiver self-reported anger, and the degree that the caregiver perceived the child to be a "problem" (Stith, et al., 2009). Although it is important to understand that in studies which have examined children's behavior or caregiver's perceptions of children's behavior, differentiation in actual behavior by an independent party has not typically been observed (Milner & Chilamkurti, 1991). It

appears that parent's perceptions are a risk factor, but they are uncorrelated with differences in actual child behavior.

Nevertheless, these findings do not negate consistent correlations of increased rates of CM among children with disabilities. A 2012 meta-analysis of 17 studies specific to CM and child disability found a correlation for all types of maltreatment with physical abuse and sexual abuse being the most significant (Jones, Bellis, Wood, Hughes, McCoy, Eckley, Bates, Mikton, Shakespeare, and Officer, 2012). Further research found that children under three years old were at greater risk of repeated physical CM if a parent had an emotional disorder, abused alcohol, or if violence occurred in the family.

The connection between domestic violence in the family and both physical and neglect CM is significant, and replicated in the literature (Mcguigan & Pratt, 2001; Connell-Carrick, 2003; Craig & Sprang, 2007). Domestic violence is also one of the most significant predictors of repeat incidence of CM (Palusci, Smith, & Paneth, 2005). Most pertinent to our current cannabis legalization trend, children's exposure to both domestic violence and trauma within families has consistently shown high correlations to both caregivers who abuse illegal substances and CM rates (Cadzow, Armstrong & Fraser, 1999; Craig & Sprang, 2007).

Drugs and Alcohol and Child Maltreatment

Approximately 50% of U.S. children live with a caregiver who uses alcohol or illegal substance(s) (National Center on Addiction and Substance Abuse, 2019). However, not all of these caregivers misuse the substances, and clearly, not all of these children suffer mistreatment. Nevertheless, approximately 12% of U.S. children reside

with at least one caregiver who misuses alcohol or illegal drugs (Substance Abuse and Mental Health Services Administration {SAMHSA}, Office of Applied Studies, 2009). There are strong correlations between parental alcohol and drug abuse and child maltreatment (Famularo, Kinscherrff, & Fenton, 1992; Cunningham & Finlay, 2013, Freisthler, Wolf, Wiegman & Kepple, 2017). For example, children with a parent who misuses alcohol or drugs are at greater odds of being the subject of a child maltreatment report, of being substantiated as a victim of maltreatment, and are removed from their homes for CM more frequently (Dubowitz et al., 2011). A 2004 sample of CPS substantiated cases indicated substance or alcohol *use* by the mother in 78 percent of the cases (Jones, 2004). About ten percent of babies born in the U.S. each year are prenatally exposed to alcohol or illegal drugs (Young, Gardner, Otero, Dennis, Chang, Earle, & Amatetti, 2009). In one out of five child fatalities, parental substance abuse is listed as a contributing risk factor (US Department of Health and Human Services, 2016).

Yet, there are also significant gaps in the literature concerning CM and parental substance use (Young, Boles, & Otero, 2007; Stanton-Tindall; Sprang, Clark, Walker, & Craig, 2013). There are opportunities to better understand the impacts on children of caregiver cannabis use differentiated by frequency and amount, the differential impact of various substances, and the mechanisms that lead to the correlation between parental substance abuse and CM. Most significant to this study is the chasm in our understanding of the ramifications of cannabis versus other drugs, the use of cannabis versus abuse of cannabis, and the harms surrounding illegally obtained cannabis versus legally obtained cannabis.

One complication in untangling the connection between CM and substance abuse, are the links between caregiver substance abuse and other co-occurring issues (CWIG, 2014). Nearly one-third of caregivers with a substance abuse issue also have a mental illness (HHS, 2014). A high percentage of women with substance abuse problems were previous victims of CM (Najavits, Weiss, & Shaw, 1999). Substance abusers also tend to suffer higher rates of poverty, unemployment, and victimizing or being victimized by an intimate partner, which in themselves are predictors of CM (CWIG, 2014). A study which conducted secondary analysis on CPS data found that caregiver substance abuse was a significant predictor of CM even when parental financial and housing challenges were controlled (Wolock, Sherman, Feldman, & Metger, 2001). However, this study did not delineate between illegal and legal substances, nor between drug types.

Studies examining the impact of individual drugs on CM initially focused on methamphetamine and, more recently, opioids, but few have isolated cannabis. Sprang, Clark, & Staton-Tindall (2010) conducted a systemic literature review and analysis. They divided studies into the following caregiver-child pair categories: (1) caregiver methamphetamine use, (2) caregiver any other type of illicit drug use, including cannabis, and (3) caregiver no illicit drug use. They found that the children living with the caregiver using any other drug were exposed to less trauma than the methamphetamine group but more than the no illicit drug use group. A study independently looking at outcomes for parental drug and alcohol use found both contributed to increased exposure to violence and later psychiatric problems in children, with alcohol having more profound impacts (Hanson, Self-Brown, Fricker-Elhai, Kilpatrick, Saunders, & Resnick 2006). One study looked at the independent effects of a person's use (not specifically caregivers) of

different types of drugs and alcohol and the degree in which they engaged in aggressive behavior. The results supported ranking methamphetamine, alcohol, heroin, and cocaine as the most dangerous, cannabis ranking as medium dangerousness, and mushrooms ranking as the least dangerous to others (Nutt, King, & Phillips, 2010).

Studies attempting to isolate caregiver cannabis use or misuse, separate from other drugs, have conflicting outcomes. A meta-analysis by Ostrowski (2011) concluded that the research surrounding cannabis consumption and aggressive behavior was inconclusive. Subsequent research by Freisthler and Kepple (2019) looked specifically at aggressive parenting behavior by drug type. In a 2009 survey sample in California, they found that past-year cannabis use and polydrug use, including alcohol coupled with cannabis, resulted in higher self-reports of child physical abuse and corporal punishment. However, lifetime users of cannabis reported significantly lower rates of physical abuse than their counterparts. Another study (Kepple, 2017) concluded that the frequent dichotomizing of parental substance misuse or no misuse resulted in overestimations of CM for heavy illicit drug or alcohol users and underestimated CM for persons not reporting heavy use but qualifying as having a substance or alcohol disorder. In a separate study examining parental substance use versus abuse, substance use and abuse were both associated with increased rates of child physical abuse. However, only *abuse* was associated with increased rates of child neglect (Kepple, 2018). Notwithstanding, the specific causal mechanisms between caregiver substance *abuse* and CM are unclear.

Children with substance abusing caregivers are not only more exposed to domestic violence, but all forms of violence and trauma (Staton-Tindall et al. 2013). It is unknown if this is a critical causal mechanism in the link between substance abusing

caregivers and CM and it is a critical question in our examination of the impacts of legalization. It is reasonable to anticipate that removing a caregiver's need to engage in a criminal act of obtaining an illegal substance would reduce children's exposure to the harms surrounding criminal conduct and exposure to violence. Yet, few studies have attempted to separate the impacts of illegal and legal drugs. A very recent study compared arrests for intimate partner violence in MML states to arrest data before legalization. The researchers also disaggregated the arrests according to the extent of the injuries and found that although, the total incidents of assaults did not change, serious injury assaults decreased 18% in MML states (Kaplan, Sian Goh, 2020). They hypothesized that in MML states, cannabis might replace alcohol, which, as discussed previously, has been more closely correlated with aggressive behaviors. The authors also urged additional research into correlations between harm reduction and drug decriminalization.

However, the majority of studies have limited their examination of parental drug use to illegal drugs; less research has focused on legal drug use. Since the specific mechanisms that lead to CM are less understood, it is not clear if simply legalizing a substance might impact the harm for children. The limited number of studies conducted in this area have focused on prescribed versus illegal opioids. An examination of data from Fragile Families and Child Wellbeing Study (FFCWS) found no association between prescription parental drug use and CM (Wolf, 2018). The increase in child injuries, which positively correlated with parental opioid overdoses, was maintained regardless of whether the parent obtained the opioid illegally (Wolf, Ponicki, Kepple, & Gaidus, 2016). A study providing CPS investigators with fictitious vignette scenarios

found that any drug use increased the odds the investigators would substantiate neglect. Furthermore, opioid and cannabis use (regardless if obtained legally) increased the odds of a physical abuse substantiation (Freisthler, Kepple, Wolf, Curry, & Gregoire, 2017). This particular study concluded with the recommendation for future studies to examine specifically the effect of the legalization of cannabis on CM. There are lessons to be learned from research examining the impact of alcohol regulation on CM.

Alcohol is the most commonly abused substance by caregivers, and considerable research has teased out social mechanisms that impact CM. Increased alcohol tax and reduced availability have shown to be an effective policy to reduce both intimate partner violence and CM (Markowitz & Grossman, 1998; Markowitz, Grossman, & Conrad, 2010). A follow-up study by these same researchers found that a one percent beer tax increase had no effect on abuse rates of male caregivers, but decreased CM by female caregivers (Markowitz & Grossman, 2000). Also, the density of alcohol outlets in a neighbor is positively correlated with CM (Freisthler, Midanik, & Gruenewald, 2004). The density of bars was positively correlated with child neglect, and liquor stores positively correlated with child physical abuse (Freisthler, 2004; Freisthler & Wolf, 2016). Researchers believe that one of the mechanisms that contribute to these positive alcohol correlations and CM is social disorganization.

Social Disorganization and Protective Policies

Neighborhoods with high densities of alcohol outlets might have higher social disorganization and, therefore, higher CM (Freisthler & Holmes, 2012). A socially disorganized neighborhood lacks community cohesion and simple controls to reinforce

commonly held values (Sampson, Morenoff, & Earls, 1999). Social disorganization leads to less collective efficacy. Collective efficacy refers to the willingness of the neighborhood members to either support other members or take action when another member acts outside the shared values. Social disorganization is positively correlated with intimate partner violence (Browning, 2002) and CM, including child fatality rates (Coulton et al., 1995; Guterman, Lee, Taylor, & Rathouz, 2009). Theoretically, social disorganization reduces collective efficacy, which erodes the social fabric which mitigates CM (Sampson et al., 1999; Freisthler & Holmes, 2012). There is a growing trend and desire to direct child maltreatment prevention efforts towards improving collective efficacy in communities (Freisthler, 2004; Kim & Maguire-Jack, 2015).

However, drug market forces harm both CM and collective efficacy (Freisthler et al., 2017). Neighborhoods with high social disorganization have more illegal drug possession and sales. Freisthler et al. (2017) hypothesize that drug markets might increase fear in neighborhoods, preventing people from building community connections. Freisthler, Needell, & Gruenewald (2005) used spatial regression to compare CM rates in census blocks in California. They found that higher prevalence of drug possession was correlated with higher rates of CM, even when financial, race, and employment demographics were controlled. A similar survey also used police data to measure the density of drug use and sales at the neighborhood level. However, in addition, they conducted telephone interviews with caregivers and asked about personal drug usage, frequency of neighborhood illicit drug sales, CM, and perceptions of neighborhood social control and support (Freisthler et al., 2017). The resulting binomial models revealed increased rates of child physical abuse were positively correlated with drug density.

Higher perceptions of social support and control were negatively correlated with CM. Nevertheless, in a multivariate logistic regression model accounting for the shared variance between predictors, caregiver cannabis use was no longer a significant predictor of child physical abuse. Notwithstanding, neighborhood drug density and neighborhood cohesion remained significant, accounting for the entire effect of cannabis use. Freisthler et al.'s (2017) study lends evidence to a theory that neighborhood mechanisms play a more significant role in CM than caregiver substance use. Additional research lends support to the belief that manipulations at the policy and legislative level can impact neighborhood mechanisms, and in turn, CM.

