COMPONENTS OF A COMPREHENSIVE MARIJUANA REGULATORY SYSTEM

ASSESSING CALIFORNIA'S MEDICAL MARIJUANA PROGRAM

A Thesis

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Kacey Lynn Dominguez

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Abstract

of

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Marijuana has been a subject of policy debate throughout the 20th and 21st centuries. Recently, with Colorado and Washington legalizing recreational marijuana, focus has shifted from effective prohibition to effective regulation. As a result of the shifting tides of marijuana policies across the United States, the federal government issued a list of priorities that states must address in a legal marijuana market, whether recreational or medical, in order to affectively mitigate negative consequences and avoid federal intervention.

In this thesis, I analyze those federal priorities, describe best practices that states have implemented in order to address those priorities, and assess California's Medical Marijuana Program (MMP) in terms of its capacity to meet federal priorities. My results indicate that California's MMP does not employ best practices to address stated federal priorities. In the final chapter, I offer recommendations to reform the California MMP in order to meet federal guidelines.

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Date

TABLE OF CONTENTS

Page

List of Tables ix

List of Figures x

Chapter

I. INTRODUCTION 1

II. LITERATURE REVIEW OF FEDERAL PRIORITIES 18

III. BEST PRACTICES 29

IV. ASSESSMENT OF CALIFORNIA'S MEDICAL MARIJUANA PROGRAM 52

V. RECOMMENDATIONS FOR REFORM 63

Appendix A. Medical Marijuana State Laws: Year Enacted and Bill Information 72

Appendix B. Marijuana Laws by State in Terms of Best Practices…….....73

References.....82

LIST OF TABLES

Tables Page

1. Assessment of California's Medical Marijuana Program..…… 53

LIST OF FIGURES

Figures Page

1. A Flowering Marijuana Plant……..……... 1

2. Views of Legalizing Marijuana…….…….. 10

3. Map of Marijuana Laws in the United States…….……. 11

I. INTRODUCTION

Marijuana has been the subject of policy debate throughout the 20th and 21st centuries. With more than 20 states having a legal medical marijuana market and the recent legalization of recreational marijuana in Colorado and Washington, the debate has shifted from effective prohibition policy to effective regulatory policy. While many argue the case for continued prohibition, the changing tide of support for state sanctioned marijuana markets necessitates a conversation about issues that need to be addressed in a legal market, whether medical or recreational, and how states can effectively employ policy to address those issues. In this paper, I do not make an argument for or against marijuana legalization; instead, I identify important policy issues that a comprehensive and effective legal marijuana regulatory system needs to address and how states have addressed those issues. Further, I assess California's current medical marijuana policy and identify how the regulatory structure is or is not adequately addressing these issues. Lastly, I provide recommendations for reforming California's medical marijuana program in order to meet stated criteria for a comprehensive regulatory system.

What is Marijuana?

To understand the marijuana debate, one must have a general understanding of the substance that is at the center of the debate. Marijuana is produced from the dried flowers and leaves of the cannabis plant (see Figure 1). The cannabis plant produces two counteracting chemical compounds: Delta-9 tetrahydrocannabinol, commonly referred to as THC, and cannabidiol (CBD). THC produces a psychoactive effect, while CBD blocks

Figure 1: A Flowering Marijuana Plant (Green Wellness, 2012)

production of THC. When cultivating the cannabis plant for the purpose of producing marijuana, growers inhibit the production of CBD, causing an increase in THC production. Marijuana is the term used to describe the flowers from a cannabis plant that has been cultivated with an increased level of THC. When the marijuana producing plant is mature, the flowers, or buds, are clipped and can be consumed, producing a psychedelic feeling. Consuming marijuana can be done in a number of ways, including smoking through a pipe, rolled cigarette or other method; in pill form; topically with oils and creams; through edible products that have been made with marijuana infused oils and butters such as cookies, brownies and other baked goods; and many other various methods that are continually being devised.

Marijuana History in America

Marijuana was widely introduced to the United States after the Mexican Revolution of 1910 and has seen dips and surges in societal and political acceptance since. Marijuana was legal in the United States until 1937 when Congress passed the Marijuana Tax Act. This Act criminalized possession or transfer of cannabis and levied a substantial tax on anyone who "dealt commercially in cannabis, hemp or marijuana" (Schaffer Library of Drug Policy (b), n.d.). At the time, hemp – which is cultivated from the cannabis plant with increased levels of CBC and inadequate levels of THC to produce the psychedelic properties of marijuana – was being cultivated and used for clothing, rope, oils and paper, among other uses. Some saw the Act as a way to reduce the size of hemp production, as hemp was viewed as a potential threat to the paper industry, which had powerful influence on Capitol Hill (Princeton, n.d.). Randolph Hearst saw the cheap production of hemp as a threat to his substantial timber holdings and urged congress to pass the Act. In addition, the Secretary of the Treasury, Andrew Mellon, was the wealthiest man in America and had invested in a new fiber, nylon, which was also competing with hemp. Because of these influences, the Marijuana Tax Act passed, significantly reducing the level of hemp

production in the United States and criminalizing marijuana possession or transport (French and Manzanarez, 2004).

The 1960s saw a shift in the cultural view of marijuana stemming from the emerging hippy subculture and changing political climate due to the Vietnam War and the civil rights movement. Studies began to report that marijuana does not lead to violence, contrary to the popular views of the previous decades. In addition, priorities shifted from strict punishment to prevention. In 1970, new policy was enacted that mandated the government study the potential harms of drug use and required the dissemination of that information as a means to discourage drug use. The Comprehensive Drug Abuse Prevention Control Act of 1970, signed by President Reagan, included the enactment of the Controlled Substances Act (CSA). The CSA "is the federal drug policy that regulates the manufacture, importation, possession, use and distribution of certain substances" (Controlled Substances Act, § 801, 1970). The CSA categorizes drugs into five Schedules, based on potential for abuse and medical uses, among other things. Marijuana is listed as a Schedule I drug, the most regulated and dangerous category. In order to be included as a Schedule I drug, the substance must meet the following requirements:

- "The drug or other substance has a high potential for abuse;
- The drug or other substance has no currently accepted medical use in treatment in the United States; and
- There is a lack of accepted safety for use of the drug or other substance under medical supervision" (Controlled Substances Act §812, 1970).

Other drugs that are categorized as Schedule I include heroin, LSD, ecstasy, mescaline, peyote and other amphetamines, opioids and psychedelics. As a means of comparison, Schedule II drugs include methamphetamine, cocaine and opium and Schedule III drugs include Vicodin and

ketamine (Controlled Substances Act, §812, 1970). Possession, production, transporting and use of Schedule I drugs result in the most strict drug penalties.

As part of the Comprehensive Drug Abuse Prevention and Control Act (1970), the National Commission on Marijuana and Drug Abuse was created, tasked with studying marijuana abuse in the United States. In 1972, the Commission, also known as the Shafer Commission, analyzed marijuana laws by ordering research projects and conducting various surveys (Shafer, 1972). The Commission eventually recommended that recreational marijuana use be decriminalized as "the existing social and legal policy is out of proportion to the individual and social harm engendered by the use of the drug" (Shafer, 1972). Its recommendation of decriminalization, however, did not result in then President Nixon changing federal marijuana policy.

Even though the federal government continued to implement policy criminalizing marijuana, movements to decriminalize the drug had already begun in some states. Beginning in 1974, Oregon became the first state to decriminalize possession of marijuana, imposing only a small fine if caught with the drug. Following Oregon's lead, California, Alaska and Colorado decriminalized marijuana possession in 1973 (Crick et al., 2013). By 1978, Mississippi, New York, Nebraska, North Carolina and Ohio had some form of marijuana decriminalization in effect (PBS, n.d.). However, the trend of decriminalization did not continue into the 1980s.

By the 1980s, the cultural view of marijuana began to shift again, resulting in increased penalties for offenders and a resurgence of the view that marijuana should not be treated differently than other, harsher drugs. President Reagan signed the Anti-Drug Abuse Act in 1986, which reinstituted mandatory minimum sentences for drug-related crimes, again lumping marijuana crimes with other drug crimes involving cocaine, LSD and heroin (Sterling, n.d.). First Lady Nancy Reagan began the DARE program as well, which promoted a "Just Say No" attitude

to all drugs, including marijuana; President Bush further propagated a zero tolerance mentality when he declared a "War on Drugs" in a nationally televised speech in 1989 (PBS, n.d.). The 1980s saw a reversion back to equating marijuana with other harsher drugs, with increased penalties for drug offenses and mass anti-drug marketing.

In the 1990s, the federal government's stance on marijuana remained unchanged, while some state residents were asked to vote on legalizing medical marijuana programs. The Marijuana Tax Act of 1937, which criminalized marijuana use and possession, applied to medical marijuana as well, and state initiatives to legalize medical marijuana sought to make that distinction – making marijuana legal only for patients who obtained a recommendation from a qualified physician. California became the first state to legalize medical marijuana when voters approved Proposition 215 – the Compassionate Use Act (NORML(a), n.d.). By 2000, Alaska, Maine, Oregon and Washington had also approved and implemented medical marijuana programs. As of February 2014, twenty states, as well as Washington, DC allow for medical marijuana (NORML(b), n.d.) (See Appendix A for more details on medical marijuana states and corresponding laws).

While medical marijuana programs are legal in terms of state laws, the cultivation, transfer, possession, sale and use of marijuana remains illegal under federal law; however, the federal government has largely allowed states to regulate their markets. Medical marijuana patients are still, technically, subject to arrest by the federal government. Florida's Attorney General, when her state was considering medical marijuana, made it clear that "whether the Amendment passes or not, the medical use of marijuana is a federal criminal offense" (Holan, 2013). Technically, the United States' Constitution dictates that federal laws "trump conflicting state laws in the same subject" (Crick et al., 2012). The CSA states that this should be the case unless there is a "positive conflict between the state law and the CSA such that the two cannot

consistently stand together" (CSA, 1974). Crick et al. (2012) explains how state medical marijuana laws are allowed to stand when in conflict with federal marijuana policy:

> Courts have generally held that medical marijuana laws that simply provide exemptions from the state penal codes are not pre-empted under federal law [because] first, a person could comply with both laws simply by avoiding marijuana, and second, state medical marijuana laws do not prevent the federal government from enforcing the CSA. (p. 12-13)

In other words, states can exempt medical marijuana users from state prosecution, but they are still liable to be prosecuted under federal law.

While almost half of the states currently have a medical marijuana program, they differ significantly in regulations, patient requirements and implementation. For example, some states are very specific regarding which conditions warrant a physician recommendation for medical marijuana, while other states are less restrictive. California has the least restrictive requirements for physicians to recommend medical marijuana. Proposition 215 lists approved ailments for medical marijuana; however, includes the phrase "or any other illness for which marijuana provides relief" (Proposition 215, 1996). This gives physicians the discretion to determine which ailments are appropriate for a recommendation of medical marijuana. On the other hand, many states specifically list which ailments are approved for medical marijuana, including conditions that can be subsequently added with the approval by the respective state Health Departments (Norml(b), n.d.). In these cases, the states have the discretion to determine which conditions are appropriate for a physician to recommend medical marijuana. The differences in what qualifies as an approved condition, and who has the authority to determine approved conditions, have resulted in medical marijuana programs that dramatically differ in scope state to state, as made evident when comparing California's medical marijuana program to other state programs.

Medical Marijuana Legalization in California

California was the first state to enact a legal medical marijuana market; with no precedent to reference regarding effective program implementation, Proposition 215 (1996) provides minimal regulations (Saloga et al., 2013). Proposition 215 (1996) does not include regulations relating to qualified patients, physicians, production, distribution or sale. As a result of the lack of state regulations, many identify California, in terms of medical marijuana, as the Wild, Wild West (Halloran, 2013).

California's inadequate definition of "qualifying patient" has made it very easy for an individual to obtain a medical marijuana recommendation and made giving such recommendations a lucrative business for physicians (Nagourney and Lyman, 2013). To become a qualified patient, a California resident patronizes an establishment that advertises issuance of medical marijuana recommendations for a fee, typically ranging from $40-$50. After a brief consultation, the doctor writes a recommendation for medical marijuana. Requirements regarding the patient-doctor relationship are not included in Proposition 215 (1996) and often the recommending physician has never seen the patient before. This is in contrast to other states that, from observing California's medical marijuana program, require "bona fide" doctor-patient relationships, prohibit financial transactions for obtaining a physician recommendation, as well as clearly define ailments approved for medical marijuana use (NORML(b), n.d.). In California, the process for receiving a medical marijuana recommendation is not regulated by any state agency (Marijuana Policy Project, 2013).

The mode of distribution in California's medical marijuana program is also unregulated and current distribution methods are technically illegal under state law, although tolerated by local law enforcement. Proposition 215 (1996) allows patients who have a doctor's recommendation to possess and cultivate medical marijuana but did not address commercial or

retail style distribution. Under Proposition 215 (1996), individual patients are authorized to cultivate his or her own supply of medical marijuana and are prohibited to sell or gift marijuana. However, in 2003, Senate Bill 420 allowed for cooperatives, also referred to as collectives: a cooperative is a group of qualified patients who cultivate medical marijuana together. The bill further stipulates that the marijuana cultivated by a cooperative is not to be used by anyone other than cooperative members and no money is to change hands (California Department of Justice, 2008). Cooperatives were designed to have each member actively participate in the cultivation process and to prevent commercial and retail sale of medical marijuana. Further, Senate Bill 420 (2003) authorized the use of primary care givers – individuals who are designated and licensed to tend to the patient's medical marijuana needs. The caregivers, after receiving license from a physician, are legally allowed to possess, cultivate and buy medical marijuana for their patient(s) and are allowed to charge for their services, but not profit (SB 420, 2003).

A grey area in Senate Bill 420 (2003) related to caregivers has resulted in the flourishing of retail medical marijuana stores, also known as medical marijuana dispensaries. Dispensaries are retail establishments where qualified patients can purchase medical marijuana. This was made possible because Senate Bill 420 (2003) did not limit the number of patients a primary caregiver can care for and dispensaries claim to fall under the law because the dispensary owner is acting as the primary caregiver for his or her customers. State lawmakers and the California Department of Justice do not recognize medical marijuana dispensaries as legal caregivers, though legislation does not ban them outright. The California Department of Justice (2008) issued its interpretation of Senate Bill 420 saying that "although medical marijuana dispensaries have been operating in California for years, dispensaries, as such, are not recognized under the law" (p.11). The California's Police Chiefs Association (2008) stated that "California law is notably silent on any such available defense for a storefront marijuana dispensary" (p. 6). Nevertheless, medical

marijuana dispensaries still operate and dispense medical marijuana to qualified patients with little interruption by state authorities. Abramsky (2010) notes that California medical marijuana dispensaries are a "'grey market straddling the boundaries of licit and illicit…[and] to a large degree, as long as the participants don't cross certain informal lines, neither do law enforcement agencies or district attorneys" (p. 20).

Since medical marijuana dispensaries in California are operating in a legal grey area, their source of marijuana is not regulated, which has resulted in illegal gangs and cartels profiting from cultivating and selling marijuana to dispensaries (Mallery, 2011). Under the law, cooperatives (informal groups of patients who collectively grow medical marijuana for personal use) are required to obtain their marijuana supply only from other members, and Governor Brown mandated that medical marijuana dispensaries do the same, but there is no enforcement of this rule (CA Department of Justice, 2008). The result is a black market supply of marijuana. The United States Forest Service reported that Drug Trafficking Organizations (DTOs) control a significant portion of marijuana cultivation in the United States. Further, they report that DTOs operating in California, "are of Mexican origin and consist of the most powerful cartels in Mexico" (Mallery, 2011, p.4). Due to the lack of regulations regarding medical marijuana dispensaries and their supply, illegal drug cartels and gangs have profited.

Recreational Marijuana Legalization

In what many see as a natural progression from medical marijuana, a movement has been building to legalize recreational marijuana. In a legal recreational marijuana market individuals who are of a certain age are permitted to possess, transport, purchase and in some cases grow marijuana. Public opinion regarding marijuana support the legalization movement, showing an increasing number of the population that believes marijuana should be legalized, as shown in Figure 2. Pro-legalization advocates cite three primary reasons for recreational legalization: the

criminal justice costs of prohibition, the human cost of incarceration and the missed opportunity for revenues from taxing a legal market (Caulkins et al., 2012; Crick et al., 2013). These costs associated with prohibition have been used as arguments to legalize recreational marijuana in a number of states.