Variations in state policies concerning Medicaid, Mandatory Reporting Laws, minimum wage, Temporary Assistance to Needy Families, and childcare waiting lists provide evidence on which laws and policies are most closely associated with CM. States with Universal Mandatory Reporting Laws did not show a difference in the total number of CM reports filed (just variation in the types of reporting parties) or disposition type when compared to states without a Mandatory Reporting law (Krase & DeLong-Hamilton, 2015). Another comparison study between states found that a one dollar increase in minimum wage correlated with a nearly ten percent decline in child neglect reports to CPS (Raissian & Bullinger, 2017). The reduction was most profound with children 12 years and under and was independent of a child's race. Statewide reductions to Temporary Assistance to Needy Families (TANF) correlated with increased CM and foster care placements when compared to states without reductions (Ginther & Johnson-Motoyama, 2017). CM was compared in states which adopted Medicaid expansion to states that did not expand, and expansion was associated with reductions in child neglect

rates, but not physical abuse rates (Brown, Garrison, Bao, Qu, Jenny, & Rowhani-Rahbar, 2019). In summary, the evidence is robust that divergent state-level policy and legislation impacts child welfare. Some of the most profound changes to state policies over the last decade are the sweeping spread of cannabis legalization in the U.S.

Status/History of Marijuana Laws in the U.S.

Currently, 33 states have laws allowing for the medicinal possession and use of cannabis, and 11 states and the District of Columbia and Puerto Rico have made cannabis possession and consumption entirely legal for adults 21 years and older (NCSL, National Conference on States Legislatures, 2019). See Appendix 1, Figure 1 for a map of the legal status of all U.S. states. California started the trend with the first medical cannabis law in 1996. In 2012, Washington State and Colorado were the first states to introduce recreational cannabis laws. In the November 2020 election cycle, 4 additional states added RMLs, 2 states added MMLs, and Oregon approved a ballot measure to decriminalize personal use and possession of several street drugs, including opium and cocaine.

The RML and MML laws in each state are discordant. They differ concerning ailments allowed, the process required to obtain cannabis, allowed amounts, home cultivation, and permissible level of tetrahydrocannabinol (THC), the main psychoactive compound in cannabis. The most permissible status is completely legal and labeled as RML in this study. The commonalities in the laws in these states are that a state resident can legally possess a personal use amount of cannabis and consume cannabis in a private space. States vary on whether they have licensed cannabis dispensaries and, if so, the

packaging, licensing, and densities of establishments. The next level of permissibility is states with some form of MML. These states allow possession and consumption of cannabis after written permission from a doctor and completion of a licensing process.

The lowest level of permissibility are states we have labeled illegal states. An illegal designation includes states in which possession of any amount of cannabis is still considered a criminal offense and states which have decriminalized cannabis.

Decriminalization refers to states that have made the possession of cannabis either a civil offense or a low-level misdemeanor, subject to a fine. For this study, decriminalized states are grouped with the illegal states (if they do not have MML or RML) because possession of cannabis is still considered probable cause for a police officer to detain, similar to a traffic violation. Besides, the term decriminalize can be misleading as several of these states still consider possession of a personal use amount of cannabis an incarcerable offense.

Irrespective of state legalizations, U.S. federal law still considers cannabis a Schedule I drug. Although in November 2019, the U.S. House of Representatives passed a bill challenging the schedule I status of cannabis, the bill has yet to pass the Senate and become law. During the timeframe of this study, the Obama and Trump presidential administrations have varied widely in their direction to federal prosecutors concerning state cannabis laws (NCSL, 2019). Most state CPS agencies still investigate alleged cannabis exposure cases. Although exposure alone is not sufficient evidence for an allegation of maltreatment to be substantiated (Rashid & Waddell, 2018). CPS Investigators are trained to evaluate whether caregiver cannabis use, similar to alcohol, places the child(s) health or wellbeing in jeopardy of harm, notwithstanding legal status.

MML/RML Effects

Undoubtedly, the rate of state-wide cannabis legalization has been rapid and does not appear to be tapering. Research into the effects of this legislation on communities is beginning to come into focus. Data from the National Youth Risk Behavior Study (YRBS) shows an overall decline in cannabis use among youth from 44% in 1999 to 37% in 2009 (Johnson, Fairman, Gilreath, Xuan, Rothman, Parnham & Furr-Holden 2015). In addition, a study examining one of the first RML states; Colorado, found no increase in use by youth, but increased frequency of use by adults (Maxwell & Mendelson, 2016). A similar increase in adult usage exists in California (Freisthler & Gruenewald, 2014) and in comparisons of use between MML states and illegal states (Chu, 2014; Pacula et al., 2013). However, it is less understood if MML and RML states start out with higher prevalence (Pacula, et al., 2013). Additionally, the availability of cannabis is proportional to the density of dispensaries. Policies limiting density can mitigate increased usage (Freisthler & Gruenewald, 2014).

The impact of legalization on driving and crime initially appears straight forward. National Highway Traffic Safety Agency (NHTSA) data between 2007 and 2014 shows a 47% increase in nighttime drivers testing positive for cannabis but a decrease in measurable driver alcohol levels (Berning, Compton, & Wochinger, 2015). A NHTSA fatality analysis report in California found increases in cannabis positive tests in fatal accident investigations after MML enactment. A California examination of violent and property crime rates found no association with the density of medical cannabis dispensaries (Kepple & Freisther, 2012).

Colorado and Washington have paved the way for legalization, and resultantly have been the site of the majority of studies assessing impact(s). A study focusing on Colorado found increases in hospital admissions, emergency room visits, calls to poison control centers but decreases in arrests and admissions to addiction treatment centers after RML enactment (Maxwell & Mendelson, 2016). A few studies have found evidence that cannabis might replace the use of opioids and reduce opioid prescriptions (Ozluk, 2017), opioid hospital admissions, and opioid overdose deaths (Powell, Pacula, & Jacobson, 2018). Smith (2020) looked more specifically at dispensary proximity and overdose deaths and found an 11% decrease in opioid overdoses in counties that opened a dispensary. An economic analysis of alcohol and tobacco tax revenues in RML states provided evidence that cannabis consumption contributed to decreasing demand for alcohol and tobacco (Miller & Seo, 2018).

A reduction in alcohol tax revenue has not negated the huge economic benefits MML and RML states have experienced. Marijuana legalization in the form of taxes and licensing fees are estimated to generate \$90 million in Colorado from the fiscal years 2013 to 2015 (Maxwell & Mendelson, 2016). A Public Broadcasting Service (PBS) channel in Colorado reported that almost 16,000 people were licensed to work in the cannabis industry as of 2015 (Boiko-Weyrauch & Kuntz, 2015). It is difficult to determine if the economic benefits of legalization are greater than any potential public health and safety costs without understanding the impact of legalization on child welfare.

Due to the relative recency of the cannabis legalization trend, research specifically into the impacts on children is limited. As legalization began to proliferate, the American Academy of Pediatrics (AAP) updated its recommendations against medical cannabis use

for children and in opposition to recreational legalization. The AAP cited potential adverse developmental impacts on children and unknown influences of caregiver usage on children (Ammerman, Ryan, & Adelman, 2015). The AAP did recommend additional research into the impact of legalization on child welfare. Cases of accidental childhood ingestion of cannabis almost immediately increased after legalization and led to subsequent state law revisions and additions requiring more stringent packaging provisions (Onders, Casavant, Spiller, Chounthirath, & Smith, 2016; Gordet, Giombi, Kosa, Wiley, & Cates, 2017).

A review of the most common academic search engines revealed three studies specifically examining MML's and CM and one unpublished article examining RMLs and CM. The findings of these limited numbers of studies are inconsistent. A small, qualitative focus group study found that current MML parental users believed their cannabis use improved their parenting abilities by helping them remain calm (Thurston, Binswanger, Corsi, Rinehart, & Booth, 2013). Two studies by Freisthler and colleagues focused on the impact of MML in California. In 2015, Freisthler et al., (2017) using survey methodology found that caregiver cannabis use was positively correlated with the frequency of child physical abuse but negatively correlated to child neglect. They additionally examined the density of medical cannabis dispensaries in California after legalization and found that increased density was positively associated with physical child abuse rates (Mair, Freisthler, Ponicki, & Gaidus, 2015). Mair et al's 2015 examination did not include any analysis of abuse statistics before establishment of dispensaries, therefore, they could not rule out the possibility that dispensaries were placed in locations with preexisting higher incidence of CM. A subsequent study

(Freisthler, 2017) replicated the findings surrounding physical abuse and neglect, but also found that associated drug violence was a better predictor of physical abuse than the availability of drugs.

Two University of Oregon researchers specifically examined state-wide variations in MML and RMLs on CM rates (Rashid & Waddell, 2018). They used differences in difference statistical analysis to assess the relationship between MML/RML and CPS substantiation rates. They found a 13% reduction in physical abuse rates, but no change in neglect rates in states with MML. They found reductions in both neglect and physical abuse rates with RML's. White caregivers aged 25-44 showed the greatest effect size in physical abuse rates. The authors hypothesized that improved economic variables and the likelihood that cannabis might replace alcohol and opioid use, which have shown to be more dangerous to children, resulted in an overall mitigating effect of cannabis legalization on CM (Rashid & Waddell, 2018).

Summary

Children who live with caregivers who abuse illegal drugs suffer higher rates of CM. However, there are significant gaps in the literature. The specific effects of caregiver cannabis abuse and extricating the cataclysmic variables that are a result of illegality are not clearly understood. There is an urgent need to understand the mechanisms that create this correlation due to the increasing frequency of statewide legalization policies. The limited number of studies that have examined the impact of MML and RMLs on CM have obtained conflicting results. One study that looked at both MML and RML found

that CM was reduced and hypothesized that caregivers might substitute cannabis for alcohol and more dangerous drugs.

This study will attempt to address some of the gaps in the literature by first comparing aggregated CM rates between RML, prelegal, and illegal states to better understand any larger trends of CM in relation to legalization. Second, by examining the factors that impact a CPS investigators decision to substantiate a case of CM and whether these factors are altered by differential cannabis legislation. Specifically, we will focus part 2 of the analyses on comparing the significance of caregiver alcohol and drug misuse risk factors in predicting child abuse substantiation based upon the legal status of the state at the time of the investigation. If cannabis is mitigating CM by replacing more dangerous substances, we should see a reduction in the significance of these variables in predicting substantiation for CM in cases in states with MML or RML versus cases in states without MML or RML. Identifying risk factors associated with maltreatment, and whether the nature of these factors is altered with increased legalization is the first step in improving assessment and prevention strategies.

Methods

Population/Unit of Interest:

The population of interest in the Part 1 analyses are all Children in the 50 U.S. States.

Whereas the unit of interest in the Part 2 analyses are all Child Protective Service (CPS) cases in the 50 states and District of Columbia and Puerto Rico.

Research Questions/Hypotheses:

Part 1: Hypothesis #1: States with Recreational Marijuana Laws (RML) have higher CM rates than states without RMLs.

Hypothesis #2: The rate of CM will differ in states that enact RML compared to the rates before enactment (prelegal).

Hypothesis #3: Any significant variations in CM rates in states with RML will not be explained by other standard predictors of child abuse (poverty rates, single parent household rates, and rates of children with special needs).