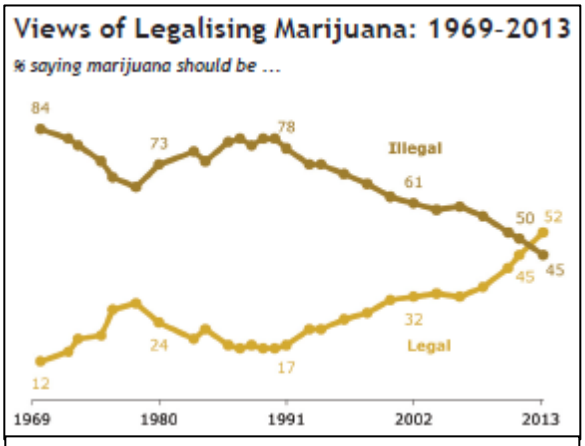

Figure 2: Views of Legalizing Marijuana
Source: Crick et al., 2013

In 2013, Colorado and Washington voters made their states the first to legalize marijuana for recreational use: Amendment 64 in Colorado passed by 56% and Washington's Initiative 502 was approved by 55% of voters (Crick et al., 2013). With these ballot initiatives, the possession, processing, transportation, use and sale of marijuana became legal for those over 21 years old. Further, regulatory structures and processes were developed and a tax structure was established for the legal market. Colorado began allowing retail sale of marijuana on January 1, 2014 while Washington's legal market will begin operating in November of the same year (Crick et al., 2013). As of April 2014, three states have debated legislation to legalize recreational marijuana with at least one state to place an initiative on the ballot in November, beginning not just a national movement but an international one as well.

Prior to Colorado and Washington, no other government jurisdiction – state or country – had a fully functioning legal marijuana market. A fully functioning legal marijuana market includes decriminalization of cultivation, processing, transporting, purchasing, possessing or use of marijuana with government regulation of the market. The Netherlands is often cited as having a fully legal marijuana market; however, while sale of up to five grams is legal through a licensed retailer, cultivation, possession and transportation of marijuana is not (Caulkins et al., 2012). The

government does not penalize those found in possession of less than five grams; however, laws regarding cultivation, transportation, and possession and sale of more than five grams are strictly enforced. In Amsterdam, a culture of marijuana tourism flourishes due to the lax enforcement of some laws, but turning to the Netherlands as an example of a fully functioning and regulated marijuana market is not appropriate (Caulkins et al., 2012). On the other hand, Uruguay, as an attempt to reduce the violence and crime attributed to the illicit drug trade, became the first country to legalize the cultivation, distribution, use and sale of marijuana. In 2013, Uruguay's Senate voted to legalize and regulate marijuana (De Robertis, 2013). The world is waiting to see how effective Uruguay, Colorado and Washington's regulatory methods will be in addressing jurisdictional needs.

Previous attempts at legalizing recreational marijuana in the United States were not successful for myriad of reasons. Alaska and Nevada voters rejected marijuana legalization in 2004 and 2006 respectively. Californians have defeated marijuana legalization twice: once in 1972 (66%-33%) and again in 2010 (54%-45%) (Caulkins et al., 2012). Oregon voters went to the polls in 2012 to decide on marijuana legalization and, like California, defeated the initiative: Measure 80, the Oregon Cannabis Tax Act, was defeated by a margin of 53% to 47%. While proponents say that Measure 80 failed due to insufficient funding, Proposition 19 in California failed due to wide spread opposition from several, diverse groups. Law enforcement claimed legalization would result in more crime and

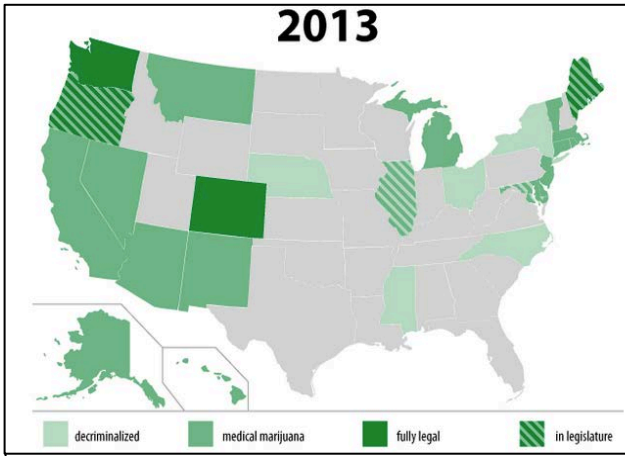

Figure 3: Marijuana Laws in the United States (Reeve, 2013)

violence; medical groups worried about the potential mental health effects of increased consumption; politicians were wary about supporting legalization as marijuana is still illegal under federal law; and the medical marijuana industry did not support the bill fearing increased regulation and taxes (Abramsky, 2010). The proponents of Proposition 19 were pro-marijuana organizations and isolated the general public. As a result, Proposition 19 failed with 53% of voters disapproving.

The success of the Washington and Colorado legalization initiatives has been attributed to the approach that each state took in terms of campaign strategy. As opposed to California, the Washington and Colorado initiatives received significant support from law enforcement, politicians, academics and the medical marijuana community rather than only pro-marijuana organizations (Crick et al., 2013). Further, in contrast to California's Proposition 19, Colorado and Washington identified where the tax revenue would go – to schools and mental health. Washington's campaign focused on women aged 20-50 to gain mainstream support of the amendment (Crick et al., 2013). As a result of well-crafted propositions and effective campaign management, Colorado and Washington became the first states to legalize and regulate a legal recreational marijuana market.

Other states, seeing the success in Washington and Colorado, will move to legalize marijuana in 2014. Pro legalization advocates in Alaska received enough signatures to put marijuana legalization on the ballot in November, 2014. New Hampshire is on its way to become the first state to legalize marijuana through the legislature, as opposed to putting it on the ballot (Crick et al., 2013). House Bill 492 was endorsed by the House of Representatives and sent to a House committee for further fine-tuning (Nelson, 2014). Oregon's Governor is urging the legislature to refine and pass Senate Bill 1556, which will legalize and tax marijuana. Governor John Kitzhaber (Democrat, Oregon) prefers the legislature craft the regulations as opposed to a

ballot initiative that is likely to appear in November (Smith, 2014; Clark, 2014). The success of Amendment 64 in Colorado and Initiative 502 in Washington has spurred other states to attempt marijuana legalization this year.

Federal Stance

Since marijuana remains illegal under federal law, a major conflict between federal and state law has emerged; however, recent actions have indicate their stance may evolve to reflect state's decisions to legalize medical and recreational marijuana. As states began to implement medical marijuana programs, federal agents often conducted raids on marijuana related facilities; though, recent federal guidance as to how states should implement marijuana regulation to avoid federal intervention, allowing banks to work with marijuana related industries, and pressure to remove marijuana from the Schedule I category, are indications of a potential shift in the federal stance on marijuana.

Under the Bush and Obama Administrations, the federal Drug Enforcement Agency (DEA) conducted (and still currently conducts) frequent raids on marijuana-related facilities operating legally under state law but determined illegal drug operations by the federal government. The DEA does not provide statistics specifically relating to medical marijuana activities as it does not distinguish between non-medical marijuana crimes and medical marijuana cultivation centers or dispensaries; however, there are numerous accounts of these raids in most, if not all states that allow for the use of medical marijuana (Eddy, 2010). Graves (2012) reports that since 2009, "the Department of Justice (DOJ) has conducted more than 170 aggressive SWAT-style raids in nine medical marijuana states." The DOJ justifies the raids as a means to ensure compliance with local and federal laws relating to drug trafficking, illegal gang activity and zoning enforcement and typically target larger, for profit medical marijuana growers and

dispensaries (Fleischer, 2013; Eddy, 2010). While individuals are not prosecuted for violating federal marijuana law, medical marijuana related businesses continue to be targeted.

Federal intervention in medical marijuana markets has been especially troublesome for California, as the state has experienced more federal raids on medical marijuana facilities than any other state. Of the 170 federal raids since 2009, more than 100 occurred in California (Graves, 2012). The federal government specifically identifies California's vague and lax policies pertaining to regulating the state's medical marijuana program as the impetus for federal intervention. Large-scale DEA operations in Los Angeles and Oakland have resulted in numerous business closures and arrests. While federal raids on California medical marijuana related operations continue, there are signs that indicate a shift in federal stance relating to marijuana policy.

The first indication of a shift in the federal government's position on marijuana came in August 2013, when the United States Department of Justice issued a memorandum in response to legalization initiatives in Oregon, Washington and Colorado. The memo, referred to as the Cole memo, identifies federal priorities that must be addressed by state marijuana policy in order to prevent federal intervention. The memo said that as long as states have "strong and effective regulatory and enforcement systems to control the cultivation, distribution, sale and possession of marijuana" the federal government will not contest recreational marijuana legalization or medical marijuana programs (Cole, 2013, p. 3). Per the Cole memo (2013), a strong and effective state regulatory system includes controls that will:

- "Prevent the distribution of marijuana to minors;
- Prevent revenue from the sale of marijuana from going to criminal enterprises, gangs and cartels;

- Prevent the diversion of marijuana from states where it is legal under state law in some form to other states;
- Prevent state-authorized marijuana activity from being used as a cover or pretext for the trafficking of other illegal drugs or other illegal activity;
- Prevent violence and the use of firearms in the cultivation and distribution of marijuana;
- Prevent drugged driving and the exacerbation of other public health consequences associated with marijuana use;
- Prevent the growing of marijuana on public lands and the attendant public safety and environmental dangers posed by marijuana production on public lands; and
- Prevent marijuana possession or use on federal property" (Cole, 2013, p. 1-2).

The Cole memo signals a shift in the federal government's stance on marijuana as it offers guidance to states on how to effectively regulate marijuana to avoid federal intervention in their state programs as opposed to strict prohibition policies.

Another action that signifies an evolution of federal views on marijuana could come as a result of mounting pressure to reclassify the drug. Marijuana is still currently listed as a Schedule I drug, with other drugs such as LSD and heroin; however, there is significant pressure to remove it from that category. On February 12, 2014, Representative Earl Blumenauer (Democrat, Oregon), with the support of 18 members of Congress, sent a letter to President Obama urging the President to reclassify marijuana (Steinmetz, 2014). This is not the first time the federal government has been asked to reclassify marijuana, but this time may be different as more states are moving to legalization. Blumenauer's request was prompted by President Obama's comments that, in his view, marijuana is not any more dangerous than alcohol or cigarettes. The argument to reschedule is based on the insufficient evidence that marijuana is addictive, citing lab studies that show rats do not self-administer marijuana, as well as the medical benefits that marijuana

produces, evidenced by the 20 states plus Washington DC that have legalized medical marijuana (US Department of Justice, 2001). Proponents also cite the preponderance of evidence that support the medical benefits of medical marijuana (Cohen, 2010). Opponents of rescheduling marijuana stand by the claim that marijuana is addictive, rejecting the claim that just because rates do not self-administer the drug does not mean it is not addicting – further citing that the widespread use of cannabis, and the existence of some heavy users, is evidence of its "high potential for abuse" (Department of Justice, 2001). They also reject the claim that marijuana serves any medical purpose (Department of Justice, 2001). The Administration, as of March 2014 has not responded to the request to reclassify but it can be assumed that as more states legalize marijuana for medical and recreational use, the federal government will experience additional pressure to re-assess its stance.

A final indication of a shift in the federal stance on marijuana stems from the United States Department of Treasury's approval for banks to provide financial services to marijuana related industries. In February 2014, the Financial Crimes Enforcement Network (FinCEN), part of the United States Department of Treasury, issued a statement that "financial institutions can provide services to marijuana related businesses in a manner consistent with their obligations to know their customers and report possible criminal activity" (FinCEN, 2014). Prior to FinCEN's statement, banks were vulnerable to racketeering, money laundering and other charges if they provided services for marijuana related businesses because marijuana is illegal on the federal level. Maxfield (2014) sums up the implication of FinCEN's statement nicely: "It's still too early to say what the impact of these nonbinding guidelines will have on the banking industry. However, there's much less ambiguity about the significance of this to people in the marijuana business. Love it or hate it, the momentum behind this movement is clearly growing."

Summary

Marijuana in the United States has experienced waves of political and societal support – from prohibition in 1937, decriminalization trends in the 1960s, increased criminalization in the 1980s, medical marijuana legalization beginning in the 1990s and recreational legalization in 2013. States' activities regarding marijuana have been complicated by the federal prohibition of the substance. As marijuana is categorized as a Schedule I drug, along with heroin, LSD and ecstasy, medical marijuana businesses that comply with state laws have been raided and banks are hesitant to do business with them. Recently, however, activities signify a possible shift in federal mentality made evident by the issuance of policy guidelines, possible reclassification of the drug, and permitting banks to provide services to marijuana related businesses. The current state of marijuana policy is changing day to day, moving to a more tolerant and regulation-centered approach.

II. LITERATURE REVIEW OF FEDERAL PRIORITIES

The Cole memo (2013) provides states with guidance regarding which issues need to be addressed in a legal marijuana market and is an effective tool by which to analyze marijuana policy in terms of its comprehensiveness. In this paper, when I refer to a "legal marijuana market" this includes a legal medical marijuana market as well as a legal recreational marijuana market. A legal medical marijuana market refers to a state approved medical marijuana program where licensed patients are permitted to possess, transport, purchase and possibly grow marijuana for medical purposes. A legal recreational marijuana market provides those protections to the general public without the medical stipulation.

Below, I use available literature to provide justification for including the issues identified in the Cole memo (2013) as necessary for a comprehensive state marijuana regulatory structure. Specifically, 1) preventing marijuana distribution to minors; 2) preventing marijuana revenue from going to criminal organizations; 3) preventing the diversion of marijuana to other states; 4) preventing driving under the influence of marijuana; 5) preventing adverse public health consequences; and 6) preventing environmental damages cause by cultivation.

Preventing Distribution to Minors

Preventing marijuana distribution to minors is high on the federal government's priority list and there is abundant research justifying this concern. Research has indicated that early use of marijuana is correlated to a plethora of dangerous activities including but not limited to academic problems, motivation and attention problems, risky sexual behavior, drug and alcohol abuse, gang activity and delayed brain development. While many studies show a correlation between early marijuana use and negative consequences, proving causation has been much more difficult. Nevertheless, the government's interest in preventing access to minors stems from studies that

indicate a relationship between early marijuana use and subsequent detrimental effects including disrupted brain development, poor academic achievement and future drug use.

Brain Development

Research has been conducted regarding adolescent marijuana use as it pertains to brain development. Wilson et al. (2000) studied 57 individuals and measured brain volume and global cerebral blood flow through MRI and PET scanning. They found that participants who began using marijuana before age 17 had "smaller whole brain and percent cortical gray matter and larger percent white matter volumes" when compared those who began using marijuana after 17 years old; meaning that participants who began smoking marijuana before age 17 had smaller brains. This study does not prove causation but Wilson et al. (2000) implied that the age in which one begins using marijuana might have a physical effect on brain development.

More specifically, research has focused on the effects of early marijuana use as it pertains to the hippocampus. The hippocampus is primarily associated with memory, and damage to the region can result in memory loss and the inability to create new long-term memories (Encyclopedia Britannica, 2013). The hippocampus is still developing in adolescence and the use of marijuana during that time has been shown to have negative effects on its development. Ashtari et al. (2011) conducted high-resolution 3D MRI tests on 14 individuals aged 18-20 with a history of heavy marijuana use during their adolescence (5.8 joints/day), and compared those results to 14 demographically matched non-marijuana user MRI results. They found that heavy marijuana users had a significantly smaller hippocampus when compared to the control group, concluding that heavy marijuana use in adolescence could have a negative effect on hippocampus development. They also studied the amygdala region but found no significant difference between the experimental and control groups. While again, this study does not prove causation, it does indicate there is a relationship between early marijuana use and hippocampus development.