Part 2: Hypothesis #4: The risk factor Caregiver use of Drugs will be a greater predictor of CM substantiation in cases in states without MML than with MML.

Research Question #5: The risk factor Caregiver use of Drugs will be a greater predictor of CM substantiation in cases in a state without RML than with RML.

Research Question#6: The risk factor Caregiver use of Alcohol will be a greater predictor of CM substantiation in cases in states without MML than with MML.

Research Question #7: The risk factor Caregiver use of Alcohol will be a greater predictor of CM substantiation in cases in states without RML than with RML.

Data Sources:

Part 1: Data for the analyses in Part 1 are from the Kids Count Data Center, 2009-2017.

The Kids Count Center aggregated data from the U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. National Child Abuse and Neglect Data System (NCANDS) Child File (Annie E. Casey Foundation, 2001). Little's Missing at Random

test was conducted on the variables and Chi-square, $\text{sig}=.630$, not statistically significant; therefore, cases with missing data were omitted from the analysis. The 50 states for nine years totaled 447 cases, after missing states or years were omitted.

Part 2: Data for analyses in Part 2 was obtained from the National Data Archive on Child Abuse and Neglect (NDCAN). Independent Datasets for the fiscal years 2010 to 2017, entitled NDCAN-Child File, were obtained (Children's Bureau, 2009-2017). NDCAN composes the datasets by compiling case-level data submitted by each U.S. State and the District of Columbia and Puerto Rico CPS agencies. Child-specific records for each investigation of an allegation of CM received by CPS that has reached a disposition are included. A case can be disposed of in one of eight ways: (1) substantiated, (2) indicated or reason to suspect (3) alternative response disposition-victim, (4) alternative response disposition-not a victim, (5) unsubstantiated, (6) unsubstantiated due to an intentionally false report, (7) closed-no finding, and (8) other. NDCAN conducts checks for missing data and consistency within the data. The data are divided into demographic and risk factors for the child alleged to have suffered maltreatment, demographic and risk factors for the primary caregiver for the child (not necessary the alleged perpetrator), demographic factors for the alleged perpetrator (s), maltreatment types and dispositions, and services offered to the family, caregiver or child. A separate case is created for each child alleged to have suffered maltreatment. The eight annual datasets were merged into one file for the analyses and 24 variables were retained for analyses.

The NDCAN datasets were obtained after approval from the University of Nevada Reno Institutional Review Board. NDCAN has deidentified any child, date, or small county information, but the datasets are still securely stored on the University of Nevada remote server. Full datasets and representative sample datasets contained 10,000 cases each. Analysis of missing data in the datasets was conducted and found to be missing at random and therefore, cases with missing data were omitted from the analysis.¹

Variables:

Part 1: Dependent Variable: Child Maltreatment Rate (CMRate), Rate per 1000 population for Physical, Emotional, Neglect, or Sexual Child Maltreatment Substantiation by CPS.

Predictor/Independent Variables: RML (x_1): The use of recreational cannabis is legal (RML) in this state; RML coded 1, no RML coded 0.

Pre-legal (x_2): The State, as of 1/1/2019, has enacted RML, eventual RML legal state coded 1, no RML as of 1/1/2019 coded 0.

¹ Initially, we intended to use the full datasets for analysis. However, access to the University library and the full datasets was restricted due to the COVID-2019 pandemic. Resultingly, the sample datasets were used for the analysis (N=87,145).

Control Variables: Poverty rate (POVr (x_3): % of children living in poverty in this state, Special Needs Children (SPEC) (x_4): % of children who have emotional, behavioral, or developmental conditions in this state, and Children of a single parent (SP) (x_5): % of children who live with a single parent in this state.

Part 2: Dependent Variable: “Child is a Victim in this report” (RptVictim): NDCAN created this variable, and we made no alterations. If any maltreatment on the case was given a disposition of substantiated, indicated, or reason to suspect, or the child died as a result of maltreatment, this was determined to be "child is a victim on this report" and coded 1. Any other maltreatment disposition resulted in the case being labeled as "child is not a victim on this report" and coded 0.

Subsets: Medical Marijuana Law case (MML): each case in the dataset depending upon the year and state in which the case was filed was identified as either MML case (coded 1) or a non-MML case (coded 0).

Recreational Marijuana Law case (RML): each case in the dataset depending upon the year and state in which the case was filed was identified as either an RML case (coded 1) or a non-RML case (coded 0).

Predictor/Independent Variables: Drug Abuse Caregiver, FCDrug (x_6): as determined by the CPS investigator handling the case, the primary caregiver of the child alleged to have suffered maltreatment exhibits "the compulsive use of drugs that is not temporary." The drug does not have to be illegal for the caregiver to indicate yes to this variable.

Also, if the drug is illegal, it does not result in an automatic yes. These were initially coded 1 for yes and 2 for no. we changed the coding to 0 for no, maintaining 1 for yes. Alcohol Abuse-Caregiver, FCAlc (x_7): as determined by the CPS investigator handling the case, the primary caregiver of the child engaged in "the compulsive use of alcohol that is not temporary" (NDCAN codebook, 52). These were initially coded 1 for yes and 2 for no. we changed the coding to 0 for no and maintained 1 for yes.

Control Variables: Domestic Violence, FCViol (x_8): as determined by the CPS investigator handling the case. A yes indicates evidence supporting spousal abuse exists in the child's family or home. These were initially coded 1 for yes and 2 for no. we changed the coding to 1 for yes and 0 for no. ChSex (x_9): Child Gender. These were originally coded 1 for male and 2 for female. we changed the coding to 0 for females and maintained 1 for males.

ChAge (x_{10}): The child age variable provided by NDCAN were collapsed into the following categories: 0-3 years (3), 4-7 years (7), 8-12 years (12), 13-17 (17), 18 and over (18), and unborn (77) to not only increase the sample size but better reflect developmental and educational level milestones associated with CM in the literature.

Inadequate Housing, FCHouse (x_{11}): The CPS worker indicated that the child living condition (unsafe, overcrowded, or substandard) rose to the level of a risk factor. These were initially coded 1 for yes and 2 for no. we changed the coding to 0 for no and maintained 1 for yes.

Financial Problem, FCMoney (x_{12}): The CPS worker indicated that the child's family financial situation rose to the level of a risk factor. These were initially coded 1 for yes and 2 for no. we changed the coding to 0 for no and maintained 1 for yes.

Public Assistance, FCPublic, (x_{13}): This field indicates whether the child's family receives TANF, general government assistance, Medicaid, Supplemental Security Income, Section 8, or food stamps. These were initially coded 1 for yes and 2 for no. we changed the coding to 0 for no and maintained 1 for yes.

Data Analysis Procedures, Part 1: Descriptive statistics, bivariate analysis, and correlations using Pearson's r were conducted for each of the dependent and independent variables. Multivariate logistic regression was conducted to examine any relationship of the independent variables on CM rates while controlling for socioeconomic and demographic factors as indicated. A .05 alpha level was used on all of the analyses.

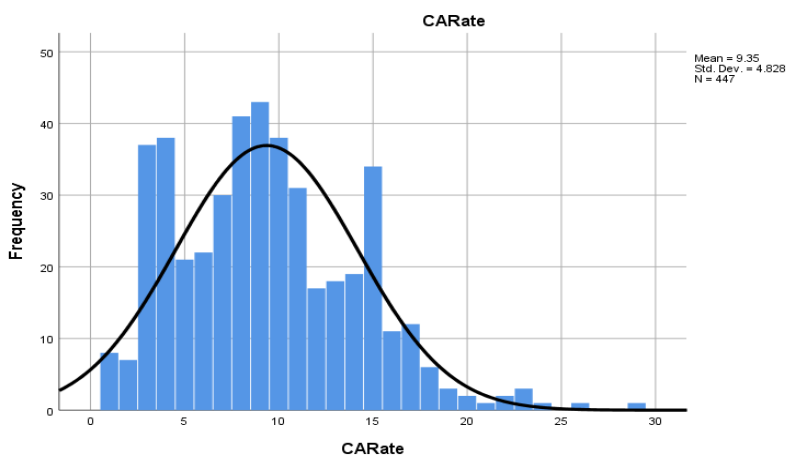
Part 2: Descriptive statistics and independent sample T-tests were conducted to determine which independent, and control variables were the most closely correlated to the dependent variable with each subgroup of MML and RML. Binary logistic regression was then used to determine which IVs provided the highest odds ratio of predicting the DV (child is a victim/the case was substantiated) between the subgroups.

Results

Part 1, Descriptive Results

The mean CM rate from 2009-2017 across all 50 states (N=447) was 9.35 per 1000 population with a standard deviation of 4.83. The rates are normally distributed. See Graph 1.

Graph 1. Histogram of CM Frequencies, All States



States in which cannabis has never been legal between 2009-2019 have a mean rate of CM substantiation of 8.73 (sd=4.505, N=343). States which enacted RML sometime within 2009-2019 but are not legal at the time of the measurement (prelegal) have a mean CM substantiation rate of 11.88 (sd=5.45, N=73). States who had RML in place at the time of the measurement had mean CM rates of 10.23 (sd=4.82, N=31). Upon initial observation, these descriptive statistics appear to support alternative hypotheses 1 and 2. CM rates are higher in states with RML than illegal states but after legalization decrease from their prelegal rates.

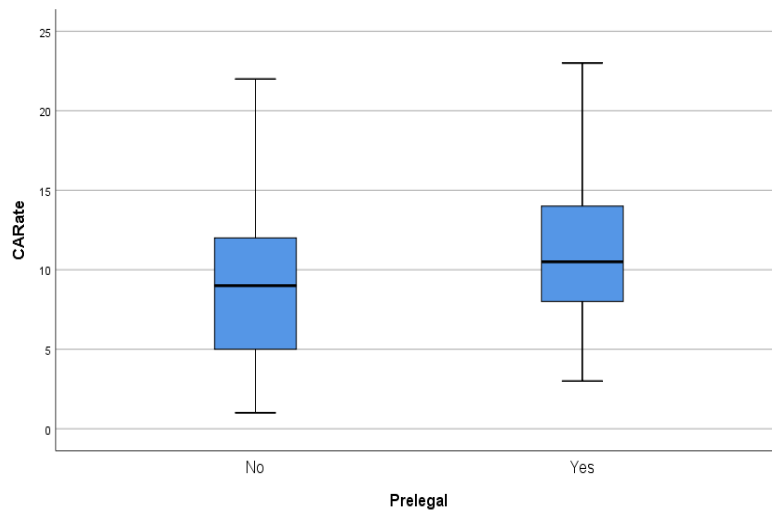
The percentage of children living in poverty in all states between 2009 and 2017 is 19.4%, with special needs is 20% and living with a single parent is 40%. Although the

CM rate is higher for pre legal states compared to illegal states (states without RML), outliers are not significantly contributing to this result. See Table 1 and Graph 2.

Table 1. Means Table for Part 1. Independent and Dependent Variables.

VARIABLES	MEAN	SD	N
Illegal States, 0,0	8.73	4.505	343
Pre legal States, 1,0	11.88	5.449	73
RML Legal States 1, 1	10.23	4.815	31
U.S. Child Maltreatment rate, Total	9.35	4.828	447
Poverty rate	.198	.052	465
Special Need Child rate	.20	.027	203
Single parent rate	.40	1.284	465

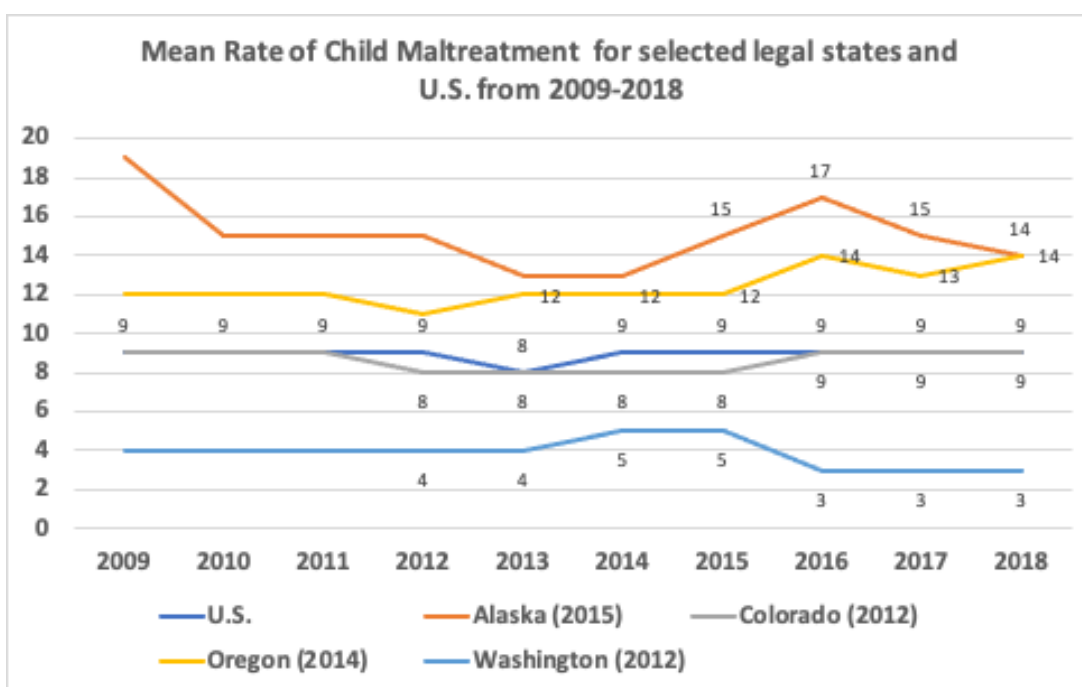
Graph 2. Boxplot of pre legal versus illegal states.



Descriptive statistics solely focusing on an examination of pre and post CM rates in states with RML further illustrate that prelegal state's rates of CM decrease after

legalization. The first two states to enact RML were Washington and Colorado in 2012. Oregon followed in 2014, Alaska in 2015, Massachusetts, Maine, and Nevada in 2016, California, Michigan, Vermont in 2018, and Illinois in 2019. However, Graph 3 demonstrates the general pattern of rates after legalization in which rates initial increase followed by a decrease back to the mean, and in the case of Washington below the prelegal mean.

Graph 3. Mean rate of CM per 1000 population for selected legal states from 2009-2017.



Part 1, Inferential Results

We used SPSS to run a linear regression and a Pearson correlation test with each independent variable against the dependent variable. Predictably, the control variables

with the highest correlation are the rates of single parenthood and poverty (.754). The dependent variable, CM rate, was more closely correlated with the control variables single parenthood (.319), the poverty rate (.283), and rate of special needs (.257) than either of the predictor variables, prelegal (.219) and RML (.103). The underlying variables accounting for higher CM rates in prelegal states than illegal states are not explained with our current variables. Pre legal states have negative correlations between Child Maltreatment Rate (CMrate) and the poverty rate (-.081) and rates of special needs children (-.223). Table 2 found in Appendix C includes a listing of all of the correlations.

A multiple regression analysis was used to test the first order model listed below:

$$\text{1st Order Model: } y = B_0 + B_{(\text{prelegal})} - B_{(\text{RML})} + B_{(\text{POVr0})} + B_{(\text{SPEC})} + B_{(\text{SP})} + e$$

The results of the regression model predict almost 18 % of the variance ($R^2 = .179$, $F = 9.519$, $p < .001$). The status of states as prelegal ($B = .266$, $p < .005$) and the rates of special needs children ($B = .233$, $p < .001$) were the most significant variables. Legality of states (RML) was not significant in the model ($B = .015$, $p > .005$). The model predicts the values of states which choose to enact RML. For example, a prelegal state which enacts RML and has a poverty rate of 19% a special needs rate of 16% and a single parenthood rate of 37% would predict a CM rate of 10.568 as illustrated in the following formula:

Example State: CMrate =

$$(-5.872) + .241 + 3.004 + (10.328 \times .19) + (41.934 \times .16) + (12.227 \times .37); \text{ CMrate} = 10.568.$$

Additionally, the residuals of the predicted values are normally distributed. See Table 3 for additional.

Table 3. Regression Coefficients, Model #1: 1st Order Model: $y = B_0 + B_{(\text{prelegal})} - B_{(\text{RML})} + B_{(\text{POVr0})} + B_{(\text{SPEC})} + B_{(\text{SP})} + e$

Variable	Unstandardized Coefficients
	B
Poverty rate	10.33
Special Needs rate	41.93**
Single Parent rate	12.23
RML state	0.24
Prelegal State	3.00**

** reflects significance of $p < .001$

We created predicted values for each state utilizing the model and the mean of each state's control variables. These predicted values are compared to the actual mean CM rate for the states. Table 4. illustrates the accuracy of the model for most states.

Table 4. Comparison between actual mean CM rate per 1000 and predicted mean CM rate using Model #1, by legal status.

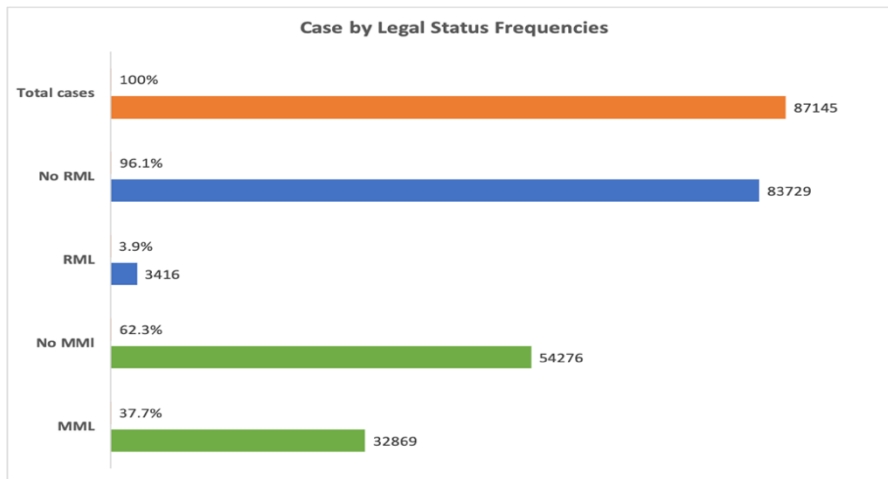
Legal Status	Actual Mean	Predicted Mean	Difference	N	N used in prediction
Illegal States	8.73	8.86	-0.13	343	155
Illegal now, but became RML States (Prelegal)	11.88	11.61	0.27	73	28
Current RML states	10.23	10.85	-0.62	31	20
Total, RML and Prelegal	11.38	11.29	0.09	104	48
Total, all States	9.35	9.43	-0.08	447	203

The results of Part 1 descriptive and inferential analysis support hypothesis #1, as RML states do have a higher statistically significant mean CM rate than illegal states.

Additionally, hypothesis #2 can also be supported as the mean rate of CM substantiation decreases after legalization. Nevertheless, we do not believe we have enough information to attribute this reduction to RML as the legalization status of states is not highly correlated in this model with CM rate. Variables are absent from this model to explain the preexisting higher mean CM rate in pre legal states. Part 2 of the analysis is designed to examine the individual case level to better understand if the legal status of the states reflects different predictors for CM substantiation.

Part 2, Descriptive Results

Graph 4 shows the total number of cases in the dataset and the frequencies of the cases by legal status. Cases are sorted according to the state and year of disposition. If a legalization law was in effect by January of the fiscal year, the case is included for the year. Whereas, if the law did not go into effect from February to June, it would not be included as a legal case in any of the groups until the following fiscal year. Within groups (MML or no MML) are mutually exclusive. Every state belongs to one category in each of the subgroups. For example, if a case occurred in Maine in 2014, it would fall into the MML-Yes, RML-No subgroups. See Appendix 2, Spreadsheet 1 for a listing of the legal status of each state, by year. Table 5. Shows the mean rate of substantiation broken down by the legal status subgroups.

Graph 4. Case by Legal Status Frequencies**Table 5. Case substantiation (Child is a Victim) by Legal status subgroups.**

Child is a Victim On this Report	<i>M</i>	N	SD
MML-No	.18	54276	.383
MML-Yes	.19	32869	.392
RML-No	.18	83729	.387
RML-yes	.17	3416	.378
Total	.18	87145	.386

We conducted comparisons between each of the categorical dummy coded, dichotomous variables and the dependent variable (child is a victim) for each legalization

subgroup using the crosstabs feature in SPSS. The percentage of cases reflected within each subgroup is shown in Table 6. Relationships indicated as significant based on a reported chi-square value ($p < .05$) are highlighted. As an example, one of the most significant relationships involved the risk factor of inadequate housing. 4.4% of cases referred to CPS in a state with MML in place in the year of the case had a risk factor for inadequate housing, compared to 17.8% of cases in a state without MML. This trend of reduced financial and housing risk factors is consistent in both RML and MML cases, lending support to the positive economic benefits of legalization. Generated expected counts were compared to actual counts. The expected counts reflect consistency with the null hypothesis (that there is no difference between groups). For example, the expected count of cases with alcohol as a risk factor in MML case is 649.1, with an actual count of 1132; caregiver drug use, expected: 1528, actual: 1928, and domestic violence expected: 1858, actual 2481. Based on these limited descriptive statistics, legalization appears to have the opposite effect on caregiver drug and alcohol risk factors than we hypothesized. Caregiver Alcohol and Drug use occurred at a greater frequency in both MML and RML cases than their counterparts. MML and RML cases less frequently had a risk factor for inadequate housing and financial problems than their respective comparison groups. It is also noteworthy that the dependent variable: the likelihood that a case resulted in a disposition that a child was a victim of maltreatment, did not show a significant relationship to any of the legal statuses. However, the predictors for a case concluding that a child was a victim upon initial examination do appear to differ. Therefore, the descriptive statistics support a relationship between state legal status and predictors of maltreatment and warrant more detailed analyses.

Table 6. Crosstabs comparing the percentage breakdown of each variable within the subgroups

Variable Name	MML, Yes	MML No	RML, Yes	RML, No
Child is Victim Yes	19.0	17.8	17.2	18.3
Caregiver Drug Yes	15.7	10.8	19.7	12.1
Caregiver Alcohol Yes	9.4	3.4	16.7	4.9
Domestic Violence Yes	16.0	10.2	11.6	12.0
Child Gender Male	50.3	50	49.8	50.1
Inadequate Housing Yes	4.4	17.8	5.0	14.2
Financial Problems Yes	12.6	20.2	9.1	18.5
Public Assistance Yes	32.8	23.7	10.1	27.6

Part 2. Inferential Statistics

To be conservative and provide a more skeptical analysis than Chi-square statistics provide, we also conducted independent-sample T-tests. First, we compared each of the independent and control variables to whether the case was substantiated (child

determined to be a victim), delineated by the subgroups using independent t-test. We then compared the mean results of the subgroups using a summary t-test to examine whether the correlation between the independent variables and dependent variables differed significantly depending upon legal status. The most noteworthy results are in Tables 7.