In addition to the physical development of the brain and the hippocampus, research has been conducted on the memory capabilities of the hippocampus as it relates to early marijuana use. Jacobson et al. (2004) tested seven tobacco only adolescent users, seven marijuana only adolescent users and seven adolescents who had no history of tobacco or marijuana use. Using a computer program, Jacobson et al. (2004) measured their mnemonic processing by asking them to indicate if they remembered a word that was presented one or two words back. While performing the task, the participant's hippocampus activity was monitored through MRI imaging. Marijuana only users had a greater number of incorrect guesses, leading Jacobson et al. (2004) to conclude that early marijuana use can inhibit the hippocampus to "deactivate" which inhibits mnemonic processing.

Studies looking at hippocampus size and brain size have shown results that early marijuana use has negative effect on these organs' development. Further, the functioning of the hippocampus has been shown to be negatively affected by early marijuana use. These studies are a large reason for the federal priority of preventing marijuana distribution to minors.

Academic Success

Studies have focused on how early marijuana use effects academic success. Horwood et al. (2010) studied data from more than 6,000 participants analyzing the age of initial use of marijuana and three educational outcomes: high school completion, university enrollment and degree attainment. Other social, personal and environmental factors such as family socio-economic background, family functioning and individual characteristics and behavior were also controlled for in the analysis. The results indicate that there were significant associations between the age an individual began using marijuana and educational outcomes. Specifically, education outcomes were highest for those who did not use marijuana before age 18 and lowest for those who used marijuana before age 15 (Horwood et al., 2010). Another study surveyed 1,293 African

American and Puerto Rican youths regarding drug use and behavior, following up five years later. The results indicated that early use of marijuana was related to an increased risk of not graduating high school and delinquency (Brook et al., 1999).

While these studies show a relationship exists between early marijuana use and negative educational achievement, they do not prove a causal relationship. Lynskey and Hall (2000) review a number of studies looking at educational success and early marijuana use, concluding that such studies "cannot be used to determine whether cannabis use causes poor educational performance, [that] poor educational performance is a cause of cannabis use or whether both outcomes are a reflection of common risk factors" (p. 2). Even with the addition of social, environmental and individual factors, a causal relationship has yet to be proven between early marijuana use and educational attainment due to the vast number of alternative, difficult to capture factors.

Future Drug Use

A primary argument for preventing marijuana distribution to minors in a legal market stems from the belief that it is a "gateway drug." Typically, the gateway sequence begins with beer or wine and moves progressively to hard liquor, marijuana and eventually to harder drugs such as cocaine, LSD and heroin (Tarter et al., 2006). Kandel (2003) explains the gateway sequence in three sequential terms: sequencing, association of initiation, and causation. Where "*sequencing* implies that there is a fixed relationship between two substances, such that one substance is regularly initiated before the other; *association* implies that initiation of one substance increases the likelihood of initiation of the second substance; and *causation* implies that use of the first substance actually causes use of the second substance" (Kandel, 2003, p. 1). Many studies have analyzed the gateway effect with similar results but few, if any, have sufficiently proved causation.

Lynskey et al. (2003) conducted a unique study in an attempt to examine the relationship between early marijuana use and subsequent drug use by controlling for genetic and environmental factors. They surveyed 311 adult male twins, where one twin used marijuana before 17 years old. They found that the twin who had used marijuana before age 17 was 2.1 to 5.2 times more likely to use other drugs and to show signs of alcohol dependence than his twin. This included controlling for factors such as early-onset alcohol or tobacco use, parental conflict/separation, childhood sexual abuse, conduct disorder, major depression and social anxiety. Lessem et al. (2006) also found that early marijuana use was found in individuals who used harder drugs. They used data from the National Longitudinal Study of Adolescent Health and then re-interviewed 18,286 participants five years later. They found that early marijuana users were twice as likely to progress to harsher drugs than non-users. However, shared environmental factors between adolescent marijuana use and future drug use mediated much of the relationship between those two variables.

Even with these findings, though, researchers caution that these results do not prove that early marijuana use leads minors down a path to harder drugs. Research has indicated that many drug users do not follow the gateway sequence. Golub and Johnson (1994) found that 75% of inner-city drug users began using cocaine before marijuana, with 1-4% of heavy drug users skipping alcohol, tobacco and marijuana all together. Blaze-Temple and Lo (1992) reported that 29% of the 1,093 Australian teenagers surveyed began using marijuana after using heroin, LSD or stimulants. Factors that are difficult to measure such as individual characteristics, childhood exposure to drugs or drug culture, media and peer influences, have significant effects of future drug use but are not accounted for in many studies (Lynskey et al., 2003).

Preventing distribution to minors a legal marijuana market is a priority for the federal government due to the aforementioned reasons: disrupted brain development, poor academic

achievement and future drug use. Adolescence is an important time for brain development and research has indicated that early marijuana use has negative effects on this process, including specific hippocampus development. Other studies looking at academic success and future drug use stemming from early marijuana use are inconclusive. While research has shown a relationship between these factors, they have yet to convincingly prove a causal relationship. Nevertheless, these studies are the basis for policy that aims to prevent distribution of marijuana to minors.

Preventing Criminal Enterprises from Profiting

Preventing revenue in a legal marijuana market from supporting criminal enterprises such as gangs and international cartels is a major federal priority. Addressing this issue effectively keeps marijuana out of the black market and is a key strategy for reducing the power of criminal enterprises that use illegal marijuana profits to support their organizations. Former Mexican President Vicente Fox expressed that effective marijuana policy is “a strategy to weaken and break the economic system that allows cartels to earn huge profits” (Rosenberg, 2010).

Current literature estimates that criminal enterprises are profiting as a result of federal prohibition and inconsistent marijuana laws across states. The National Drug Intelligence Center reported that Mexican and Columbian drug trafficking organizations (DTOs) earn $18 billion to $39 billion annually, with the Office of National Drug Control Policy estimating that 60% of Mexican DTO revenue comes from exporting marijuana (Kilmer et al., 2010). However, Kilmer et al. (2010) dispute these numbers stating that these statistics are politically motivated and use unverified data. Kilmer et al. (2010) estimate that Mexican DTOs gross revenue from exporting marijuana is about $1.5-2 billion and marijuana accounts for 15-26% of drug export revenues. Though their estimate does not include revenue generated from marijuana that is cultivated and sold in the United States, which is estimated to be substantial (Kilmer et al., 2010).

Preventing criminal enterprises from profiting in a legal marijuana market is a priority for the federal government as well as for California, where DTOs smuggle and cultivate a significant amount of marijuana to meet demand. Kilmer et al. (2010) conclude that marijuana legalization, whether medical or recreational, coupled with effective regulations "would effectively eliminate Mexican DTOs' revenues from supplying Mexican-grown marijuana to the California market" (Kilmer et al., 2010, p. 19). However, questions remain as to how a decline in marijuana profits would effect DTO organizations: whether they will increase trafficking of other drugs and/or increase activities in other profitable criminal industries such as gun trade, extortion, kidnapping, gambling or human trafficking. Nevertheless, preventing DTOs from profiting from marijuana is a top priority to disrupt their revenue stream and overall capacity to operate.

It can be useful to look at history to see the effects that reduced criminal profits have on DTOs and society. During prohibition in the 1930s, the Mafia controlled the alcohol supply by bootlegging liquor. As a result, major cities in the United States experienced increased criminal activity and violence. After prohibition, the number of homicides in the country significantly declined. Kilmer et al. (2010) make the assumption that this was in part the result of prohibition repeal. By the 1960s, outside of a few cities, the mafia was extinct. Kilmer et al. (2010) notes that this was not due entirely to the end of prohibition – other factors such as increased federal law enforcement and changing migration patterns played an important role – but the virtual elimination of bootlegging profits contributed to their downfall. Similarly, if criminal enterprises are prevented from profiting in a legal marijuana market, their power and capacity to engage in other illegal activities diminish.

Preventing Diversion to other States

States that neighbor legal marijuana states have an interest in preventing marijuana from leaking into their borders, and addressing this issue is a significant federal priority. Neighbors of

legal marijuana states will incur increased policing and criminal justice costs if diversion is not prevented, as more supply of marijuana will be present in the neighboring states (Federal Raids, 2013). Currently, the interstate travel of marijuana has been seen throughout the country. The Rocky Mountain High Intensity Drug Trafficking Area reported that since 2005 interstate marijuana smuggling has increased 407% with most marijuana coming from Denver, Boulder and El Paso and being moved to Florida, Illinois, Kansas, Missouri, Nebraska, Texas and Wisconsin (Ripley, 2014). Preventing marijuana diversion to other states where it remains illegal is a federal priority as it seeks to respect individual state law and to limit policing and criminal justice costs for neighboring states.

Preventing Drugged Driving

Preventing drugged driving is a crucial element of a legal marijuana market and a top priority for the federal government. Use of marijuana impairs driving in a number of ways, including distance perception distortions, reduced reaction time and decreased hand-eye coordination (Anderson, 2012). However, studies have also showed that while these are impediments to driving, when compared to drunk drivers, marijuana users have an increased awareness that they are impaired, and compensate by employing strategies that have been shown to actually increase driver safety, including driving slower, avoiding risky maneuvers and increasing following distances (Anderson, 2012). Still, preventing drugged driving is high on the list of federal priorities.

The most risky behavior, and the primary reason for federal attention, is due to the dangerous effect that consuming marijuana in combination with alcohol has on one's ability to drive. Sewell et al. (2009) reported that the most risky behavior and the highest risk for fatal car crashes occurs when marijuana is mixed with alcohol, resulting in a multiplier effect that is more dangerous than when either product is consumed in isolation. Sewell et al. (2009) describes that

when marijuana is used with alcohol, the driver does not recognize their impairment and does not employ strategies to overcompensate for that impairment. This results in the driver taking unnecessary risks and increases the odds for fatal car accidents. For these reasons, preventing drugged driving is necessary.

Preventing Public Health Consequences

Addressing and mitigating any public health concerns that can occur as a result of consuming marijuana and marijuana-infused goods are necessary components of any legal marijuana market and a top federal priority. Public health consequences can occur if methods are not employed to prevent such events.

Employing techniques that prevent public health consequences are necessary because without such techniques customers will consume products that could be extremely detrimental to their health. Consequences such as allergic reactions, product contamination, overdoses and other potential side effects are potential consequences of not addressing this priority. Other consumer goods, such as foods, beverages and prescription drugs go through processes that are meant to prevent public health consequences. Specifically, policy implemented in 2012 to label tobacco products as potentially harmful to one's health has had "a significant public health impact" (Food and Drug Administration, n.d.). Requiring marijuana policy that prevents public health consequences is a legitimate priority for the federal government.

Preventing Environmental Damage

Marijuana is California's largest cash crop, estimated at more than $10-14 billion dollars annually (Mallery, 2011). Growing marijuana is a very intensive process that requires many resources and has the potential to cause incredible environmental damage if inputs are not regulated. This is cause for concern for the federal government. Currently, marijuana is not considered a legitimate crop and therefor is not regulated by the Food and Drug Administration,

U.S. Department of Agriculture or the Environmental Protection Agency, as are other crops (Lindsey, 2012). This oversight has led to a plethora of environmental problems as growers use chemicals and employ practices that would be outlawed if used for other crops (Lindsey, 2012). As a result, major environmental damage has been done, specifically in California: waterways have been diverted and polluted, habitat has been destroyed and animals have been killed.

The unregulated use of chemicals and pesticides on marijuana plants can have negative environmental consequences. Like most agricultural crops, chemicals are used on marijuana plants; these products ward off rodents and pests that can be damaging to the crop and can enhance the THC level and bud production (Mallery, 2010). Mallery (2010) estimates that for growers who use chemicals on their crops, 1.5 pounds of fertilizer is used for every 10 plants. These nutrients have washed into rivers and lakes, causing nutrient imbalances, pollution and kills fish, endangered species and other wildlife in the area (Mallery, 2010). In addition, illegal and unregulated pesticide “fences” are used to protect marijuana crops from animals, and they have been known to cause damage and even death to mice, wood rants, ground squirrels, gophers, deer and bears. Further, predatory animals, including bobcats, coyotes, fishers and martens have been known to die as a result of eating animals that have consumed the toxins (Manji, 2012).

Indoor marijuana cultivation produces different challenges when it comes to mitigating environmental damage. In many parts of the nation, the climate is not ideal for growing marijuana outdoors, so many producers move indoors. Growing marijuana indoors requires significant energy to provide adequate lighting, temperature, watering systems and ventilation. O’Hare et al. (2013) concludes that “the most important environmental cost of marijuana productions in the legal Washington market is likely to be energy for indoor growing” (p. 1). Mills (2011) found that indoor marijuana cultivation accounted for 1% of national electricity production in the United

States, totaling $6 billion per year, generating greenhouse gas pollution equivalent to three million cars.

California – where the "Mediterranean climate, abundant water, and loamy organic soils" creates an ideal growing atmosphere for marijuana – has particular interest in preventing environmental damage caused by indoor marijuana cultivation. California is the top marijuana producing region in the world and has been significantly affected by indoor marijuana cultivation (Mills, 2011). Mills (2011) estimates that indoor cultivation in California totals 3% of all electricity use, or 9% of household use. As an example, after medical marijuana was legalized in Humboldt County, there was a 50% increase per capita in electricity use compared to other areas (Mills, 2011). Preventing environmental damage that is caused by indoor and outdoor marijuana cultivation is a main priority for the federal government, and is particularly important for California.

Summary

Justification of the aforementioned issues as important elements of a comprehensive marijuana regulatory system stems from consequences experienced in current medical marijuana markets and in some cases from experience in other industries, such as alcohol and tobacco. The priority to prevent distribution of marijuana to minors stems from numerous studies that indicate a relationship, albeit not a proven causal relationship, between early marijuana use and delayed brain development, poor academic achievement and future drug use. Ensuring that criminal enterprises do not profit in a legal marijuana market is justified due to the negative social consequences that result from strong criminal organizations. Preventing such gangs from earning profits in a legal marijuana market will diminish the gang's capacity to operate. Controlling the diversion of marijuana to other states is necessary, as state laws must be respected. In a legal marijuana market, preventing drugged driving is essential due to the multiplier effect of

consuming marijuana and alcohol in combination, which results in an increased chance of fatal accidents when compared to consuming either substance alone. Public health consequences such as allergic reactions, overdoses and product contamination can result if consumers are not made aware of specific details about the product and must be addressed in a legal marijuana market. Finally, the environmental damage caused by marijuana cultivation has been significant, including polluted waterways and the death of numerous animals. The federal government is justified for identifying this as a priority that must be addressed by state marijuana policy. While literature has shown that the issues identified by the Cole memo (2013) are important priorities, it does not offer guidance regarding best practices that states can implement to produce those outcomes. The next chapter identifies those best practices.

III. BEST PRACTICES

This chapter identifies specific policies that states with a legal marijuana market have implemented, as well as policies that have been effective in regulating the alcohol and tobacco industries. The alcohol and tobacco industries are similar to a marijuana market as governments require similar regulations as those identified in the Cole memo (2013); it is useful to look to those best practices when literature regarding marijuana is absent or insufficient. Most of the best practices related to marijuana are from Colorado and Washington, where much academic and policy research has been conducted. Other examples of best practices are collected from states that have comprehensive medical marijuana regulatory programs. See Appendix B for more details about other state's marijuana laws.

Preventing Distribution to Minors

There are a number or well-researched best practices for preventing distribution of harmful substances to minors; however, much of the literature supporting these practices is related to alcohol and cigarettes. This research is applicable to preventing distribution of marijuana to minors in a legal market as well. In this section, I specifically identify age restrictions, advertising restrictions and a high tax rate as best practices for preventing distribution of marijuana to minors in a legal market.

Age Restrictions

Determining the age limit for legally purchasing, possessing and consuming marijuana has an effect on the access minors have to the drug. In the National Survey of American Attitudes on Substance Abuse (2009), cigarettes, which are legal for those 18 and over, was reported easier for minors to obtain than alcohol, which has an age restriction of 21 years old. The difference in age limits could be the reason that cigarettes are more accessible for minors than alcohol, as minors are closer in age to people who can legally buy cigarettes. In Colorado and Washington,

possession, transportation, sale and use of marijuana is only legal for those over 21 years old with most state medical marijuana programs instituting an age limit of 18 years old. However, regulatory policy focused on the demand side is less effective than policy aimed at the supply side (Gosselt et al., 2012).

Ensuring compliance by those who legally sell marijuana determines the effectiveness of age restrictions in a legal marijuana market. Gosselt et al. (2012) sought to determine the factors that result in compliance or non-compliance of alcohol age limits, and their findings can be used to understand how to ensure policy compliance of marijuana stores. During their study, they interviewed 106 Dutch managers of facilities where alcohol is sold. Gosselt et al. (2012) found that the primary reason for complying with age restrictions was "intrinsic support," meaning the seller supports the age restriction due to "concerns about physical and mental health of minors, alcohol abuse and nuisance" (Gosselt et al., 2012, pp. 6). The secondary reason was due to the "law abiding nature" of the seller, compliance because it is the law. The third most noted reason for compliance was financial, related to possible fines and punishments resulting from selling to a minor.

The primary reasons for non-compliance stem from secondary purchasing – when a legal aged individual purchases for a minor, and responsibility – the belief that others, such as parents, should be responsible for educating and monitoring alcohol consumption. Gosselt et al. (2012) also asked store managers for possible solutions that would increase compliance with alcohol age limits. Interviewees identified shifting the responsibility to parents, clarifying and consistently reminding stores of the rules, and increased intrinsic support as potential solutions to non-compliance. While the primary solution is likely outside of the scope of policy, the other results can influence policy makers to levy substantial fines as disincentives to selling to minors, and to disseminate information aimed at increasing store owner's "intrinsic support" of the policy.

Advertising Restrictions

Restricting advertising, in regards to the content and where advertising may occur, is a method employed to restrict exposure and reduce the desire for teens to seek out marijuana. While these method do not directly prevent distribution to minors, they have been proven to reduce minor's demand and therefor prevent them from seeking out marijuana. Caulkins (2012) recommends "tight restrictions on advertising through print, point-of-sale, internet, radio and television… [to] minimize use among youth" (p. 69). Literature is lacking pertaining to marijuana advertising, but literature examining alcohol and cigarette advertising and the effect on youth exposure and consumption are numerous. These studies can be used to understand the effects that marijuana advertising restrictions will have on minors.

The effect of alcohol advertising on youth consumption has shown consistent results. Grube and Wallack, (1994) surveyed 468 fifth and sixth grade children from northern California regarding beer advertisements and branding. They found that awareness of beer advertising was related to "more favorable beliefs about drinking…and to increased intentions to drink as an adult" (p. 1). Washington and Colorado have specific advertising restrictions that attempt to limit minor's exposure; and as a result, reduce the likelihood of minors' desire to consume marijuana. Washington will prohibit advertising through any medium "within 1,000 feet of the perimeter of a school, playground, recreation center or facility; child care center, public park or library; or any game arcade, admission to which is not restricted to people over 21" (WAC §314-55-155, 2013). In terms of non-print advertising, restrictions have been created to avoid marketing to teens. Following the Colorado Task Force (2013) recommendations, Colorado restricts advertising on billboards, television, radio direct mail, among others, "that have a high likelihood of reaching minors" (CDR §R1104, 2013). Specifically, advertising is only allowed on television, radio, on the internet or in print if the advertisers can prove that no more than 30% of the targeted audience

is under 21 years old (CDR §R1104, 2013). With these advertising restrictions, based on previous studies, exposure and likelihood of minors consuming marijuana will not be negatively affected as a result of legalization.

Restricting the content of marijuana advertisements is also a method to reduce teens' exposure to marijuana marketing. In alcohol advertisements, identifying with and desirability of the characters in the ads has been shown to increase the likelihood that youths will consume alcohol. These results have been demonstrated among 7-12-year-olds (Austin and Nach-Ferguson, 1995), third, sixth and ninth graders (Austin and Knaus, 2001), and ninth and twelfth graders (Pinkleton, Austin, and Fujioka, 2001). As a result of these studies, states have enacted restrictions as to the content of the marijuana advertising. Washington forbids advertising that:

> "depicts a child or other person under legal age to consume marijuana or includes objects such as toys, characters, or cartoon characters suggesting the presence of a child or any other depiction designed in any manner to be especially appealing to children or other persons under legal age to consume marijuana or is designed in any manner to be especially appealing to children or other persons under the age of 21" (WAC §314-55-155, 2014).

Regulation of the content of marijuana advertising so it does not appeal to minors is an effective way to mitigate young people's desire and likelihood of consuming marijuana.

Partial bans with specific restrictions on alcohol advertising have been shown to have varying effects on consumption. Ornstein and Hanssens (1985) found that allowing alcohol advertisements that include prices, especially on billboards, increased alcohol consumption. They rationalized that price advertising leads to greater competition, lower prices, and therefore greater consumption. States, including Connecticut and Massachusetts prohibit dispensaries from advertising prices (CDCP, p. 73, 2013; MDPH, 2013). Ornstein and Hanssens (1985) also found

that promotional giveaways of a product increases consumption. To address these issues, Washington and Colorado have prohibited advertisements and storefront displays that include price as well as any promotional product distribution (WAC §314-55-083 (6j), 2014; CDR §R1111, 2013). By looking to the alcohol industry and the effect advertising has on minors, regulations can be implemented that limit the negative impact on minors' activities and views towards marijuana.

Advertising restrictions, however, have been subject to lawsuits that assert that they violate the First Amendment. In the United States, the Supreme Court has struck down restrictions on advertising for alcohol, and marijuana groups have already begun to fight advertising restrictions in their industry (Caulkins, 2012). In February 2014, two publications, High Times – a magazine that caters to marijuana businesses and consumers and Westword – a free alternative Denver based newspaper, sued Colorado over the advertising restrictions, saying that they are "unjustifiably burdensome and violate free speech rights guaranteed by the U.S. Constitution" (Coffman, 2014). Colorado's marijuana advertising restrictions are comparable to tobacco but are much more restrictive than alcohol. The lawsuit claims these restrictions go against the wishes of the voters: voters approved Amendment 64 to legalize recreational use of marijuana and to regulate it like alcohol. Restrictions on cigarette advertising began with the Public Health Cigarette Smoking Act (1969), that prohibits cigarette advertisements on television, radio, billboards, on public transportation and in magazines that are sent to school libraries or targeted to children. In addition, the Master Settlement Agreement (1998) strictly prohibited the use of cartoons in tobacco advertisements and tobacco logos printed on clothing.

On the other hand, alcohol advertising has fewer restrictions. Attempts at prohibiting billboard advertising and off-premise advertising of liquor prices have had mixed results in the court system. In *44 Liquormart v. Rhode Island* (1996), the United States Supreme Court struck

down the state law that prohibited advertising alcohol prices on billboards, in newspapers or other forms of media (Scenic America, n.d.). A year earlier, the United States Court of Appeals for the Fourth Circuit upheld Baltimore's ban on alcohol advertising on billboards (Anheuser-Busch, Inc. v. Schmoke, 1995). With varying precedents on advertising restrictions, it is unclear how the court will rule regarding marijuana advertising restrictions; however, potential lawsuits must be considered when determining such restrictions.

High Tax Rate

The tax rate that is levied in a legal marijuana market will affect the accessibility that minors have to the product. Younger people are more sensitive to price than adults and the more expensive a good, the lower the likelihood that minors can afford it (U.S. Department of Justice, 2011). To reduce accessibility of minors to tobacco products, the Department of Justice (2011) recommended increasing the costs by levying a substantial excise tax, further explaining that increasing the price puts a higher barrier between youths and ease of access (affordability) to the products. In Washington, a 25% excise tax will be levied at three transaction points: from cultivator to processor, from processor to distributor, and from distributor to the consumer (WAC §314-55-089, 2014). Colorado levies taxes at the point of sale, including a 15% sales tax, a 15% excise tax in addition to a 2.9% state tax and any other local taxes (Colorado House Bill 1318, 2013). In Alaska and New Hampshire's proposed legalization initiative, an excise tax of $50 and $30 per ounce, respectively, would be attributed to the cultivators when they sell marijuana to a retail store or manufacturing facility (AKB 17, Ch. 61 §43.61.010, 2013; NHHB 492, 2013). The taxes levied on marijuana transactions would increase the price and theoretically reduce accessibility to minors.

While significant taxes will likely reduce accessibility to minors through legal channels, those same taxes could also produce a large black market where minors would be able to

purchase marijuana. Caulkins (2011) warned that any tax that results in a retail price significantly higher than the price to produce marijuana would result in a black market as cultivators, processors, retailers and consumers attempt to evade the high taxes. The Colorado Task Force (2013) also acknowledged the "need to keep taxes low enough so as not to encourage a persistent black market in marijuana" (p. 8). If the implemented tax results in a significant increase in prices relative to prohibition prices, consumers could turn to the black market. Caulkins, Andrzejewski and Dahlkemper (2013) analyzed how Washington's tax structure will affect price in a legalized market compared to prices pre-legalization. They found that the 25-25-25 percent tax structure will result in a 58% increase in the cost of marijuana, with 37% of the price being paid by the consumer. Further, they reported that "based on a production cost of $2 per gram…the after-tax retail price will be $17 per gram" (Caulkins, Andrzejewski and Dahlkemper, 2013). This tax structure could encourage a black market, and theoretically, increase minor's accessibility to marijuana as transactions move out of regulated stores and onto the streets. The tax structure of the legal marijuana market can have both negative and positive impacts on minor's accessibility to marijuana and must be weighed accordingly.

Wrap-up

When analyzing potential methods to prevent distribution to minors in a legal marijuana market, many things must be considered. Implementing age restrictions has been proven successful at limiting access only when the focus of regulation is on the supply side, encouraging retailer's compliance to age limits. Advertising restrictions that limit minors' exposure to marijuana has been shown to affect alcohol consumption, and this same method can be employed in a legal marijuana market. Lastly, imposing taxes on marijuana transactions can reduce access to marijuana as minors are more sensitive to price increases; however, a tax that increases the price too much could encourage a black market due to tax evasion. A balance must be struck in

terms of determining the tax rate. Employing techniques that have been proven effective, such as age limits, advertising restrictions and appropriate tax rates can prevent marijuana distribution to minors.

Preventing Criminal Enterprises from Profiting

Many states have implemented practices that are aimed at preventing criminal enterprises from profiting in a variety of industries, including the marijuana, alcohol and gun markets. Practices that can prevent profits from being diverted to criminal enterprises include background checks, supply requirements, and allowing for personal production.

Background checks

Running background checks on those applying to obtain a permit for operating a marijuana related facility may reduce the potential for Drug Trafficking Organizations (DTOs) from profiting in a legal marijuana market. Unfortunately, there is little research that specifically addresses background checks and DTO profits in the marijuana market. However, research about background checks for obtaining a gun permit and its relationship to guns being diverted to the illegal market can illustrate the impact background checks can have to avoid marijuana from being diverted to the illegal market.

Background checks for the seller and buyer have been shown to reduce the number of guns diverted to the illegal market. Daniel Webster, Director of the Johns Hopkins Center for Gun Policy and Research found that “state universal background checks — along with other state laws designed to increase gun seller and purchaser accountability — significantly reduce the number of guns diverted to the illegal market” (Sargent, 2013). While background checks for gun sales are done on both seller and buyer, only marijuana sellers, cultivators or processors would be subject to background checks, not the purchaser.

Colorado and Washington require that facility owners submit fingerprints and agree to a criminal history background check before being approved for a license to operate (CDR §R231, 2013; WAC §31-55-020 3, 2013). Colorado mandates that the background check show the applicant is "of Good Moral Quality" (CDR §R231, 2013). The applicant must also prove that he or she has "not discharged a sentence for a conviction of a felony in the five years immediately preceding" the application. However, Colorado allows for the applicant to be approved if the controlled substance charge was for possession or use that would not have been illegal at the time he or she applied for the license (CDR §R231, 2013). Requiring background checks for potential operators of marijuana related facilities, in combination with other regulations, can control the diversion of marijuana into illegal markets and subsequently prevent criminal enterprises from profiting.

Supply Requirements

Regulating where marijuana related facilities purchase their supply will reduce the possibility that revenues are being used to fund illegal operations. The Colorado Task Force (2013) recommends the use of "vertical integration," meaning that the cultivation, processing and sale of marijuana must be done under common ownership; further recommending that at least 70% of marijuana that a retail store sells is grown by that same facility. The remaining 30% can only be sold to or bought from other licensed facilities. Massachusetts employs a similar requirement, mandating that dispensaries can only purchase marijuana from other licensed dispensaries but this cannot constitute more than 30% of total annual inventory (MDPH §725.105, 2013). Their reasoning is that with vertical integration, regulatory agencies will have more control, ensuring that marijuana is not being diverted, grown or sold by illegal organizations, and thus preventing DTOs from profiting in the legal market.

Other approaches have mandated that marijuana related facilities must purchase marijuana or marijuana related goods from specific, licensed sources. Regulating where marijuana related facilities get their supply from, including where retail stores get there marijuana and where cultivators get their materials, seeds and plants from, will reduce the possibility that revenues are being used to fund illegal operations. Vermont, and New Jersey are among the states that stipulate medical marijuana dispensaries can only purchase from cultivation centers that are licensed in their respective states (VSB §4473, 2011; NMR §8:64-11.5, 2010). These kinds of regulations eliminate the possibility that illegal organizations will fill the needs of producers and retailers.

Allowing Personal Cultivation

A third approach to preventing criminal organizations from profiting in a legal marijuana market is by introducing another source of supply – personal cultivation. Allowing for personal cultivation will provide competition for the supply of marijuana and reduce the demand for marijuana produced by DTOs (Kilmer et al., 2010; Caulkins et al., 2011). Alaska allows for personal cultivation but limits the amount of plants one can grow to six while New Jersey and Illinois prohibit patient to grow their own medical marijuana supply (AKAB §17.37.040, 2013; NMR §8:64-3.4, 2010; IDPH §946.280, 2013). In Uruguay, the law that legalized marijuana in 2013 did not include permission for individuals to cultivate; however, current legislation is aiming to include personal cultivation as a permitted activity. Uruguay's President Jose Mujica is pushing for the bill's passage "in a bid to undermine drug-smuggling gangs and other criminality" (Smith, 2012). Permitting personal cultivation offers another supply source and can reduce the demand for marijuana sold by illegal operations.

While introducing an additional supply source could reduce the demand for DTO controlled marijuana, it also results in cultivation that is not controlled or regulated by any state

or local agency and has a higher potential to be diverted to illegal markets (Caulkins et al., 2011). This would be counterproductive to the efforts to control the supply and sale of marijuana in a legal market. New Mexico, as an attempt to regulate personal medical marijuana grows, has implemented licensing requirements. A patient who wishes to cultivate marijuana must obtain a Personal Production License and is limited to cultivating no more than four mature plants. Further, the authorized patient is prohibited from selling or giving marijuana to any other individual or entity; however, it is unclear how much the program is utilized, followed or enforced (NMR §7.34.4.8, 2010). Nevertheless, if allowing for personal cultivation, measures to regulate such grows should be considered in order to prevent criminal enterprises from cultivating and profiting from marijuana transactions.

Wrap-up

States with legal marijuana markets have employed methods to prevent profits from being diverted to criminal enterprises. Looking to gun sale research, background checks have been shown to reduce the number of guns that are diverted to the illegal market. Along the same lines, background checks for prospective marijuana related facility operators can reduce the likelihood that marijuana will be diverted to the illegal market and provide revenues for DTOs. Further, mandating where or from whom facilities can purchase their supplies limits the potential for organized crime to provide those services. Lastly, while allowing for personal cultivation provides competition and drives down demand for DTO cultivated marijuana, it can also create an unregulated market where illegal cartels and drugs can cultivate marijuana in the United States. Methods such as New Mexico's Personal Production License attempts to control personal cultivations but it is unclear how effective the program is at regulating personal grows.

Preventing Diversion to other States

Many states with legal marijuana markets have implemented policies with the aim of preventing marijuana from being transferred into states where it is illegal. Employing techniques that aim to prevent or limit the amount of marijuana that is diverted to other states respects other states laws and reduces the burden of law enforcement in the state where marijuana remains illegal. Approaches to prevent diversion include tracking marijuana "from seed to sale," limiting non-resident purchases and preventing excess marijuana supply in the state.