Four variables were found to be significant correlates, regardless of MML legal status, in predicting that a child was a victim. Albeit the difference in correlations between the legal statuses were statistically significant. Put simply, the same variables play significant roles in predicting substantiation regardless of legal status. However, the variable's importance does change relative to legal status. As an example, Caregiver alcohol misuse was positively correlated with a substantiation decision in both MML groups (MML-no, $t=17.015(25047)$ $p<.000$; MML, $t=17.040(12088)$ $p<.000$). However, the mean difference between legalization status was significant ($t=-14.614(7561)$ with MML-no, $M=.07(.260)$ and MML-yes, $M=.18(.386)$ indicating a risk factor of caregiver alcohol was more highly correlated in cases being investigated in states with MML. The risk factor of domestic violence in the household had the highest correlation for a substantiation decision regardless of MML status. However, the degree of correlation was less impacted by a change in legal status with cases in states without MML, $M=.24(.428)$, $t=46.181(36442)$; cases in states with MML, $M=.30(.460)$, $t=26.563(15541)$ and a significant difference in means, $t=-6.646(11045)$, $p<.000$. The risk factors of Caregiver Drug and Alcohol use both worked in the opposite direction of our hypotheses. The mean rate of caregiver drug and alcohol use in cases in which a victim is substantiated is statistically significantly higher in MML legal states than non-legal states.

Consistent with the descriptive results, the economic risk factors appear reduced with legal statuses. The risk factor of Inadequate housing occurs at a reduced rate in substantiated cases in states with MML ($M=.09(.288)$ $t=13.006$) than MML-no cases ($M=.22(.413)$ $t=8.850(30487)$) with a significant ($p<.000$) difference in means ($t=14.244(8400)$). This trend continued in a comparison between RML cases.

Similar to the MML subgroups, all four primary risk factors were significant at $p<.001$ and positively correlated with a decision to substantiate maltreatment in both RML subgroups. Children who were substantiated for maltreatment were more likely to have a caregiver who misused drugs or alcohol, lived in a household with domestic violence, and suffered from inadequate housing than children in cases that were unsubstantiated, regardless of legal status. However, the mean difference between cases in states with RML and cases in states without RML was no longer significant with the risk factors of Caregiver drug use and Domestic Violence. The mean rate of domestic violence in substantiation actually decreased in RML-yes cases ($M=.22(.412)$) compared to RML-no cases ($M=.26(.439)$). Caregiver use of alcohol demonstrated the greatest statistical mean difference ($t=-6.598(7561)$) between legal statuses with RML-no ($M=.10(.305)$) and RML-yes over double $M=.22(.416)$.

In summary, bivariate results support caregiver drug and alcohol misuse, domestic violence and inadequate housing are significant predictors of substantiation for maltreatment in all of the cases. Nonetheless, caregiver alcohol and drug use are more highly correlated to substantiation in cases occurring with MML. Caregiver alcohol use is more highly correlated to substantiation in cases occurring with RML and the risk factor of inadequate housing is less correlated in legal states than non-legal states.

Table 7. Bivariate Results of MML and RML subgroups

Subgroups Risk Factor	No MML				Between groups t(df)	No RML				Between groups t(df)
	M	SD	M	SD		M	SD	M	SD	
Caregiver Drugs	.23	.42	.28	.45	-4.782(7702)	.25	.43	.27	.44	-.814(7702) ns
Caregiver Alcohol	.07	.26	.18	.39	14.614(75610)	.1	.31	.22	.42	-6.598(7561)
Domestic Violence	.24	.43	.3	.46	6.646(11045)	.26	.44	.22	.41	1.549(11045) ns
Inadequate Housing	.22	.42	.09	.29	14.244(8400)	.18	.39	.09	.29	4.407(8400)

Results are significant at $p < .001$, unless indicated with “ns” in which $p > .05$.

Binary logistic regression was used to predict the probability that a case was substantiated versus unsubstantiated and the variables that most contributed, independent of the other variables. Again, the analysis was run separately differentiated by legal status to determine if the factors that predict substantiation varied depending upon legal status. The predictor variables used in the model reflect the results of the previous crosstabs and t-test analysis. The predictor variables used were Caregiver alcohol, Caregiver drugs, domestic violence, Inadequate housing, and financial problems. The states with MML model was significant (-2 log likelihood =7604.39, $X^2=346.127$, $p<.000$) with an overall prediction rate of 81.6 %. The states without MML model had an overall prediction rate of 79.5 % and was significant (-2 log likelihood =18,389.41, $X^2=1393.007$, $p<.000$) The states with RML showed a similar overall prediction rate of 75.6% and the model was significant (-2 log likelihood =962.62, $X^2=20.392$, $p<.001$). The states without RML model correctly predicted 80.1%. of substantiation decisions and was also significant (-2 log likelihood =25145.21, $X^2=31614.28$, $p<.000$).

Using a $p < .05$ standard of significance, all the variables had significant partial effects predicting the odds of substantiation (child is a victim) in the MML subgroups. However, Inadequate housing and domestic violence were the most significant for predicting substantiation in cases in states without MML. In fact, the odds were 3.6 times greater of a substantiation if inadequate housing existed in a state without MML. The odds were slightly over 3 times greater of a substantiation decision if domestic violence existed in the household in a state without MML. Caregiver drug misuse had a lower odds ratio ($B=.670$, $Wald=53.606$, $Exp(B)=1.953$, $p<.000$) in states with MML than states without MML ($B=1.000$, $Wald=294.776$, $Exp(B)=2.718$). In other words, a case involving a child who lives in Alabama, a state without MML, is over 2.5 times as likely to be substantiated for maltreatment because her caregiver misuses drugs. Whereas a case involving a child who lives in California, a state with MML, is less than 2 times as likely to have her case substantiated because her caregiver misused drugs. A caregiver's misuse of drugs is still a significant risk factor and a positive predictor of substantiation, albeit with decreasing odds. However, caregiver use of alcohol increases the odds of a substantiation decision in a case in a states with MML to a greater degree ($B=.507m$, $Wald=21.127$, $Exp(B)=1.660$, $p<.000$) than in cases in states without MML ($B=.287$, $Wald=8.229$, $Exp(B)=1.332$, $p<.000$).

The risk factor of domestic violence was the only shared, significant predictor for substantiation between RML subgroups. In the cases in states with RML none of the risk factors remained significant after controlling for the shared influence between the variables. The risk factors of Caregiver use of drugs and alcohol and inadequate housing remained significantly correlated with a decision to substantiate in cases in states without

RML. The risk factor of inadequate housing increased the odds over 3 times that a case would result in a substantiation. The risk factor Caregiver use of drugs had 2.5 times the odds of a case resulting in a substantiation, whereas this risk was not a significant predictor in cases in states with RML. The odds ratios of each risk factor, by subgroup can be found in Table 8. The logistic regression coefficients, Wald test, and odds ratio for each of the predictor variables on each of the dependent variables can be found in Appendix D, Table 9 and 10.

Table 8. Odds Ratios results of Binary Logistic Regression by subgroup

Risk Factors for Substantiation	No MML	MML	No RML	RML
Odds Ratio, Exp (B)				
Caregiver Drugs	2.7***	2***	2.5***	0.6
Caregiver Alcohol	1.3*	1.7***	1.4***	1.6
Domestic Violence	3.2***	2***	2.7***	3.5***
Inadequate Housing	3.6***	2.4***	3.3***	1.3
Financial Problems	1.4***	0.7***	1	1.2

***p=<001, *p<.05

The results of the descriptive and inferential analyses support hypotheses: #4 and #5. The results support that the risk factor caregiver use of drugs has greater predictive value in cases in states without MML and RML versus cases in states with MML and RML. However, the results do not support, hypothesis #6, that the risk factor caregiver use alcohol is a more significant predictor of substantiation in cases in states without MML compared to cases in states without MML. The results support the opposite results, as alcohol is playing a more significant role in CM in legalized states than states without cannabis legalization.

There is insufficient evidence at this time to support hypotheses #7. Although, the bivariate results indicate that the mean rate of caregiver alcohol misuse is significantly higher in cases substantiated in RML states versus cases substantiated in states without RML, the binary logistic regression results are inconclusive. The small number and short time frame in which states have legalized (small data sample size of cases in states with RML) and omitted variables explaining the prelegal CM rates noted in the Part 1 analysis are necessary to draw any further conclusions.

Discussion

This study was interested in the general trends of expanding cannabis legalization on CM and more specifically, whether caregiver alcohol and drug misuse were playing a less significant role in states with legalization. Comparisons of CM rates before and after RML enactment reveal initial increases followed by declines closer and, in some cases (Washington) below the previous mean. Children in legal states show a decreased risk of maltreatment after legalization but are still at greater risk than in illegal states. Current RML states started with higher rates of CM, and it is not apparent within our results what contributed to these differences. These results are similar to some of the previous recent research on legalization and CM. Other studies that looked specifically at RML's and CM found legalization to have a mitigating effect on CM and hypothesized that cannabis might replace more dangerous substances (Waddell & Rashid, 2018).

This study aimed to explore that hypothesis. To better understand any differences in caregiver alcohol and drug use predictors between contrasting levels of legalization, secondary analysis of CPS investigative case data was conducted. On the surface, our

findings do not support the hypothesis that cannabis might replace alcohol consumption. Caregiver alcohol use increased the odds of a substantiation decision for maltreatment in cases in states with MML more so than cases in states without MML. Although, the odds ratios were less conclusive with cases in states with RML, the bivariate mean rate of caregiver alcohol misuse in substantiation cases doubled compared to cases in states without RML. Albeit these results are more reflective of the comparative rate in which caregiver drug and alcohol use were creating harm in a particular case, not the overall rate of caregiver and alcohol use in the states in general. Overall use of alcohol and more dangerous drugs could still have been replaced by cannabis use in legalized states, simultaneous with serious cases of misuse increasing. Our results are generalizable to the cases that CPS investigates, not all acts of CM. In short, the ability to interpret the results is limited without baseline measurements for each state and specific drug types which is not part of the observational data. However, our results do support that there is a relationship between differential cannabis legalization levels and risk factors of CM substantiation and demonstrates the need for further research.

Our findings do lend credence to the existing evidence that cannabis legalization is economically beneficial for children investigated by CPS. In cases occurring in a state with an MML or RML, the substantiation odds were less impacted by the economic variables of inadequate housing and financial problems, and this should be compelling. Children living in poverty and impoverished neighborhoods have long been predictors of increased rates of CM (Legano et al., 2009; Coulton et al., 1995). The findings that risk factors of inadequate housing and financial problems are less predictive in substantiating cases in legalized states could signal a bettering of some children's lives. Overall

reductions in CM might lag behind economic gains. Child advocates could use the evidence of the economic benefits of legalization to direct additional monies to research, supporting, and counteracting any negative repercussions of caregiver substance use on child welfare.