Tracking "From seed to sale"

Employing a comprehensive tracking system that accounts for marijuana from the cultivation stage to the sale eliminates the risk that product will leak out of the regulated market and to other states. Colorado uses, and Washington will use, an electronic seed-to-sale tracking system that allows the state to monitor all marijuana products from cultivation to processor to retail store through to the sale. Colorado's medical marijuana program has been using a sale tracking system (Marijuana Inventory Tracking Solution, MITS) and is "often described as the most closely regulated [medical marijuana program] in the world" (Johnson, 2013). Each marijuana establishment is required to identify one MITS administrator, who must complete training, to be responsible for tagging either a seed or immature plant with an individualized identification number in order for the system to track the product (CDR §R309, 2013). Washington is currently creating the mechanism by which to track marijuana in their legal market.

A seed-to-sale framework as a means to prevent leakage to other states; however, presents potential problems for the implementing state. These programs are expensive and difficult to regulate and administer. Laura Harris, the Director of the Colorado Medical Marijuana Enforcement Division, believes that the seed to sale regulations are "'a model of regulatory

overreach,' too cumbersome and expensive to enforce" (Johnson, 2013). The Colorado Department of Revenue announced in July, 2013 that its tracking system would not be able to track the weight of marijuana until after it is harvested from the plant, relying on the cultivator's declaration of how much marijuana a plant produces (Ingold, 2013). Issues of cost and feasibility could hinder effective implementation of any electronic seed to sale regulatory framework.

Further, Colorado's current seed to sale regulatory framework has not been proven effective at preventing leakage to other states. Law enforcement officials outside of Colorado have reported numerous accounts of arrests for marijuana that was purchased in Colorado and medical marijuana from Colorado has been found in states including Kansas, Nebraska and Wyoming, among others (Johnson, 2013). In order to prevent diversion of marijuana to neighboring states, a comprehensive and effective seed to sale program must be created, in addition to supplemental regulations.

Non-resident purchases

Limiting the amount of marijuana that out of state residents can purchase will prevent large-scale leakage to other states where recreational or medical marijuana may still be illegal. The Colorado Task Force recommended (2013) that out of state residents should be restricted to purchases less than the threshold for Colorado residents "to discourage unlawful diversion of marijuana out of the regulated system and out of the state, since the lower transaction amount would make the accumulation of marijuana more difficult" (p. 52). As a result of the recommendation, Colorado allows non-residents to purchase ¼ of an ounce in a single transaction compared to the one ounce limit for residents (CDR §R402, 2013). By limiting large purchases to only residents, states can prevent out of state visitors from crossing the border, purchasing large amounts of marijuana, and driving back to their home state.

Limiting Supply

Assessing the demand for marijuana and authorizing cultivation permits accordingly can reduce the likelihood that excess marijuana will exist and be smuggled to other states. Alison Holcomb, the leader of Washington's Initiative 502, stated that "excess supply creates incentive to divert outside the state" (Johnson, 2013). Beau Kilmer, co-director of the RAND Drug Policy Research Center commented that "the decisions they [states] make about how many producers to allow and what time of production to allow will really shape what the market will look like and shape this whole discussion of diversion… Are they going to allow four producers, or 400?" (Neighbor States, 2013) In an attempt to measure demand in the state, the Washington Liquor Control Board will conduct a survey and determine the number of cultivation permits issued based on the results (Johnson, 2013). Authorizing cultivation centers based on population is a method of controlling supply based on demand as well. Arizona determines how many medical marijuana dispensaries it permits based on the ratio to pharmacies (ARS §36-2804, n.d.). Nevada determines the number of dispensary and cultivation center it licenses based on the population of the county; for example, a county with more than 700,000 residents will have a maximum of 40 licensed facilities. Further stipulating that there will be no more than one dispensary for every ten pharmacies (NRS §11, 2013). These methods of determining demand, based on surveys, population and related industries, can be an effective way to determine the number of marijuana cultivation facilities the state approves; and therefore, reducing the likelihood of excess supply that could be diverted to other states.

Wrap-Up

Preventing diversion of marijuana to neighboring states is an important factor to address in a legal marijuana market. Attempts at tracking marijuana from seed to sale, while effective in their planning stages, have been troublesome to implement and administer due to cost and

implementation feasibility. However, marijuana tracking systems, in combination with other policies, such as limiting purchases for non-residents and measuring demand to approve licenses accordingly could be effective. To determine demand for marijuana, and approve marijuana related facility permits accordingly, measures such as surveys, population and other industry data can be used. These methods aimed at reducing the diversion of marijuana from states where it is legal to states where it is not have been implemented in numerous states; however, more research is needed to determine the effectiveness of these policies.

Preventing Drugged Driving

Preventing drugged driving requires two steps: determining an impairment threshold and a method by which to measure impairment. Addressing these two steps have proven a challenge for states as methods for identifying and measuring impairment from marijuana is unlike those for other substances, such as alcohol. Further research is needed in order to determine specific best practices, but an understanding of these two steps is key.

Determining DUI Threshold

As a means to deter driving under the influence of marijuana, there must be a threshold to determine impairment. For alcohol, impairment is measured by the driver's blood alcohol content (BAC), and any driver that tests over the legal limit is charged with driving under the influence. Throughout the nation, the BAC is .08 for those over 21 and varies by state for those under 21 from .01 to .05. According to the National Highway Traffic Safety Administration (2004), the .08 threshold was determined because "nearly 300 studies reviewed have shown that, at a .08 BAC level, virtually all drivers are impaired in the performance of critical driving tasks such as divided attention, complex reaction time, steering, lane changing and judgment" (p. 2). As a result of these studies, .08 was adopted as the national level of impairment.

For marijuana, some states have enacted DUI like thresholds for determining impairment. Colorado and Washington will determine a driver as under the influence of marijuana if the person shows to have, through a blood test, five nanograms or more of delta 9-tetrahydrocannabinol (THC) per milliliter (NORML, n.d.). Other states, such as Arizona and Illinois have a zero tolerance policy: if any trace amount of THC is found in a driver's system, they are arrested for driving under the influence (ARS §28-1381; IDPH §5/11-501, 2014). Other states do not specifically address marijuana but under most states DUI laws, being under the influence of any drug constitutes impairment and makes the driver vulnerable to arrest for driving under the influence.

There are disputes that a "per se limit," similar to the .08 BAC threshold, is not appropriate for marijuana. Studies aimed at determining a universal impairment level, such as the .08 BAC, have failed to do so. Fuchs (2013) explains that while it is widely accepted that driving under the influence of marijuana is dangerous, "there is a lack of evidence that ties a certain THC level with a certain degree of impairment." The National Highway Traffic Administration (n.d.) exemplifies this point by stating that "it is difficult to establish a relationship between a person's THC blood or plasma concentration and performance impairing effects ... It is inadvisable to try and predict effects based on blood THC concentrations alone." The lack of evidence that a single THC level results in impairment for the majority of people has been used as an argument against using a BAC like equivalent for driving under the influence of marijuana.

Further, there are concerns that a per se limit for marijuana would not improve public safety and could result in innocent people being charged with driving under the influence of marijuana. The Marijuana DUI Workgroup recommended that a per se limit should not be enacted because there is no evidence that such a limit would improve public safety and reduce traffic accidents (Elliot, 2011). Jones (2005) determined that Sweden's policy of "zero

concentration limits in blood for controlled substances" has done nothing to decrease driving under the influence of marijuana, to deter recidivism, nor has it increased public safety. The Marijuana DUI Workgroup (2011) reported that "a five nanogram per se limit would result in unimpaired and innocent people being wrongly convicted" (Elliot, 2011, p. 3). While many organizations argue against the per se threshold, there are also concerns about the method by which marijuana impairment is measured.

Measuring Impairment

Measuring impairment from marijuana in a similar manner as measuring impairment from alcohol – through a blood test – is not appropriate for two reasons: the inaccurate measure of current impairment and the different aspects of how the body metabolizes marijuana compared to alcohol. A blood test for marijuana does not measure impairment at the time of the test but measures whether the individual has THC in their blood stream, not providing an accurate measurement of impairment (Elliot, 2011). THC can stay in the blood stream for up to three months after use, depending on a variety of factors, and blood tests pick up on this amount of THC, not whether that amount is causing impairment. Karschner et al. (2009) found that, though a blood test, six of 25 frequent, long-term marijuana users tested positive for THC after seven days of not consuming marijuana. Factors such as sex, body fat composition and frequency of use can cause varying THC levels when measured through blood tests (Ramaekers, et al., 2010). For these reasons, a blood test is not an appropriate method by which to measure impairment.

Secondly, the differences in how the body metabolizes marijuana compared to alcohol, does not lend itself to blood testing as an accurate method by which to determine impairment. The Marijuana DUI Workgroup says this is true because "alcohol is water soluble; cannabis is stored in the fat and is metabolized differently, making a direct correlation [between THC blood level] with behavior difficult to measure" (Elliot, 2011). Methods other than blood tests need to

be researched in order to effectively measure the level of impairment due to marijuana consumption.

Recently, researchers have studied alternative, more accurate, ways to measure impairment from marijuana as a means to cite drivers for driving under the influence. Researchers are currently developing a breath test to measure impairment, much like the Breathalyzer used to test for drunk driving. This new device has proven to be an effective measure of current THC levels and impairment, detecting use as little as 30 minutes to two hours after consuming marijuana (Adams, 2013). However, this method is not effective for daily users, who have tested positive for impairment even if they are not impaired, due to the build-up of THC as a result of heavy use (Anderson, 2012). Further research is needed to ensure accurate testing of impairment caused by consuming marijuana.

Wrap-Up

Addressing driving under the influence of marijuana is an important policy consideration in a legal market. Attempting to measure and determine a per se threshold for impairment for marijuana, like the BAC for alcohol, can lead to inaccurate measurements and unjust results. No studies have been able to determine a THC level that is universally shown to impair driving, nor that per se THC thresholds have resulted in improved public safety and reduced traffic accidents. Further, the method by which to measure impairment from alcohol – a blood test – is not an accurate method for measuring marijuana impairment. This is due to the many factors that influence impairment, such as body type and frequency of use as well as the differences in metabolizing marijuana compared to alcohol. Research is currently being conducted to find an alternative method to measure impairment, including a breath test similar to the Breathalyzer used to determine BAC. Further resources need to be directed to ensure the enacted method is accurate and fair.

Preventing Public Health Consequences

Methods to prevent public health consequences have been employed in other industries, such as food, alcohol and prescription drugs. Using those methods, including product labeling and product testing, is an effective way to prevent public health consequences in a legal marijuana market.

Product labeling

Information posted on marijuana product labels regarding the potency and active ingredients allows the consumer to make well informed decisions about consumption. The Colorado Task Force (2013) recommends including the potency of the marijuana strain because "research indicates that the potency of marijuana has increased over time, and variations will inevitably be found between plants and in the harvest of the same plant over time" (p. 61). Requiring this information to be included on the label allows consumers to ingest the appropriate amount and avoid potential negative side effects (Colorado Task Force, 2013). States, including Connecticut, New Jersey, Colorado and Washington require that the THC level of the marijuana or marijuana infused product be printed on the label, with some states requiring additional chemical properties such as THCA, CBD, CBDA and CBG be present (CDCP p. 48-49; 61, 2013; NMR §8:64:10.5, 2010; WAC §314-55-105, 2013; CDR §R1000, 2013). This information educates the consumer and allows them to make appropriate consumption decisions, mitigating any potential public health problems.

In addition to listing active ingredients, notification of harmful substances used while cultivating the marijuana further educate the consumer of potential health risks. Providing information about the use of pesticides or other chemicals during cultivation allows consumers to make an informed decision as to whether they want to consume the product. Following the Colorado Task Force (2013) recommendations, Colorado requires that all nonorganic pesticides,

fungicides, herbicides, solvents and chemicals used during cultivation are listed on a label affixed to the marijuana or marijuana infused products. Washington mandates that a list of all pesticides, herbicides and fungicides found in the product be available upon request, although does not specify who the requesting person or agency is, whether it is the state or consumer (WAC §314-55-087, 2013). The inclusion of these chemicals on the packaging labels informs consumers and reduces the potential for a public health scare.

Product testing

In order to provide accurate labels for consumers, products must be tested. Product testing serves two purposes: testing to determine whether the marijuana is safe for public consumption, and as a means to provide consumers with accurate information about the content and potency of the product (Colorado Task Force, 2013). Marijuana can be sold not only in the typical dried form meant for smoking, but also as butters, creams, edibles such as cookies, brownies, chocolates, popsicles and candies, and in oils and pills, among other forms. All of these forms of marijuana need to be tested for quality assurance and content to prevent public health consequences.

Determining which agency will be tasked with testing marijuana products is complicated due to marijuana being illegal federally. Laboratories that test other items, such as pharmaceutical drugs or tobacco, are wary of testing marijuana out of fear that their laboratory will be raided and/or shut down by federal agents. Most states that require marijuana testing, including Colorado, Washington and Nevada, do so through small, private licensed laboratories that specialize only in marijuana testing (Halford, 2013). The Colorado Task Force (2013) recommended that the a “Good Laboratory Practices Advisory Group” be assembled, comprised of private laboratories and overseen by a state agency, such as Health, Agriculture or Public

Safety. The creation of this groups “will help ensure the safety and consistency of marijuana products and assist in the accurate labeling of their contents” (p. 71).

Laboratory testing of marijuana examines a number of characteristics of the plant in order to ensure consumers are not at risk. States test for substances such as solvents, poisons, toxins, harmful chemicals, molds, mildew, salmonella, pesticides, harmful microbial such as E. Coli, metals and fungus. Different resources are used to determine whether the marijuana contains too much of one of these substances. Connecticut laboratories use the US Pharmacopeia Convention standards to determine whether a sample passes the microbiological and chemical residue test. Washington requires that labs follow the Cannabis Inflorescence and Leaf monograph published by the American Herbal Pharmacopoeia for quality assurance tests (CDCP p. 63, 2013). These tests and thresholds help determine whether a sample of marijuana is safe for public consumption.

Wrap-Up

Methods for preventing public health consequences in a legal marijuana market include appropriate product labeling and product testing. Appropriate labels would include a profile of the potency, active ingredients and chemicals used during the cultivation process. In order to provide accurate labels, marijuana needs to be tested. A number of states have required testing and permit marijuana testing facilities to operate; however, the federal illegality has resulted in laboratories fearing federal intervention if they decide to test marijuana. Technically, laboratories that test marijuana are violating federal law and are at risk of being raided and/or shut down due to their involvement with marijuana. In a legal marijuana market, laboratories need to be able to test marijuana accurately and comprehensively without fear of federal intervention in order to prevent public health consequences.

Preventing Environmental Damage

Best practices employed for regulating other agricultural crops can be used in the same manner in a legal marijuana market. Identifying a regulatory agency and creating a list of approved chemicals and pesticides to be used during the cultivation process limit growers to using chemicals and pesticides that are shown to be less environmentally damaging than other products and enacts consequences if regulations aren't followed. Additionally, regulating indoor cultivation to limit electricity use will mitigate environmental damage.

Identify approved chemicals & pesticides

Identifying a regulating agency and creating a list of approved substances to use during cultivation is an effective way to mitigate environmental damage. Currently, since marijuana is illegal on the federal level, there are no substances approved for use on the plant during cultivation, like there are for legal agricultural crops. If marijuana was recognized as an agricultural crop then the California Department of Pesticide Regulation (CDPR) would be responsible for regulate any pesticide use (Lindsey, 2012). States have imposed varying regulations in regards to the use of chemicals and pesticides during the marijuana cultivation process that are regulated by local health departments. New Jersey does not allow any pesticides to be used during marijuana cultivation, reasoning that: "Inasmuch as there are no pesticides authorized for use on marijuana, and the unauthorized application of pesticides is unlawful, a plant cultivation shall not apply pesticides in the cultivation of marijuana" (NMR §8:64-10.9, 2010). Washington State has also implemented specific rules relating to chemical and pesticide use. They require that only substances that are registered with the Washington State Department of Agriculture (WSDA) or the Organic Materials Review Institute are allowed to be used on marijuana plants (WAC §314-55-084). Strict requirements about the use of chemicals and pesticides can mitigate the environmental damage caused by marijuana cultivation.

Regulate indoor growing

Regulating indoor cultivation and encouraging greenhouses could reduce the negative environmental impact of indoor cultivation. O'Hare et al. (2013) predicts that the most significant cost to Washington after legalization will likely be the amount of energy used for indoor growing operations. In Colorado's medical marijuana industry, marijuana cultivation warehouses receive electricity bills ranging from $21,000 to $100,000 or more (Breathes, 2013). Mills (2011) suggests, as a means to reduce the amount of energy used to grow marijuana, a transition to greenhouse cultivation, which would dramatically reduce energy use with efficiency improvements of up to 75%. Greenhouses are successful for growing many high value crops and the technology that is already being employed for those crops can be easily adopted for marijuana grows; further, using greenhouses as the primary method for indoor marijuana cultivation would reduce environmental damages (O'Hare et al., 2013).

Wrap-Up

Preventing environmental damage due to marijuana cultivation can be addressed in a number of ways; however, is complicated due to federal prohibition. Since marijuana is illegal on the federal level, there are no approved chemicals or pesticides approved by the CDPR, FDA, U.S. Department of Agriculture or the Environmental Protection Agency for use on the plant, like there are for legal crops. In an attempt to regulate marijuana cultivation, some states have enacted policy regarding the use of chemicals and pesticides. Further, addressing indoor cultivation and encouraging greenhouses can mitigate environmental damage due to the significant energy that indoor grows require. Employing these techniques in a legal marijuana market would have significant, positive environmental effects.

Summary

A number of states have implemented policies that address the issues identified by the Cole memo. These best practices can be used by other jurisdictions to craft a comprehensive marijuana regulatory system. In some areas, more research is necessary in order to appropriately identify effective best practices for a legal marijuana market, specifically for preventing drugged driving. In other areas, there have been proven techniques that have been employed in other industries, such as alcohol, tobacco and firearms that can be used in a legal marijuana market as well.

IV. ASSESSMENT OF CALIFORNIA'S MEDICAL MARIJUANA PROGRAM

In the previous chapters I presented federal recommendations about what outcomes a comprehensive state marijuana regulatory structure should produce and corresponding best practices. In this chapter, I assess California's Medical Marijuana Program (MMP) in relation to those guidelines and best practices. The MMP, created by Senate Bill 420 (2004) is a state mandated local program with the primary purpose of maintaining a voluntary identification card system, operating under the scope of the State Department of Health Services. The MMP is the only state agency involved in medical marijuana regulation of any kind, and as such, is the appropriate agency to assess the comprehensiveness of a statewide regulatory system. Results indicate that California's MMP does not include all the necessary components of a comprehensive regulatory system. As a result, local jurisdictions have enacted policy to fill the regulatory gaps left by insufficient state policy.

On the following page, Table 1 provides an overview of the issues addressed in the Cole memo presented in Chapter II, best practices provided in Chapter III and an indication whether California's MMP addresses those issues. This assessment is only for state policy and does not include local laws. Overall, California's MMP does not meet best practices. The only aspect the MMP addresses pertains to preventing criminal enterprises from profiting in the legal marijuana market; however, only one policy is implemented to address this issue: allowing for personal cultivation. The following chapter further explains how California's MMP measures up to best practices and how local jurisdictions have filled those regulatory gaps.

Issue to be Addressed	Best Practices	Does CA MMP address?
Prevent distribution to minors	Age restrictions	
	Advertising restrictions	
	High tax rate	
Prevent criminal enterprises from profiting	Background checks	
	Supply requirements	
	Permitting personal cultivation	✓
Prevent diversion to other states	Tracking "from seed to sale"	
	Non-residential purchase limits	
	Limit supply	
Prevent drugged driving	Determine DUI threshold	
	Determine tool to measure impairment	
Prevent public health consequences	Product labeling	
	Product testing	
Prevent environmental damage	Chemical & pesticide restrictions	
	Regulate indoor cultivation	

Table 1: Assessment of California's Medical Marijuana Program (MMP) in terms of Department of Justice recommendations and best practices.

While state law does not adequately address regulating the medical marijuana market, local jurisdictions have implemented policy to fill the regulatory gaps. Senate Bill 420 (2003) permits that local governments adopt laws that are consistent with State law; it is up to each jurisdiction to decide if it will allow medical marijuana related businesses, in what zones, and under what regulations (Ch. 11362.83). Reactions by counties and cities have varied, from banning marijuana dispensaries outright to issuing specific permits for these enterprises (California Police Chief Association, 2009). Butte County (n.d.) refers to their local policies as "the best way to avoid conflict with the vagueness of the Compassionate Use Act of 1996" and the City of Angels (2005) implemented regulations because "currently, the city has no rules or regulations governing medical cannabis or dispensaries of medical cannabis." Due to the vague and insufficient regulatory structure of the California MMP, local jurisdictions feel the need to implement regulations in order to mitigate negative consequences of an unregulated market.

Preventing Distribution to Minors

California's MMP does not include regulations that adequately prevent distribution of marijuana to minors. Age restrictions, advertising restrictions and substantial tax rates are not included in state policy; however, many local jurisdictions have implemented regulations that address these gaps in state policy.

California state policy does not prevent minors from qualifying for medical marijuana on the basis of age alone; however, there are informal rules that prevent minors from obtaining medical marijuana. Those under 18 are eligible by the state to receive medical marijuana recommendations with parent consent, though many doctors are hesitant and most medical marijuana dispensaries prohibit anyone under 18 from entering the premises, regardless of parental approval. Further, if a minor receives a recommendation from a doctor for medical marijuana, the local County Health Department is required to "contact the parent with legal authority to make medical decisions, legal guardian, or other person or entity with legal authority to make medical decisions" to verify the validity of the illness and recommendation (Medical Cannabis of Southern California, n.d.). While there are obstacles for minors when it comes to obtaining medical marijuana at the local level, prevention of distribution of marijuana to minors does not stem from state law.

Advertising restrictions and substantial taxes, best practices for preventing distribution of marijuana to minors, is not part of California's MMP regulatory structure. Medical marijuana transactions are subject to state sales tax but additional statewide taxes are not levied. Local jurisdictions; however, have enacted additional taxes. Oakland was the first city to levy a tax on the sale of medical marijuana in 2009, approving a measure that would levy an $18 tax on every $1,000 of gross marijuana sales for dispensaries (Measure V, 2010). Further, in 2010, Oakland approved a 5% sales tax on medical marijuana sales (Marijuana Policy Project, 2013). In 2010,

San Jose passed Measure U, a marijuana business tax, by a margin of 78-22%, which resulted in a 10% tax "on the gross receipts of businesses located in the city that sell marijuana (Ballotpedia, n.d.). As far as advertising restrictions, the MMP does not address this issue. Local jurisdictions including Marysville have implemented restrictions due to the lack of state regulation. Marysville prohibits any advertising, displays of merchandise or signs outside of dispensaries (Marysville Code, §18.67.040, n.d.).

Overall, California's MMP does not provide a comprehensive regulatory system that prevents minors from obtaining marijuana. The MMP does not have an age restriction, and advertising restrictions and tax rates are not included in state marijuana policy.

Preventing Criminal Enterprises from Profiting

California's MMP does not adequately include policies that prevent criminal enterprises from profiting in the medical marijuana industry. State law does allow for personal cultivation, a practice that can mitigate criminal profits, but does not require background checks or set regulations regarding the supply sources of medical marijuana dispensaries. As a result, many jurisdictions have implemented policy to fill the regulatory gaps left by the insufficient state policy.

Background checks are not required under California's MMP policy for individuals who operate marijuana related industries. Medical marijuana dispensary owners are required to obtain a sellers permit to allow the state to collect appropriate taxes; however, this process does not include a background check. To address this oversight, local jurisdictions have required medical marijuana facilities to apply for dispensary permits or general business permits with the added requirement of background checks. Some jurisdictions also require that all dispensary employees undergo background checks to be approved to work at marijuana facilities. For example, Los Angeles requires annual background checks for every individual who holds a permit to operate a

medical marijuana dispensary in the city (Proposition F, 2013). While some local governments require background checks to operate a medical marijuana business, the California MMP has no such requirement which potentially allow criminal enterprises to reap profits.

The MMP does not address what is arguably the largest aspect of criminal profit relating to marijuana in California: regulating where medical marijuana dispensaries obtain their supply. Since medical marijuana dispensaries operate in a grey area, state laws do not target dispensaries, which has resulted in an unregulated supply of medical marijuana for dispensaries. Further, few local jurisdictions have addressed supply requirements which has resulted in huge profits funneling to criminal enterprises. Eureka has attempted to address supply regulations by requiring dispensaries to register with a certain cultivation facility and only sell marijuana from those facilities; however, it is unclear how or if this is enforced (Eureka Municipal Code, 2011). The MMP does not adequately regulate medical marijuana dispensary's supply sources as a means to prevent criminal enterprises from profiting in the medical marijuana market nor do local jurisdictions.

California's MMP does include one policy that potentially prevents criminal enterprises from profiting from the legal medical marijuana market: personal cultivation. Proposition 215 and subsequent policies permit qualified patients to cultivate their own supply with little to no regulations regarding the licensing or location of personal marijuana grows. Senate Bill 420 (2003) did impose plant limits on how much a patient can grow, limiting patients to a maximum of six mature or 12 immature plants; however, allowed local jurisdictions to set higher thresholds. While allowing for personal cultivation is a method by which to reduce profit realized by criminal organizations, it is less effective when not used in combination with other best practices.

Overall, California's MMP does not include regulations that prevent criminal enterprises from profiting in the medical marijuana market. State policy does not require background checks

for operators of medical marijuana facilities nor does it include requirements for medical marijuana dispensaries relating to legal supply sources. One aspect where the MMP may prevent criminal enterprises from profiting is by allowing for personal cultivation; however, when implemented in isolation it is unlikely to have a large effect on reducing illegal revenues.

Preventing Diversion to other States

California's MMP does not prevent marijuana diversion to other states; it does not have a method to track marijuana, does not prevent out of state residents from obtaining medical marijuana, nor does it have a method by which to ensure supply does not exceed demand. Further, few local jurisdictions have implemented policy addressing this issue.

California state policy does not address any form of tracking marijuana from seed to sale as a means to prevent leakage of legal medical marijuana to other neighboring states. With this gap in state law, some jurisdictions have enacted regulations for medical marijuana industries in their borders, but most have not. Arcata requires that medical marijuana facilities produce an operations manual that includes the "process for tracking medical marijuana quantities and inventory controls including on-site cultivation, processing, and/or medical marijuana products received from outside sources" (Arcata Municipal Code §E1, n.d.). Eureka adds the requirement that dispensary operations manual must include "the process for documenting the chain of custody of all cannabis products from farm to patient" (Eureka Municipal Code, 2011). However, it is unclear whether this regulation is enforced. The city of Fairfax requires dispensaries to record "the total gross weight of all marijuana possessed at the dispensary that is no longer affixed to any living marijuana plant at the close of each business day" as a means to inventory medical marijuana (Fairfax Medical Marijuana Ordinance, §12, 2002). While California's MMP does not address tracking marijuana as a method to prevent diversion to other states, a few localities have

implemented policies as an attempt to fill that policy gap for their jurisdiction, but it is unclear if or how these regulations are enforced or effective.

California MMP does not expressly prohibit non-residents from obtaining a doctor's recommendation for medical marijuana or from purchasing medical marijuana from a California dispensary. Proposition 215 (1996) was written "to ensure that seriously ill Californians have the right to obtain and use marijuana for medical purposes" but throughout the bill it refers to qualified patients as being exempt from criminal charges for the use, possession or cultivation of medical marijuana. From this reading of the bill, qualified patients, whether California residents or not, are able to obtain medical marijuana in the state. Chadwick (2012) notes that "not one known California appellate court decision has ruled otherwise." The state attempted to address this issue by requiring applicants for the state marijuana cards to be residents, however, because these cards are voluntary it is not a control mechanism over who can obtain medical marijuana, just who is eligible to apply for the voluntary identification card. While the state MMP does not prohibit non-residents from obtaining medical marijuana, many physicians and dispensaries require patrons to possess valid California identification. Nevertheless, state or local policy does not address non-resident purchasing of medical marijuana; thus, unable to prevent diversion of marijuana to other states.

California MMP does not attempt to control supply in relation to demand: the number of permitted dispensaries, cultivators or other marijuana related facilities are not addressed at the state level. The state has left regulatory decisions to local governments and some cities have employed policies to limit medical marijuana facilities. For example, Clearlake currently permits three medical marijuana dispensaries, but when Clearlake's population reaches 20,000, an additional dispensary will be permitted to operate (Clearlake Ordinance No. ORD-150-2011, §5-

20.3, 2011). The state has no mechanism by which to control the supply of medical marijuana, which is a best practice to prevent leakage of the product to other states.

Overall, California's MMP does not include policy that prevents diversion of medical marijuana to other states. No mechanism by which to track marijuana from seed to sale exists and local ordinances passed as an attempt to do so are limited and inadequate. Further, non-residents are not expressly prohibited from obtaining a medical marijuana doctor recommendation or from purchasing medical marijuana from a California dispensary. The only limits for non-residents are enforced by physicians and dispensaries. Lastly, state policy does not have a method for determining demand and limiting the supply as a result, while some local jurisdictions have implemented some form of demand assessment.

Preventing Drugged Driving

California's MMP does not include provisions to prevent drugged driving. Driving under the influence of marijuana is treated in the same way as driving under the influence of alcohol or other drugs. State law has a caveat that while it is illegal to drive under the influence of any drug, the state "must show that the substance impaired the driver, not simply that the driver ingested the drug and then drove" (NORML, California Drugged Driving, n.d.). Neither state nor local policy has addressed a per se threshold for marijuana or appropriate methods by which to accurately measure impairment.

Preventing Public Health Consequences

California's MMP does not include requirements aimed at preventing potential health consequences: there are no label or testing requirements for medical marijuana. Though some argue that marijuana and related products are subject to state policies that regulate food and drugs; however, the state does not enforce those laws for medical marijuana. All food and drugs in California are regulated under the Sherman Food, Drug and Cosmetic Law, including the

manufacture, sale, labeling and selling (Gallegos, 2011). California' MMP does not address these regulations but also does not exempt medical marijuana and related food products from the Sherman Law (Gallegos, 2011). The Humboldt District Attorney believes that "although California's appellate courts have yet to apply the Sherman Law in the medical marijuana context, the manufacture, sale, labeling, advertising and dispensing of medical marijuana is regulated under the Sherman Law" (Gallegos, 2011). Nevertheless, marijuana and related food products continue to be sold throughout the state unregulated due to the confusion about who has the authority to regulate these goods.

While state law is vague and does not directly address product labeling and testing, local jurisdictions have enacted laws to attempt to prevent public health consequences and regulate medical marijuana similar to other goods. Eureka requires that any medical marijuana dispensary selling food products must obtain the appropriate license(s) from the Health Department and be in compliance with accompanying health regulations. Eureka has the most comprehensive regulations in terms of product labeling and testing. They require that medical marijuana contain a label including the name of the distributor, strain, strength, dosage and all chemicals, fertilizers and/or pesticides used during cultivation (Eureka Municipal Code §158.022, 2010). Further requiring that "dispensary applicants submit the procedure by which they will assure safety and quality by testing for bacteria, mold, pesticides and other contaminants and to determine patient dosage by testing for the major active ingredients including THC, CBD and CBN." Apart from local regulations, there are no requirements for medical marijuana labeling or testing in California, doing nothing to prevent public health consequences.

Preventing Environmental Damage

California's MMP does not include provisions to prevent environmental damage caused by medical marijuana cultivation. Regulations pertaining to the use of chemicals and pesticides or

regulations of indoor grows do not exist on the state level, while local jurisdictions have attempted to fill this regulatory gap by instituting their own protocols.

State policy does not address appropriate use of chemicals or pesticides during the marijuana cultivation process. Since marijuana is illegal on the federal level it is not considered a bona fide agricultural crop; thus, marijuana farmers are not subject to the same regulations as farmers growing a different crop as currently there are no registered pesticide approved for use on marijuana (Lindsey, 2012). A few local governments; however, have taken steps to regulate the use of chemicals and pesticides to mitigate the environmental damage of marijuana grows in their jurisdictions. Arcata requires that medical marijuana cultivators have an operations manual that includes "the chemicals stored, used and any effluent discharge into the City's waste water and/or storm water system" (Arcata Municipal Code, n.d.). Possibly the most comprehensive regulatory system aimed at preventing environmental damage resulting from marijuana cultivation is currently being drafted in Humboldt County: the Medical Marijuana Land Use Code (MMLUC) (Manji, 2012). The draft includes regulations of growing sites, chemical use, energy limits and other elements that have negative consequences for the environment (Humboldt Medical Marijuana Land Use Code, 2013). Local policies that attempt to regulate chemical and pesticide use have been implemented due to the lack of policy at the state level.