Some of the most relevant outcomes of this study are evidence of what appears not to be occurring. There is no evidence that caregivers in legalized states are on a drug runner, engaged in never-ending acts of spousal abuse, and child maltreatment has not experienced a widespread spike. The determination that a child was substantiated for abuse was not critically impacted by the legality status in which the case existed. The finding that caregiver drug risk factors are not demonstrating profoundly different effects in RML and MML states than Illegal states contributes to the literature supporting the likely significant role illegality plays in drug and CM harms, such as children's greater exposure to incarcerated parents and violence associated with criminality.

The risk factor of domestic violence was the most significant predictor of substantiation in all cases (RML or not). Albeit the mean rate of domestic violence in substantiation cases was lower in states with RML than without RML. The variable increased the odds over 3 times that a case would lead to a substantiation in a case in a state with RML and over 2 times in a case in a state without RML. The domestic violence risk factor in the dataset was the only variable available to examine the interconnectedness more closely between caregiver substance abuse and children's exposure to trauma and violence. The fact that the mean rate of domestic violence was lower in cases in states with RML versus cases in states without RML is an encouraging sign. It is consistent with Kaplan and Sian Goh (2020) finding that legalization might

reduce the severity of domestic violence. It also contributes to research suggesting that at least a portion of the increased exposure to violence for a child of a caregiver misusing drugs might be a result of illegal drug markets and the need for a user in an illegal state to necessarily engage with a criminal element. Drug markets have been shown to increase social disorganization, which decreases guardianship to protect against CM. A lack of an apparent uptick in domestic violence associated with legalization is an encouraging sign with the legalization trend.

We are also hopeful that the multiple categories used in this study to reflect the heterogeneous nature of legalization laws will contribute to a continued trend. Our findings support the literature indicating that the etiology of CM has unique components related to family, cultural, and geographic differences. The most successful prevention tools require a similar level of individualism. Our results support the hypothesis that the predictors of CM substantiation are correlated with cannabis legalization. This insight can contribute to future CM assessments and prevention strategies. However, it is not without limitations.

Limitations and Future Direction.

This study has several threats to validity, reliability, and generalizability. Unfortunately, validity and reliability threats are inherent in the observational and ecological nature of the study. To avoid an ecological fallacy, the results of the first part of the analysis is generalizable to the state level, not the individual level. Additionally, in both parts of the analysis, neither CPS cases nor states were randomly assigned to groups. Resultantly, the groups of states and cases have inherent differences that are not only

hard to identify but if identified, difficult to account for in the analysis and interpretation. The observational nature of the study limits the findings to “observed correlations” and lends little insight into the compelling causal mechanisms of CM. Only the variables in the given datasets were considered and an obvious assortment of omitted variables are apparent from the literature. In general, illegal states tend to be the more rural states and legal states, particularly RML states, have larger urban populations creating a multitude of differences critical to CM, such as the density of reporting/witnessing persons, cultural factors surrounding CM and cannabis usage, and racial demographics which were are confounding variables not accounted for in this analysis. Additional factors correlated to CM in the literature, such as child gender, caregiver race, parental education level, caregiver relationship to child victim, drug use versus abuse, and maltreatment type, were also not accounted for in this study.

Caregiver drug use not being delineated by drug type in the dataset is the most critical limitation of this study. Legality research would be nearly unequivocal if caregiver cannabis use was itemized in the CPS case file. Research has also supported the density of cannabis dispensaries can have an impact on usage rates (Freisthler & Gruenewald, 2014). Dispensary density was not considered in the analysis. Other variables that certainly contribute to predicting and explaining CM were in effect across legalization levels and omitted from consideration in this study.

A significant level of inconsistency also exists within the data, impacting reliability. CPS agencies and individual investigators within the agencies differ in their policies, thresholds for investigation, and attitudes towards substance use and CM, introducing inconsistencies into data. The legality of cannabis is not, per protocol,

intended to affect a substantiation decision. However, there have already been some highly publicized cases questioning whether CPS workers consistently follow these guidelines (Price-Wolf, Kepple, & Freisthler, 2019). Additionally, the data used in Part 2 of this investigation covered seven years. Policies and personnel in the agencies likely changed during the timeframe contributing to inconsistency in the dataset. The very nature of legalization might alter behaviors of reporting persons, changing the dynamics of the cases given to CPS, not necessarily the nature of CM. Also, the findings are limited in the populations in which they can be generalized.

This study can be generalizable to children referred to a CPS agency for allegations of CM, not all children in a population or even all maltreated children. In addition, the reliability of the findings is reduced because of a small sample size of RML states. As more states legalize and the first RML states collect more post legalization data to compare to pre-legalization trends, more insightful and decisive conclusions can be drawn. Even with these limitations, this study contributes to addressing the gaps in understanding the impacts of legalization on CM and should be viewed as a first step towards further research as significant avenues for further inquiry are evident.

Critical gaps exist in our ability to measure and analyze incidence, etiology, and best practices in child welfare. There is not a firm understanding of CM incidence rates due to a lack of a standardized, national data collection instrument (CWIG, Child Welfare Information Gateway, 2014). A NIS has not been conducted since 2010, before the first RML. The NIS is a necessary tool to uncover trends in child welfare and validate data from CPS. CPS data is increasingly used for research in the absence of a recent NIS. If

the NIS were conducted more frequently, additional comparison data would exist to compare the effects of legalization more astutely.

Notwithstanding, wholesale improvements to national CM measurement tools, CPS agencies should consider characterizing caregiver drug risk factors by individual drug type given the trends in legalization. In addition, further research can be directed at extricating the specific mechanisms between caregiver legal versus illegal drug use, children's exposure to trauma and violence, social disorganization, and CM. Comparative cross-national studies examining nations with lengthier and more robust decriminalization trends could provide constructive insight towards future U.S. tendencies. Longitudinal studies and prospective cohort studies comparing children with caregivers who use cannabis in legal versus illegal states could provide clarity into the secondary and long-term effects of legalization.

Studies evaluating risk assessment measurement tools in child welfare have supported the finding that actuarial instruments tend to outperform clinical tools (Van der Put, Assink, & Solinge, 2017). This finding illustrates the value of observational studies, despite the inherent limitations. Reputable inquiry into the varietal plethora of existing observational data assists in improving actuarial instruments, pinpointing shortcomings, and revamping outdated approaches. As an example, the initial promising mutations made to cannabis packaging requirements in response to a spike in accidental child ingestion cases are suggestive of the power of adaptability (Onders et al., 2015). Albeit, we can't adapt, if we don't first identify problems. It is problematic that we did not consider the impacts of strict drug criminalization trends on child welfare and it is equally problematic to enact new legislation without first considering the impact on children.

However, it is unconscionable to not examine the data after the fact and take preventative measures and reallocate resources based upon the assessed areas of impact.

Conclusion

Rob Nixon (2011) coined the term “slow violence” to describe the hidden, relentless, daily onslaught of calamities faced by the environmental poor. The term is assistive in comprehending the incalculable challenges and long-term repercussions of maltreated children. Mothers who suffered at least one episode of maltreatment as children were 72% more likely to abuse their children, and if they suffered multiple episodes, they were 300% more likely (Bartlett, Kotake, Fauth, & Easterbrooks, 2017). Exposure to violence, poverty, and caregiver substance abuse all contribute to the CM cycle equation. Illegality, drugs and alcohol are highly correlated integers in this equation. Yet, over half the states in the United States have enacted cannabis legalization legislation over the last decade and researchers and practitioners have barely scratched the surface into revealing the impact on children. This present study and comparable studies illustrate the reality that a myriad of interconnected mechanisms contribute to child outcomes and untangling the web is arduous. Albeit, these complications should not paralyze researchers and practitioners into inaction, as policy and legal alterations can and will impact child welfare, whether we have the fortitude to examine them or not.

References

- Abuse, S., & Administration, M. H. S. (2019). 2018 National Survey on Drug Use and Health. Administration for Children and Families (HHS). (2010). *Fourth National Incidence Study of Child Abuse and Neglect, final report (NIS-4);2010 ASI 4588-48; NIS-4.*
- America, P. C. A. (2012). Healthy families mean healthy children. Healthy communities. A thriving economy and strong nation. Investments in prevention support healthy child development and lower the number of children affected by abuse and neglect, and the financial cost to our nation in turn. *Child Abuse and Neglect.*
- Ammerman, S., Ryan, S., Adelman, W. P., & Committee on Substance Abuse. (2015). The impact of cannabis policies on youth: clinical, research, and legal update. *Pediatrics, 135*(3), e769-e785.
- Annie E. Casey Foundation, & Center for the Study of Social Policy (Washington. (, 2001). *Kids count data book.* Center for the Study of Social Policy.
- Appleyard, K., Berlin, L. J., Rosanbalm, K. D., & Dodge, K. A. (2011). Preventing early child maltreatment: Implications from a longitudinal study of maternal abuse history, substance use problems, and offspring victimization. *Prevention Science, 12*(2), 139-149.
- Assink, M., Spruit, A., Schuts, M., Lindauer, R., van der Put, C. E., & Stams, G. J. J. (2018). The intergenerational transmission of child maltreatment: A three-level meta-analysis. *Child abuse & neglect, 84*, 131-145.

- Bartlett, J. D., Kotake, C., Fauth, R., & Easterbrooks, M. A. (2017). Intergenerational transmission of child abuse and neglect: Do maltreatment type, perpetrator, and substantiation status matter? *Child Abuse & Neglect, 63*, 84-94.
- Berger, L. M. (2004). Income, family structure, and child maltreatment risk. *Children and Youth Services Review, 26*(8), 725-748.
- Berning, A., Compton, R., & Wochinger, K. (2015). Results of the 2013-2014 National Roadside Survey of Alcohol and Drug Use by Drivers. *Journal of Drug Addiction, Education, and Eradication, 11*(1), 47.
- Blakemore, T., Herbert, J. L., Arney, F., & Parkinson, S. (2017). The Impacts of Institutional Child Sexual Abuse: A rapid review of the evidence. *Child abuse & neglect, 74*, 35-48.
- Boiko-Weyrauch A, Kuntz K. Top 10 numbers about legal pot in Colorado that do not include 4–20. [Accessed May 15, 2015]; Available at: <http://inewsnetwork.org/2015/04/17/top-10-numbers->
- Brown, D., & De Cao, E. (1999). The Impact of Unemployment on Child Abuse and Neglect in the United States. *System (NCANDS), 2002*, 2003.
- Brown, E. C., Garrison, M. M., Bao, H., Qu, P., Jenny, C., & Rowhani-Rahbar, A. (2019). Assessment of rates of child maltreatment in states with Medicaid expansion vs states without Medicaid expansion. *JAMA network open, 2*(6), e195529-e195529.
- Browning, C. R. (2002). The span of collective efficacy: Extending social disorganization theory to partner violence. *Journal of Marriage and Family, 64*(4), 833-850.

- Cadzow, S. P., Armstrong, K. L., & Fraser, J. A. (1999). Stressed parents with infants: reassessing physical abuse risk factors. *Child abuse & neglect, 23*(9), 845-853.
- Child Welfare Information Gateway. (2014). Child maltreatment 2012: Summary of key findings.
- Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services (2011). *National Child Abuse and Neglect Data System (NCANDS) Child File, FFY 2010* [Dataset]. National Data Archive on Child Abuse and Neglect.
<https://doi.org/10.34681/8NG1-T302>
- Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services (2013). *National Child Abuse and Neglect Data System (NCANDS) Child File, FFY 2011* [Dataset]. National Data Archive on Child Abuse and Neglect
<https://doi.org/10.34681/83Q9-DM23>
- Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services (2014). *National Child Abuse and Neglect Data System (NCANDS) Child File, FFY 2012* [Dataset]. National Data Archive on Child Abuse and Neglect.
<https://doi.org/10.34681/DKTJ-KM27>
- Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services (2015). *National Child Abuse and Neglect Data System (NCANDS) Child File, FFY 2013*

[Dataset]. National Data Archive on Child Abuse and Neglect.