Like pesticide and chemical use, indoor cultivation is neither addressed nor regulated by California's MMP. As a result of this policy gap, local jurisdictions have implemented restrictions on indoor medical marijuana cultivation as an attempt to prevent environmental damage. Cities including Arcata, Elk Grove, Eureka, Fort Bragg, Napa, Sacramento and counties such as Humboldt and Lake have instituted limits and penalties for excessive electricity use. Many of those jurisdictions limit medical marijuana grows to a maximum of 1200 watts for lighting (NORML, n.d.). In 2012, Arcata began imposing a 45% tax on all residents that use more

than 600% of the energy baseline (Arcata Resolution No. 112-52, 2012). As a result of the nonexistent state regulations pertaining to indoor cultivation, local jurisdictions have taken the lead in implementing policy aimed at preventing negative environmental damage cause by indoor medical marijuana cultivation.

Overall, California MMP does not adequately prevent environmental damage caused by medical marijuana cultivation. Due to the federal illegality of marijuana, there are no agricultural regulations and the state does not impose any regulations either. Further, regulations for indoor cultivation is absent from the state MMP. Due to the gap in state policy, local jurisdictions have implemented methods in aimed at preventing environmental damage stemming from medical marijuana cultivation.

Summary

The results indicate that the California MMP does not adequately meet the Cole memo guidelines for a comprehensive marijuana regulatory system. The only aspect where the MMP includes regulatory best practices is by allowing for personal cultivation as an attempt to prevent criminal enterprises from profiting. However, when implemented in the absence of other regulations, this is ineffective. All other aspects of a comprehensive regulatory system are left to local jurisdictions to attempt to control. Many local governments have instituted regulations in an attempt to fill the state's regulatory gap, but many have not. As a whole, the medical marijuana market in California is highly unregulated, does not meet federal recommendations and is subject to continued federal intervention as a result. Reform is necessary to bring California's MMP up to federal standards and to avoid continued federal intervention in the state sanctioned legal marijuana market.

V. RECOMMENDATIONS FOR REFORM

Using the information and findings presented in the previous chapters, I offer recommendations to better align California's MMP with federal standards and best practices. Enactment of these recommendations will result in a comprehensive regulatory system and prevent federal intervention. However, first I examine why reform has not already occurred.

Political Considerations of Medical Marijuana Regulatory Reform

While determining the regulatory gaps between California's medical marijuana program and federal priorities expressed in the Cole memo and best practices, other aspects for implementing a comprehensive regulatory structure are not captured in this policy-focused analysis, such as political feasibility. In California, there has been intense opposition to instituting regulatory reform for medical marijuana from various groups with diverse priorities including law enforcement, patient advocates and local governments. Law enforcement is reluctant to support any form of medical marijuana regulatory reform due to their view that marijuana is not legitimately a medicine and the whole system is de facto legalization, in conflict with state and federal laws. Patient advocates resist regulation that would limit access and/or a patient's right to cultivate, purchase and consume their medicine. Local governments want the right to control how medical marijuana facilities are regulated within their jurisdictions, as opposed to universal states laws. These conflicts among groups who wield substantial political power have prevented reform of California's MMP regulations.

The first attempt to reform the MMP was Assembly Bill 2312 introduced by Rep. Ammiano in May, 2012. AB 2312 would have regulated medical marijuana industries on a statewide level, including taxes and statewide patient and dispensary regulations. Patient advocates initially supported this bill; however, through the legislative process, amendments were added that would have allowed local governments to ban medical marijuana dispensaries outright

(Downs, 2012). As a result, patient advocates discontinued their support of the bill, fearing localities would ban dispensaries, unduly limiting access for medical marijuana patients. Law enforcement opposed AB 2312 from the beginning as it legitimized a criminal activity. As a result of these political conflicts, Rep. Ammiano withdrew AB 2312 in June, 2012 as it was unlikely to pass.

A later attempt to regulate California's MMP was also introduced by Rep. Ammiano in February, 2013. AB 473 would have created a Division of Medical Marijuana Regulation and Enforcement within the Department of Alcoholic Beverage Control and introduce statewide standards relating to cultivation, manufacturing, testing, transportation, distribution and sale of medical marijuana (AB 473, 2013). Patient advocates supported the regulatory aspects of AB 473 but disagreed with the proposed regulatory agency – the Department of Alcohol Beverage Control– as they did not agree that medical marijuana (medicine) should be regulated like alcohol (a vice). Law enforcement vehemently opposed any kind of legislation that would give legitimacy to marijuana (Downs, 2013). The bill passed the Assembly Appropriations Committee; however, because of weak support, AB 473 was defeated by a margin of 35-37 in May, 2013 (California Legislative Information, n.d.).

The most recent attempt to regulate California's MMP is Senate Bill 1262, introduced by Senator Correa in February, 2014. The bill proposes statewide regulations on physicians, dispensaries and cultivation sites to be created by the State Department of Public Health and administered by county health departments (SB 1262, 2014). The bill is the first of its kind to received support from law enforcement and the League of California Cities. The two groups released a joint letter addressing their shift in policy stating: "Although we remain strongly opposed to marijuana use, it is increasingly likely that in the near future some statewide regulatory structure for medical marijuana could be enacted… [and] without our proactive

intervention, it could take a form that was severely damaging to our interests." (Hecht, 2014). Patient advocates are pleased that law enforcement and local governments are willing to participate in reforming the MMP; however, they do not agree with the requirements SB 1262 will place on recommending physicians (Hecht, 2014). Nevertheless, SB 1262, set for hearing April 221, 2014, is seen as a breakthrough, opening the lines of communication between various political groups potentially resulting in a much needed reform of California's MMP.

With momentum building to reform California's MMP, I offer recommendations below to be included in future marijuana policy in order to address outcomes identified in the Cole memo. The recommendations stem from best practices employed by other states and local California jurisdictions.

Recommendations for Preventing Distribution to Minors

In order to have a comprehensive statewide regulatory structure that prevents distribution of marijuana to minors, formal age restrictions, advertising restrictions and substantial state taxes must be implemented. Employing an age restriction of 21 years old, as opposed to 18 years old, will be more effective at preventing distribution to minors, as evidenced by the National Survey of American Attitudes on Substance Abuse (2009) mentioned in Chapter III. However, to ensure compliance to age restrictions, policy must focus on retailers. Enhancing retailer's intrinsic support for the age restriction through educating them about the dangers of the use of marijuana by minors. Attending training as a requirement for obtaining a seller's permit regarding these issues, as well as regular dissemination of educational materials will increase seller's intrinsic support. Another means of determent includes substantial fines for selling marijuana to a minor. These methods will ensure compliance to age restrictions in a legal marijuana market.

A second method for reducing the likelihood that minors will obtain marijuana in a legal market is enforcing strict advertising regulations. While these policies will not directly prevent

minors from obtaining marijuana, as regulating sellers do, research has shown that these restrictions limit minors' exposure to marijuana and thus decreasing the chance that they will seek out marijuana. Regulations limiting the advertising of prices, prohibiting advertisements that use cartoons or other symbols that relate to minors, and restricting marijuana businesses from placing advertisements in mediums where minors are likely to view them will reduce demand for obtaining marijuana.

Lastly, imposing a statewide tax on the cultivation, processing and/or sale of marijuana will increase the cost of marijuana, and as minors are more sensitive to price increases, will prevent minors from obtaining marijuana. Consideration should be given, though, to the tax rate. A tax rate that is too high will encourage a black market while a tax too low would be inefficient for preventing minors from obtaining marijuana. I do not recommend a tax rate similar to Washington as it could result in a black market. Employing a tax system similar to Colorado, a 15% sales tax, in addition to local and state taxes, would be more reasonable. It is also necessary to continually reassess the tax system in order to assure effective implementation and desired outcomes. Looking to Colorado and Washington to see the effects of their tax system is recommended before considering the appropriate rate, but currently it is too early to tell those effects.

Recommendations for preventing criminal enterprises from profiting

In order to prevent criminal enterprises from profiting in a marijuana market, California should require all marijuana facilities operators or permit applicants to submit to a background check. In addition, it should be clear which crimes make an applicant ineligible; crimes associated with drug possession or sale or any violent crimes should disqualify an applicant. This would prevent those with serious criminal history or drug ties from operating a marijuana facility and

having access to marijuana. Incorporating background checks into the statewide regulatory system is one method to prevent criminal enterprises from profiting in a legal marijuana market.

More importantly, regulating medical marijuana dispensary's supply source will prevent criminal enterprises from profiting in a legal marijuana market. Implementing a vertical integration program similar to Colorado, requiring that 70% of marijuana sold in dispensaries must be cultivated by a facility under the same ownership, is an effective way to prevent criminal enterprises from profiting. Another option employed by various medical marijuana states requires that dispensaries only purchase marijuana from licensed cultivators, and are audited to guarantee compliance. Implementing this kind of regulation requires identification of a regulatory agency who will audit businesses to ensure compliance with the policy. Integrating this auditing process into already existing processes that businesses must go through would be sufficient. California needs to implement a program that regulates the supply of marijuana sold in dispensaries that, along with background checks, will prevent criminal enterprises from profiting in the medical marijuana market.

Recommendations for Preventing Diversion to other States

In order to prevent diversion of marijuana to other states, reform of the California MMP must be made. Employing a program that tracks marijuana from seed to sale will prevent leakage outside of the legal market. Using an electronic system similar to Colorado and Washington could be an effective way to track marijuana; however, additional methods are required due to the limits of these systems. Requiring marijuana facilities to document and report all marijuana daily is an effective, supplemental way to track marijuana — though these methods need to be coupled with inspections and audits to ensure compliance. Instituting specific security requirement for all marijuana related facilities such as 24-hour surveillance and electronic entry that tracks the

activities of facility employees can also be an effective way to deter diversion of marijuana to other states.

Further, addressing non-resident purchases will limit diversion to other states. Creating purchasing limits of small amounts for non-residents will allow for tourism while preventing large quantities from crossing over state borders. In addition, limiting the supply of marijuana, through authorizing a restricted number of marijuana facilities, will prevent substantial leakage of product out of state. Using information such as population or number of equivalent industry facilities, such as liquor stores, can be an effective way to ensure the supply of marijuana matches the demand. Implementing these policies will prevent diversion of marijuana to other states.

Recommendations for Preventing Drugged Driving

In a legal marijuana market, preventing drugged driving is essential; however, policy makers must keep in mind that one size does not fit all: what works to prevent drunk driving does not fit for drugged driving. A per se threshold and blood-based tests do not measure marijuana impairment as it does for alcohol. On-site field sobriety tests are the best method for determining impairment caused by marijuana consumption since no better method currently exists for marijuana. Determining a per se threshold and employing a measurement method that does not accurately determine impairment could have negative consequences as drivers who register impaired through faulty methods are faced with substantial financial and legal penalties. Contributing and building upon academic and technological research aimed at finding effective methods for determining and measuring impairment is needed.

Recommendations for Preventing Public Health Consequences

Preventing public health consequences in a legal marijuana market is similar to preventing public health consequences in other markets. Requiring specific information to be placed on labels, similar to food and alcohol products, will inform the consumer of the

ingredients, prevent over consumption and avoid potential allergic reactions. For marijuana, providing information such as potency, THC level, cultivation date, chemicals used during cultivation, strain name and weight is necessary to avoid these public health consequences.

Requiring product testing will ensure accurate labeling as well as guarantee the processing and packaging methods are sanitary to avoid any contamination of product. Testing for active ingredients, chemical or pesticide residue, molds and mildew, potency, and other harmful toxins should be required regularly. A regulatory agency must be identified and given the resources to inspect and hold facilities accountable for meeting state standards. Enlisting agencies and inspectors who are currently responsible for ensuring compliance of other industries, including local public health departments or the Department of Alcoholic Beverages Control, should be used for the marijuana market. Employing these techniques will prevent public health consequences in California's medical marijuana market.

Recommendations for Preventing Environmental Damage

Preventing environmental damage stemming from marijuana cultivation requires techniques and strategies that are identical to regulations for other crops. Michael O'Hare (2013) of the University of Berkeley notes that:

> Outdoor cultivation of cannabis does not raise important energy issues different from other crops. Conventional good agronomic practice such as low-till/no-till, erosion and runoff control, careful control of nitrogen application and timing, integrated pest management, and the like all apply and expertise in these practices is available from county agents and extension services. (p. 19)

With this being said, the first step to prevent environmental damage caused by marijuana cultivation would be for the state to recognize marijuana as a bona fide crop and provide regulation with regard to permitted pesticide use. The California Department of Pesticide

Regulation (CDPR) – the agency that regulates pesticide use on agricultural crops in the state – would be the appropriate agency to regulate this market. (Lindsey, 2012). Currently, if a grower uses a pesticide that is not registered for that specific crop, the CDPR has the authority to confiscate the batch of crops that was treated with the unregistered pesticide (Lindsey, 2012). Using this same method for marijuana cultivation would reduce the amount of environmental damage caused by illegal and unregulated pesticide use. In addition to regulating pesticide use, The California Department of Fish and Game (2012) recommends that government agencies provide growers with best practices and to create "better defined state regulations to provide specific guidance for growing operations such appropriate locations to minimize environmental impacts, number of plants, etc." These strategies will reduce the environmental damage caused by marijuana cultivation.

Indoor marijuana cultivation is also damaging to the environment due to significant energy use and needs to be regulated. Policies that penalize excess energy use could mitigate the environmental damage caused by indoor marijuana cultivation. O'Hare et al. (2013) recommends levying an "excise tax on indoor-cultivated marijuana to reflect about nine cents per gram worth of global warming effect" (p. 2). Following the lead of local jurisdictions in California, state policy should enact a tax related to the use of energy for indoor cultivation. This could be done through an per ounce excise tax on marijuana cultivated indoors or through a tax on facilities that exceed a predetermined level of energy use. Employing these methods, along with recognizing marijuana as a bona fide crop and issuing guidelines relating to pesticides, chemicals and approved growing practices would prevent environmental damage caused by marijuana cultivation.

Conclusion

When attempting to reform California's MMP, attention must be paid to the various stakeholders, including law enforcement, patient advocates and local jurisdictions, who often have conflicting priorities. These conflicts have made reform very difficult; however, recently proposed legislation has received unprecedented support, though it is still unknown whether SB 1262 will pass as patient advocates are not yet fully onboard. Nevertheless, all groups agree that reform is necessary. Reform is not just necessary to address current problems associated with California's MMP, but as a means to prepare the state for inevitable legalization of recreational marijuana.

Reforming California's MMP is essential in order for the state to be able to effectively regulate a legal recreational marijuana market. An analysis of a state's medical marijuana program, and accompanying regulation, is an effective way to determine readiness for legalization as it is an indication of structural and organizational capacity for regulating a legal recreational market. Crick (2012) noted that Colorado has "the most extensive regulatory apparatus of any of the eighteen [now twenty] medical marijuana states in the country," and this demonstrates its capacity to effectively regulate a legal recreational market (p. 7). In essence, effectively regulating a smaller medical marijuana market can be seen as preparation and capacity building for effectively regulating a larger legal recreational marijuana market. In this sense, if California moves ahead with recreational legalization without first building its capacity to regulate medical marijuana, current problems will be much larger and harder to tackle in the legal market.

A state's medical marijuana regulations are also an effective tool to predict how smooth the transition to a legal recreational market will be. The Colorado Task Force (2013) noted that employing current medical marijuana regulatory "infrastructure, resources and staff expertise

developed over the past few years in regulating medical marijuana, will facilitate a quicker and smoother transition" to legalization (p. 22). Looking at California's current MMP, with its lack of statewide infrastructure, resources and staff experience in regulating medical marijuana, the transition to a legal recreational market would not be quick or smooth. To prepare for legalization, the state must reform the current program or else face significant and potentially detrimental consequences for the state.