<https://doi.org/10.34681/B4Z1-HW82>

Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services (2016).

National Child Abuse and Neglect Data System (NCANDS) Child File, FFY 2014

[Dataset]. National Data Archive on Child Abuse and Neglect.

<https://doi.org/10.34681/CCGC-JJ02>

Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services (2017).

National Child Abuse and Neglect Data System (NCANDS) Child File, FFY 2015

[Dataset]. National Data Archive on Child Abuse and Neglect

<https://doi.org/10.34681/SZHC-3V41>

Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services (2018).

National Child Abuse and Neglect Data System (NCANDS) Child File, FFY 2016

[Dataset]. National Data Archive on Child Abuse and Neglect.

<https://doi.org/10.34681/DAG6-8J36>

Children's Bureau, Administration on Children, Youth and Families, Administration for Children and Families, U. S. Department of Health and Human Services (2019).

National Child Abuse and Neglect Data System (NCANDS) Child File, FFY 2017

[Dataset]. National Data Archive on Child Abuse and Neglect.

<https://doi.org/10.34681/TMRZ-JN03>

- Chu, Y. W. L. (2014). The Effects of Medical Marijuana Laws on Illegal Marijuana Use. *Journal of Health Economics*, 38, 43-61
- Connell-Carrick, K. (2003). A Critical Review of the Empirical Literature: Identifying correlates of child neglect. *Child and Adolescent Social Work Journal*, 20(5), 389-425.
- Cunningham, S., & Finlay, K. (2013). Parental substance use and foster care: Evidence from two methamphetamine supply shocks. *Economic Inquiry*, 51(1), 764-782.
- Coulton, C. J., Korbin, J. E., Su, M., & Chow, J. (1995). Community level factors and child maltreatment rates. *Child development*, 66(5), 1262-1276.
- Craig, C. D., & Sprang, G. (2007). Trauma Exposure and Child Abuse Potential: Investigating the cycle of violence. *American Journal of Orthopsychiatry*, 77(2), 296-305.
- Dubowitz, H., Kim, J., Black, M. M., Weisbart, C., Semiatin, J., & Magder, L. S. (2011). Identifying children at high risk for a child maltreatment report. *Child abuse & neglect*, 35(2), 96-104.
- Famularo, R., Kinscherff, R., & Fenton, T. (1992). Psychiatric diagnoses of maltreated children: preliminary findings. *Journal of the American Academy of Child & Adolescent Psychiatry*, 31(5), 863-867.
- Finkelhor, D., & Hashima, P. Y. (2001). The victimization of children and youth. In *Handbook of youth and justice* (pp. 49-78). Springer, Boston, MA.
- Finkelhor, D., Saito, K., & Jones, L. (2018). Updated trends in child maltreatment 2016. Crimes against Children Research Center.

- Freisthler, B. (2004). A spatial analysis of social disorganization, alcohol access, and rates of child maltreatment in neighborhoods. *Children and Youth Services Review, 26*(9), 803-819.
- Freisthler, B., & Gruenewald, P. J. (2014). Examining the relationship between the physical availability of medical cannabis and cannabis use across fifty California cities. *Drug and alcohol dependence, 143*, 244-250.
- Freisthler, B., & Holmes, M. R. (2012). Explicating the social mechanisms linking alcohol use behaviors and ecology to child maltreatment. *Journal of sociology and social welfare, 39*(4), 25.
- Freisthler, B., & Kepple, N. J. (2019). Types of Substance Use and Punitive Parenting: A Preliminary Exploration. *Journal of Social Work Practice in the Addictions, 19*(3), 262-283.
- Freisthler, B., Kepple, N. J., Wolf, J. P., Curry, S. R., & Gregoire, T. (2017). Substance use behaviors by parents and the decision to substantiate child physical abuse and neglect by caseworkers. *Children and Youth Services Review, 79*, 576-583.
- Freisthler, B., Midanik, L. T., & Gruenewald, P. J. (2004). Alcohol outlets and child physical abuse and neglect: applying routine activities theory to the study of child maltreatment. *Journal of studies on alcohol, 65*(5), 586-592.
- Freisthler, B., Needell, B., & Gruenewald, P. J. (2005). Is the physical availability of alcohol and illicit drugs related to neighborhood rates of child maltreatment? *Child abuse & neglect, 29*(9), 1049-1060.

- Freisthler, B., Wolf, J. P., Wiegmann, W., & Kepple, N. J. (2017). Drug use, the drug environment, and child physical abuse and neglect. *Child maltreatment, 22*(3), 245-255.
- Freisthler, B., & Wolf, J. P. (2016). Testing a social mechanism: does alcohol outlet density moderate the relationship between levels of alcohol use and child physical abuse? *Violence and victims, 31*(6), 1080-1099.
- Ginther, D. K., & Johnson- Motoyama, M. (2017, October). Do State TANF Policies Affect Child Abuse and Neglect? In *Paper presented at the APPAM 39th Annual Fall Research Conference, Chicago, IL.*
- Glasser & Emanuelson. (2020). Puff, Puff, Passed: 2019 Marijuana Laws in Review: 2020 Projections. *Employment Training Practice and Procedures*. Available at: <https://www.healthemploymentandlabor.com/2019/12/23/puff-puff-passed-2019-cannabis-laws-in-review-and-2020-projections>.
- Gourdet, C., Giombi, K. C., Kosa, K., Wiley, J., & Cates, S. (2017). How four US states are regulating recreational marijuana edibles. *International Journal of Drug Policy, 43*, 83-90.
- Guterman, N. B., Lee, S. J., Taylor, C. A., & Rathouz, P. J. (2009). Parental perceptions of neighborhood processes, stress, personal control, and risk for physical child abuse and neglect. *Child abuse & neglect, 33*(12), 897-906.
- Hanson, R. F., Self-Brown, S., Fricker-Elhai, A. E., Kilpatrick, D. G., Saunders, B. E., & Resnick, H. S. (2006). The Relations between Family Environment and Violence exposure among youth: Findings from the National Survey of Adolescents. *Child Maltreatment, 11*(1), 3-15.

- Hill, K. P. (2015). Medical cannabis for treatment of chronic pain and other medical and psychiatric problems: a clinical review. *Jama*, *313*(24), 2474-2483.
- Hussey, J. M., Chang, J. J., & Kotch, J. B. (2006). Child maltreatment in the United States: Prevalence, risk factors, and adolescent health consequences. *Pediatrics*, *118*(3), 933-942.
- Jones, L. (2004). The Prevalence and Characteristics of Substance Abusers in a Child Protective service sample. *Journal of Social Work Practice in the Addictions*, *4*(2), 33-50. doi:10.1300/J160v04n02_04
- Jones, L., Bellis, M. A., Wood, S., Hughes, K., McCoy, E., Eckley, L, Bates, Mikton, Shakespeare, & Officer. (2012). Prevalence and risk of violence against children with disabilities: a systematic review and meta-analysis of observational studies. *The Lancet*, *380*(9845), 899-907.
- Johnson, R. M., Fairman, B., Gilreath, T., Xuan, Z., Rothman, E. F., Parnham, T., & Furr-Holden, C. D. M. (2015). Past 15-year trends in adolescent cannabis use: Differences by race/ethnicity and sex. *Drug and alcohol dependence*, *155*, 8-15.
- Kaplan, J., & Goh, L. S. (2020). Physical harm reduction in domestic violence: does cannabis make assaults safer? *Journal of interpersonal violence*, 0886260520961876.
- Kempe, C. H., Silverman, F. N., Steele, B. F., Droegemueller, W., & Silver, H. K. (1962). The battered-child syndrome. *Jama*, *181*(1), 17-24.

- Kepple, N. J. (2017). The complex nature of parental substance use: examining past year and prior use behaviors as correlates of child maltreatment frequency. *Substance use & misuse, 52*(6), 811-821.
- Kepple, N. J. (2018). Does parental substance use always engender risk for children? Comparing incidence rate ratios of abusive and neglectful behaviors across substance use behavior patterns. *Child abuse & neglect, 76*, 44-55.
- Kepple, N. J., & Freisthler, B. (2012). Exploring the ecological association between crime and medical cannabis dispensaries. *Journal of studies on alcohol and drugs, 73*(4), 523-530.
- Kim, H., & Drake, B. (2018). Child maltreatment risk as a function of poverty and race/ethnicity in the USA. *International journal of epidemiology, 47*(3), 780-787.
- Kim, B., & Maguire-Jack, K. (2015). Community interaction and child maltreatment. *Child Abuse & Neglect, 41*, 146-157.
- Krase, K. S., & DeLong-Hamilton, T. A. (2015). Comparing reports of suspected child maltreatment in states with and without Universal Mandated Reporting. *Children and Youth Services Review, 50*, 96-100.
- Legano, L., McHugh, M. T., & Palusci, V. J. (2009). Child abuse and neglect. *Current problems in pediatric and adolescent health care, 39*(2), 31-e1.
- Maltreatment, C. (2016). Published: February 2018. An office of the Administration for Children & Families, a division of US Department of Health & Human Services. This report presents national data about child abuse and neglect known to child protective services agencies in the United States during federal fiscal year 2018.

- Mair, C., Freisthler, B., Ponicki, W. R., & Gaidus, A. (2015). The impacts of cannabis dispensary density and neighborhood ecology on cannabis abuse and dependence. *Drug and alcohol dependence, 154*, 111-116.
- Markowitz, S., Grossman, M., & Conrad, R. (2010). Chapter 2 Alcohol policies and child maltreatment. *Current Issues in Health Economics, (Contributions to Economic Analysis, Vol. 290)*. Bingley: Emerald Group Publishing Limited, 17-35.
- Markowitz, S., & Grossman, M. (2000). The effects of beer taxes on physical child abuse. *Journal of health economics, 19*(2), 271-282.
- Markowitz, S., & Grossman, M. (1998). Alcohol regulation and domestic violence towards children. *Contemporary Economic Policy, 16*(3), 309-320.
- Maxwell, J. C., & Mendelson, B. (2016). What do we know about the impact of the laws related to cannabis? *Journal of addiction medicine, 10*(1), 3.
- McGuigan, W. M., & Pratt, C. C. (2001). The predictive impact of domestic violence on three types of child maltreatment. *Child abuse & neglect, 25*(7), 869-883.
- Miller, K., & Seo, B. (2018). *The Substitutability of Recreational Substances: Marijuana, Alcohol, and Tobacco*. Working Paper.
- Milner, J. S., & Chilamkurti, C. (1991). Physical child abuse perpetrator characteristics: A review of the literature. *Journal of Interpersonal violence, 6*(3), 345-366.
- Mulder, T. M., Kuiper, K. C., van der Put, C. E., Stams, G. J. J., & Assink, M. (2018). Risk factors for child neglect: A meta-analytic review. *Child abuse & neglect, 77*, 198-210.

- Najavits, L. M., Weiss, R. D., & Shaw, S. R. (1999). A clinical profile of women with posttraumatic stress disorder and substance dependence. *Psychology of Addictive Behaviors, 13*(2), 98.
- National Center for Health Statistics, & Centers for Disease Control and Prevention. (2016). Violence Prevention. Retrieved from:
<https://www.cdc.gov/violenceprevention/childabuseandneglect/index.html>.
- National Conference of State Legislatures. (2018). State medical cannabis laws. Marijuana Deep Dive, State Policy Updates. Retrieved from:
<https://www.ncsl.org/bookstore/state-legislatures-magazine/cannabis-deep-dive.aspx>.
- Nixon, R. (2011). *Slow Violence and the Environmentalism of the Poor*. Harvard University Press.
- Nutt, D. J., King, L. A., & Phillips, L. D. (2010). Drug harms in the UK: a multicriteria decision analysis. *The Lancet, 376*(9752), 1558-1565.
- Onders, B., Casavant, M. J., Spiller, H. A., Chounthirath, T., & Smith, G. A. (2016). Marijuana exposure among children younger than six years in the United States. *Clinical pediatrics, 55*(5), 428-436.
- Ostrowsky, M. K. (2011). Does cannabis use lead to aggression and violent behavior? *Journal of Drug Education, 41*(4), 369-389. doi:10.2190/DE.41.4.c
- Ozluok, P. (2017). The effects of medical cannabis laws on utilization of prescribed opioids and other prescription drugs. *Available at SSRN 3056791*.

- Pacula, R. L., Powell, D., Heaton, P., & Sevigny, E. L. (2013). *Assessing the effects of medical cannabis laws on cannabis and alcohol use: The devil is in the details* (No. w19302). National Bureau of Economic Research.
- Palusci, V. J., Smith, E. G., & Paneth, N. (2005). Predicting and responding to physical abuse in young children using NCANDS. *Children and Youth Services Review*, 27(6), 667-682.
- Powell, D., Pacula, R. L., & Jacobson, M. (2018). Do medical cannabis laws reduce addictions and deaths related to pain killers? *Journal of Health Economics*, 58, 29-42.
- Price Wolf, J., Kepple, N. J., & Freisthler, B. (2019). Understanding the Role of Parental Opiate or Marijuana Use in Child Welfare Substantiation Decisions. *Journal of Social Work Practice in the Addictions*, 19(3), 238-261.
- Raissian, K. M., & Bullinger, L. R. (2017). Money matters: Does the minimum wage affect child maltreatment rates? *Children and youth services review*, 72, 60-70.
- Rashid, A., & Waddell, G. R. (2018). The Mitigating Effect of Marijuana Legalization on Child Victimization.
- Sampson, R. J., Morenoff, J. D., & Earls, F. (1999). Beyond social capital: Spatial dynamics of collective efficacy for children. *American sociological review*, 633-660.
- Scannapieco, M., & Connell-Carrick, K. (2005). *Understanding child maltreatment: An ecological and developmental perspective*. Oxford University Press on Demand.

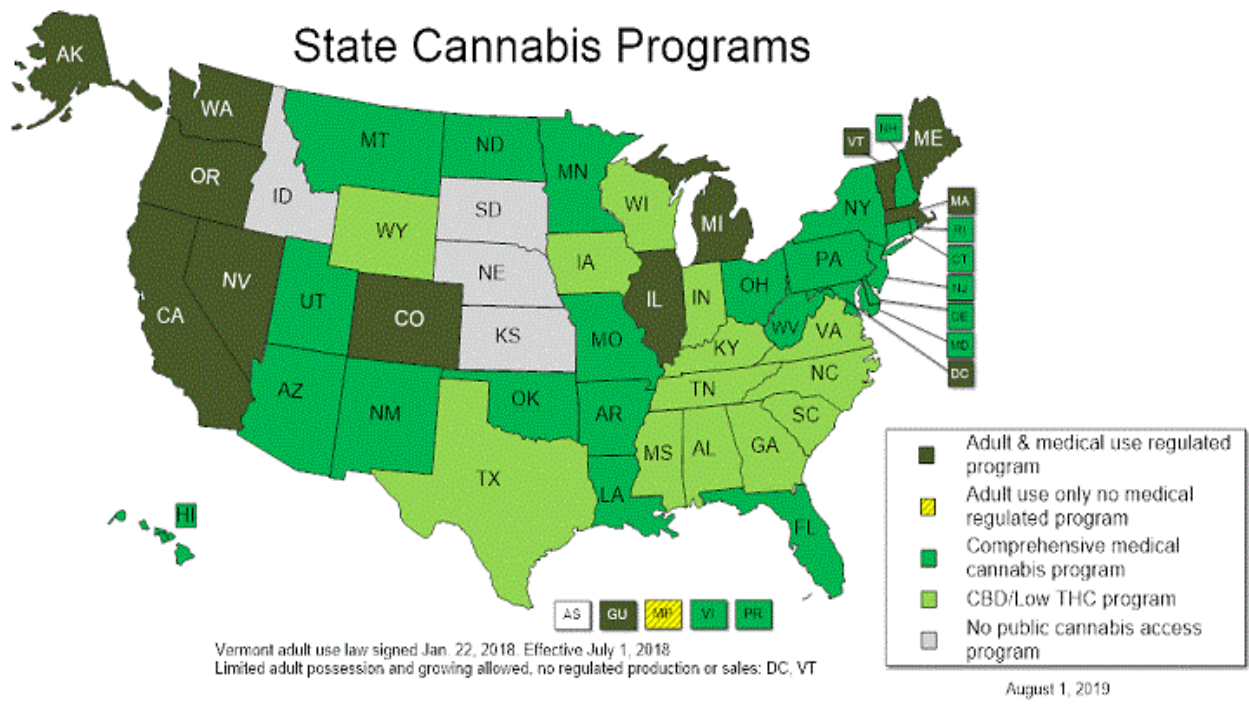
- Schnitzer, P. G., & Ewigman, B. G. (2005). Child deaths resulting from inflicted injuries: household risk factors and perpetrator characteristics. *Pediatrics*, *116*(5), e687-e693.
- Sedlak, A. J., Mettenburg, J., Basena, M., Peta, I., McPherson, K., & Greene, A. (2010). Fourth national incidence study of child abuse and neglect (NIS-4). *Washington, DC: US Department of Health and Human Services*, *9*, 2010.
- Smith, R. A. (2020). The effects of medical cannabis dispensaries on adverse opioid outcomes. *Economic Inquiry*, *58*(2), 569-588.
- Sprang, G., Clark, J. J., & Staton-Tindall, M. (2010). Caregiver substance use and trauma exposure in young children. *Families in Society*, *91*(4), 401-407.
- Staton-Tindall, M., Sprang, G., Clark, J., Walker, R., & Craig, C. D. (2013). Caregiver substance use and child outcomes: A systematic review. *Journal of Social Work Practice in the Addictions*, *13*(1), 6-31.
- Stith, S., Liu, L., Davies, C., Boykin, E., Alder, M., Harris, J., Som, S., McPherson, M., & Dees, J., (2009). "Risk factors in child maltreatment: A meta-analytic review of the literature." *Aggression and violent behavior* *14*, no. 1 (2009): 13-29.
- Substance Abuse and Mental Health Services Admin (SAMHSA), US Dept of Health and Human Services, & United States of America. (1999). *Blending Perspectives and Building Common Ground: A Report to Congress on Substance Abuse and Child Protection*.
- Thurstone, C., A Binswanger, I., F Corsi, K., J Rinehart, D., & E Booth, R. (2013). Medical cannabis uses and parenting: A qualitative study. *Adolescent Psychiatry*, *3*(2), 190-194.

- Van der Put, C. E., Assink, M., Gubbels, J., & van Solinge, N. F. B. (2018). Identifying effective components of child maltreatment interventions: a meta-analysis. *Clinical child and family psychology review, 21*(2), 171-202.
- Van der Put, C. E., Assink, M., & van Solinge, N. F. B. (2017). Predicting child maltreatment: A meta-analysis of the predictive validity of risk assessment instruments. *Child abuse & neglect, 73*, 71-88.
- Wolf, J. P. (2018). Prescription drug misuse and child maltreatment among high-risk families. *Journal of interpersonal violence, 0886260518772109*.
- Wolf, J. P., Ponicki, W. R., Kepple, N. J., & Gaidus, A. (2016). Are community level prescription opioid overdoses associated with child harm? A spatial analysis of California zip codes, 2001–2011. *Drug and alcohol dependence, 166*, 202-208.
- Wolock, I., Sherman, P., Feldman, L. H., & Metzger, B. (2001). Child abuse and neglect referral patterns: A longitudinal study. *Children and Youth Services Review, 23*(1), 21-47.
- Young, N. K., Boles, S. M., & Otero, C. (2007). Parental substance use disorders and child maltreatment: Overlap, gaps, and opportunities. *Child maltreatment, 12*(2), 137-149.
- Young, N. K., Gardner, S., Otero, C., Dennis, K., Chang, R., Earle, K., & Amatetti, S. (2009). Substance-exposed infants: State responses to the problem. *HHS Pub. No. (SMA), 9*, 4369.
- Zhou, Y., Hallisey, E. J., & Freymann, G. R. (2006). Identifying perinatal risk factors for infant maltreatment: an ecological approach. *International Journal of Health Geographics, 5*(1), 53.

Appendix A

Figure 1.

Figure 1, taken from the NCSL, Marijuana Deep Dive, State Policy Updates website, shows the status of the laws in each state as of August of 2019 (NCSL, 2019).



Appendix C
Table 2

Table 2. Correlations.

Correlations		CMRate	Poverty rate	Special needs	Single parent	RML	Pre legal
Pearson Correlation	Child Maltreatment	1.00	.283	.257	.319	.103	.219
	Poverty rate	.283	1.000	.336	.754	-.163	-.081
	Special needs rate	.257	.336	1.00	.318	-.213	-.223
	Single parent rate	.319	.754	.318	1.000	-.042	.029
	RML	.103	-.163	-.213	-.042	1.000	.609
	Pre legal	.219	-.081	-.223	.029	.609	1.00

Appendix D
Tables 9 and 10.

Table 9. Binary Logistic Regression Coefficients MML group

Predictor	B	Wald x	p	Odds Ratio, Exp(B)
Constant, MML, NO YES	.336	29.031	.000	1.400
	-.540	56.339	.000	.583
FCDrug, MML, NO YES	1.000	294.776	.000	2.718
	.670	53.606	.000	1.953
FCAlc, MML, NO YES	.287	8.229	.004	1.332
	.507	21.127	.000	1.660
DomViol, MML, NO YES	1.149	463.581	.000	3.156
	.696	78.899	.000	2.006
InadeqHou, MML, NO YES	1.288	233.486	.000	3.625
	.880	43.830	.000	2.411
FinProb, MML, NO YES	.301	19.059	.000	1.352
	.360	12.693	.000	.698

Table 10. Binary Logistic Regression Coefficients RML group

Predictor	B	Wald x	p	Odds Ratio, Exp(B)
Constant, RML, NO YES	.042	.797	.372	1.043
	-.428	2.262	.133	.652
FCDrug, RML, NO YES	.921	357.110	.000	2.511
	-.592	.841	.359	.553
FCAlc, RML, NO YES	.363	23.579	.000	1.437
	.454	.521	.471	1.575
DomViol, RML, NO YES	.980	490.175	.000	2.664
	1.244	15.407	.000	3.470
InadeqHou, RML, NO YES	1.184	277.498	.000	3.268
	.235	.194	.660	1.264
FinProb, RML, NO YES	.047	.693	.405	1.048
	.205	.194	.133	1.227