Through this paper, I have presented a brief background on marijuana, described federal priorities that must be identified in a state's legal marijuana policy, best practices for states to employ to address those federal priorities and assessd California's MMP in terms of those priorities and best practices. My assessment shows that California's MMP is in need of reform and I provide recommendations in order to be compliant with federal guidelines. While specific policy reform is needed, lawmakers must consider the diverse set of interests and groups that have a stake in the process, including law enforcement, patient advocates and local governments. Recent legislation has received support that is unprecedented, but still has its detractors. Nevertheless, continued push for reform is necessary in order to be prepared for inevitable recreational legalization and to facilitate a smoother transition. My hope is that this thesis will be used in preparing future legislation that has widespread support, is effective and comprehensive, in order to prevent federal intervention and prepare the state for a legal recreational marijuana market.

Appendix A. Medical Marijuana State Laws: Year Enacted and Bill Information

State	Year	Policy	Passage
California	1996	Proposition 215	56%
Alaska	1998	Ballot Measure 8	58%
Oregon	1998	Ballot Measure 67	55%
Washington	1998	Initiative 692	59%
Maine	1999	Ballot Question 2	61%
Colorado	2000	Ballot Amendment 20	54%
Hawaii	2000	Senate Bill 862	32-18: House 13-12: Senate
Nevada	2000	Ballot Question 9	65%
Montana	2004	Initiative 148	62%
Vermont	2004	Senate Bill 76 House Bill 645	22-7: Senate 82-59: House
Rhode Island	2006	Senate Bill 0710	33-1: Senate 52-10: House
New Mexico	2007	Senate Bill 523	32-3: Senate 36-31: House
Michigan	2008	Proposal 1	63%
Arizona	2010	Proposition 203	50.13%
Washington DC	2010	Amendment Act B18-622	13-0
New Jersey	2010	Senate Bill 119	25-13: Senate 48-14: House
Delaware	2011	Senate Bill 17	17-4: Senate 27-14: House
Connecticut	2012	House Bill 5389	21-13: Senate 96-51: House
Massachusetts	2012	Ballot Question 3	63%
Illinois	2013	House Bill 1	35-21: Senate 61-57: House
New Hampshire	2013	House Bill 573	18-6: Senate 284-66: House

Appendix B. Marijuana Laws in Terms of Best Practices

*Empty boxes indicate that state law does not address the particular issue.

	Alaska	Arizona	Connecticut
Age restrictions	18+; if patient is a minor, parent or guardian must be primary caregiver for & control the acquisition, possession, dosage & frequency of use (AKAB §17.37.010, 2013)	18+; if patient is a minor, parent or guardian must be primary caregiver for & control the acquisition, possession, dosage & frequency of use (ARS § 36-2804.03, n.d.)	
Advertising restrictions			No external advertising at dispensary site, no price advertising (CDCP, p. 73, 2013)
High tax rate			
Background checks		Owners, employees & volunteers of any marijuana related facility (AAR §R9-17-304, n.d.)	All applicants for dispensaries & producer licenses (CDCP, p. 25, 2013)
Supply requirements		Only from other registered dispensaries, a qualifying patient, or a designated caregiver (AAR. §R9-17-316)	Only from a licensed producer (CDHP §11, 2012)
Permitting personal cultivation	Allowed: no more than 6 plants (AKAB §17.37.040, 2013)	Allowed if nearest dispensary is >25 miles away (NORML, n.d.)	Unclear: not explicitly addressed under the statute (NORML, n.d.)
Tracking "from seed to sale"			
Non-residential purchase limits			
Limit supply		No more than 1 dispensary for every 10 pharmacies. May issue more to ensure that at least 1 dispensary in each county (ARS §36-2804, n.d.)	Maximum number of licensed producers at any time shall not be less than 3 nor more than ten (CDHB §10,2012)
Determine DUI threshold		Zero tolerance per se drugged driving law enacted for cannabis, cannabis metabolites (ARS §28-1381, n.d.)	
Determine tool to measure impairment			
Product labeling		• Dispensary's registry identification number • Amount, strain, & batch number of medical marijuana • The date of manufacture, harvest, or sale • List of all chemical additives, including nonorganic pesticides, herbicides, & fertilizers, used in the cultivation & production of the medical marijuana (AAR §R9-17-317, n.d.)	• Serial number & brand name of product • Name of patient, physician & dispensary • Expiration data • Storage recommendations • All active ingredients including THC, THCA, CBD, CBDA • Pass/fail rating based on the laboratory's microbiological & chemical residue analysis • Any other information necessary to comply with state or local labeling requirements for similar products not containing marijuana, including but not limited to the CO Food, Drug & Cosmetic Act, CO General Statutes, Bakers Act (CDCP p.

			48-49; 61, 2013)
Product testing		A dispensary shall provide to the Department upon request a sample of the dispensary's medical marijuana inventory of sufficient quantity to enable the Department to conduct an analysis of the medical marijuana (AAR §R9-17-317, n.d.)	Independent, licensed testing laboratories will test a sample of each batch of marijuana from a production facility for microbiological contaminants, chemical residue, & active ingredients. Based on the US Pharmacopeial Convention standards (CDCP p. 63, 2013)
Chemical & pesticide restrictions			
Regulate indoor cultivation			
	*Does not allow dispensaries (the network for public health law)		

	Colorado	**Delaware**	**Hawaii**
Age restrictions	21+ (CDR §402, 2013)	21+ (DSB §4909A, 2011)	18+ unless qualifying patient's parent, guardian, consents in writing to allow the qualifying patient's medical use of marijuana; serve as the qualifying patient's primary caregiver; & control the acquisition of the marijuana, the dosage, & the frequency of the medical use (HSB §329-122, 1999)
Advertising restrictions	No advertising on billboards, television, radio direct mail, among others, “that have a high likelihood of reaching minors” Specifically, advertising is only allowed on television, radio, on the internet or in print if the advertisers can prove that no more than 30% of the targeted audience is under 21 years old (CDR § R1104, 2013)	No print, broadcast, or in-person solicitation of customers. Not including phone books, trade or medical publications, or the sponsorship of health or not-for-profit charity or advocacy events (DSB §4919A, 2011)	
High tax rate	15% sales tax, a 15% excise tax in addition to a 2.9% state tax and any other local taxes (Colorado House Bill 1318, 2013)		
Background checks	Facility owners submit fingerprints and agree to a criminal history background check before being approved for a license to operate (CDR § R231, 2013)	Principal officer, board member, agent, volunteer, or employee before the person begins working at the registered compassion centers (DSB §4918A, 2011)	
Supply requirements	Only from registered cultivation centers, but can only purchase from other dispensaries amount that is less than 30% of total onhand inventory (CDR §401, 402, 2013)	Only from registered compassion center (DSB §4919A, 2011)	
Permitting personal cultivation	Permitted (NORML, n.d.)	Prohibited (NORML, n.d.)	Permitted (NORML, n.d.)
Tracking “from seed to sale”	Must have tracking system that tracks from seed to sale and will likely add “peripheral components” such as Radio-Frequency Identification Devices under development now (CDR § R405, 2013)		

Non-residential purchase limits	Non-residents to purchase ¼ of an ounce in a single transaction compared to the one ounce limit for residents (CDR §402, 2013)		
Limit supply		At least 1 non-profit 'compassion center' per county (NORML, n.d.)	
Determine DUI threshold	Five nanograms or more of delta 9-tetrahydrocannabinol (THC) per milliliter (NORML, n.d.)	If within 4 hours of operating a vehicle, any amount of illicit or recreational drug is in the blood (DSB §4177, 2011)	
Determine tool to measure impairment			
Product labeling	All marijuana containers must include: • Cultivation facility information • Weight • Potency profile including THC, THCA, CBD, CBDA, CBN, CBG as a percentage of the total weight of the product • THC per miligram • All nonorganic pesticides, fungicides, herbicides, solvents and chemicals (CDR §1003, 2013)		
Product testing	All marijuana establishments are required to submit samples to private licensed retail marijuana testing facilities to test for: • Residue solvents • Poisons or toxins • Harmful chemicals • Dangerous molds, mildew or filth • Harmful microbials • THC and other cannabinoid potency (CDR §703, 2013)		
Chemical & pesticide restrictions			
Regulate indoor cultivation			
			Does not permit dispensaries (NORML, n.d.)

	Illinois	**Maine**	**Massachusetts**
Age restrictions	18+ (IDPH §946.200, 2014)	18+; if under 18 a parent, guardian or person having legal custody shall serve as a primary caregiver for a minor child (MRS §2423-A, 2013)	18+; if under 18, requires written consent of the parent or legal guardian, & documentation of the rationale in the medical record (MDPH §725.010, 2013)
Advertising restrictions			No advertising prices, no promotional gifts t-shirts or samples (MDPH, 2013)
High tax rate			
Background checks		Principal officers, board members & employee must undergo a criminal history record check annually (MRS §2425, 2013)	All dispensary workers & owners (MDPH §10, 2013)
Supply requirements		Only from a primary caregiver or grow themselves (MRS §2428, 2013)	Only from other registered dispensaries; but this cannot be more than 30% of total annual

			inventory. Otherwise grow themselves (MDPH §725.105, 2013)
Permitting personal cultivation	Not allowed (IDPH §946.280, 2013)	Permitted (NORML, n.d.)	Not allowed; but does allow for a hardship cultivation registry if dispensary is not economically feasible to visit (MDPH §725.035, 2013)
Tracking "from seed to sale"		Requires the use of a numerical identification system to track plants from cultivation to sale & to track prepared marijuana from acquisition to sale (MRS §2428, 2013)	Requires tagging & tracking of all marijuana seeds, plants, & products, using a seed-to-sale methodology (MDPH §725.105, 2013)
Non-residential purchase limits	Must be proven Illinois resident (IDPH §946.200, 2014)	No limits (MRS §2423-D, 2013)	
Limit supply	Permits 22 cultivators, 60 dispensaries (NORML, n.d.)	Initially will register no more than one dispensary in each of the 8 public health districts. After review of the first full year the department may amend the rules (MRS §2428, 2013)	35 treatment centers (distributors & cultivators)
Determine DUI threshold	A person is guilty of DUI if there is any amount of a drug, substance, or compound in the person's breath, blood, or urine resulting from the consumption of cannabis (IDPH §5/11-501, 2014)		
Determine tool to measure impairment			
Product labeling			• Quantity of usable marijuana in package • Date packaged • Batch number, sequential serial number, & bar code to identify manufacturing & processing facility • Cannabinoid profile including THC level • Date of testing & findings (MDPH §725.105, 2013)
Product testing			• Cannabinoid profile • Contaminants including but not limited to mold, mildew, heavy metals, plant-growth regulators, & the presence of non-organic pesticides (MDPH §725.105, 2013)
Chemical & pesticide restrictions		Only pesticides that are registered with the Department of Agriculture, Conservation & Forestry, Board of Pesticides Control & is used consistent with best management practices approved by the Commissioner of Agriculture, Conservation & Forestry (MRS §2428, 2013)	Non-organic pesticide in the cultivation of marijuana is prohibited. All cultivation must be consistent with U.S. Department of Agriculture organic requirements (MDPH §725.105, 2013)
Regulate indoor cultivation			

	Michigan	Montana	Nevada
Age restrictions	18+; if minor requires consent of patient's parent or legal guardian to serve as the patient's primary caregiver & to control the acquisition, dosage, & frequency of use of the marihuana by the patient (MAR §333.105, 2013)	18+; if minor the parent or legal guardian consents to the medical use of marijuana by the minor, is responsible for health care decisions for the minor, agrees to serve as the minor's caregiver; & agrees to control the acquisition of marijuana & the dosage & frequency of use by the minor (MCA §50-46-307, 2013)	18+; if minor the parent or legal guardian must submit a written statement saying they will be responsible for health care decisions, serve as primary caregiver & agrees to control the acquisition of marijuana & the dosage & frequency of use by the minor (NRS §22.35, 2013)
Advertising restrictions		Advertising prohibited; may not advertise in any medium, including electronic media (MCA §50-46-341, 2013)	
High tax rate			2% sales tax of wholesale price when sale between marijuana facilities, & at point of sale (NRS §24.4, 2013)
Background checks		Owners of any marijuana related facility (MCA §50-46-308, 2013)	Owners, employees & volunteers of all marijuana related facilities (NRS §10, 2013)
Supply requirements		Only from another registered patient or facility (MCA §50-46-308, 2013)	Only from a licensed marijuana facility, a qualified patient or qualified caregiver (NRS §16, 2013)
Permitting personal cultivation	Permitted (MAR, 2013)	Permitted (MCA, 2013)	Permitted (NRS §1.7, 2013)
Tracking "from seed to sale"			Must have inventory control system to monitor, in real time, medical marijuana from the point that it is harvested at a cultivation facility to point of sale (NRS §19.2, 2013)
Non-residential purchase limits			
Limit supply			Number of dispensary & cultivation centers based on County population: • > 700,000: 40 • 100,000-700,000: 10 • 55,000-100,000: 2 • In each other county, 1 certificate. But, no more than one dispensary for every 10 pharmacies (NRS §11, 2013)
Determine DUI threshold	Zero tolerance per se drugged driving law enacted for cannabis & other controlled substances (MAR §257.625, 2013)	DUI threshold is 5ng/ml or more THC in blood (NORML, n.d.)	DUI threshold 2 ng/ml of THC in blood; or 15 ng/ml THC in urine (NRS §484.379, 2013)
Determine tool to measure impairment			
Product labeling			
Product testing			• Concentration of THC & CBD • Whether the tested material is organic or non-organic • Presence & of molds & fungus. • Presence & concentration of fertilizers & other nutrients

			(NRS §19.9, 2013)
Chemical & pesticide restrictions			
Regulate indoor cultivation			
	Does not allow dispensaries (NORML, n.d.)	Does not allow dispensary, but allows providers for up to 3 patients (NORML, n.d.)	

	New Hampshire	**New Mexico**	**New Jersey**
Age restrictions	18+; unless the parent or legal guardian consents in writing to: Allow the qualifying patient's medical use of marijuana; Serve as the qualifying patient's designated caregiver; Control the acquisition of the marijuana & the frequency of the medical use of marijuana by the qualifying patient; & completes an application on behalf of the minor (NHHB573, §126-W:3, 2013)		18+; if patient is a minor requires parent approval. Parent or guardian will control obtaining & possession of marijuana
Advertising restrictions			No signs, no advertising of prices, no promotional items
High tax rate			
Background checks	Each alternative treatment center owner (NHHB573, §126-W:3, 2013)	For all owners (§7.34.4.8)	For all owners & employees (NMR §8:64-7.2, 2010)
Supply requirements	From other registered centers in New Hampshire or donations (no compensation), from individuals & entities from jurisdictions outside of New Hampshire who are authorized to cultivate medical marijuana in their home state (NHHB 573 §126-W:2, 2013)		Only from New Jersey registered cultivation centers (NMR §8:64-11.5, 2010)
Permitting personal cultivation	Not permitted (NORML, n.d.)	Requires a Personal Production License to for personal cultivation, for personal use only (§7.34.4.8)	Not allowed (NMR §8:64-3.4, 2010)
Tracking "from seed to sale"			
Non-residential purchase limits			
Limit supply	Limits the number of plants a cultivation center can grow		
Determine DUI threshold			
Determine tool to measure impairment			
Product labeling	• Percent of THC • Weight of the marijuana (NHHB 573 §126-W:8, 2013)	• Name of strain, • Batch number • Quantity (§7.34.4.10)	• Name & address of cultivation site • Quantity • Date packaged • Serial number to identify the manufacturing & processing center • THC level • Low, medium or high grade • Any other ingredients (NMR

			§8:64:10.5, 2010)
Product testing		If complaint is received, can require producer to provide samples of medical cannabis for testing regarding the presence of mold, bacteria or another contaminant in cannabis (§7.34.4.8)	Provides samples to the department during announced & unannounced inspections (NMR §8:64-14.4, 2010)
Chemical & pesticide restrictions	Cannot use pesticides in marijuana cultivation unless pesticides become authorized for use on marijuana (NHHB 573 §126-W:8, 2013)		"Inasmuch as there are no pesticides authorized for use on marijuana, & the unauthorized application of pesticides is unlawful, a plant cultivation shall not apply pesticides in the cultivation of marijuana" (NMR §8:64-10.9, 2010)
Regulate indoor cultivation			

	Oregon	**Rhode Island**	**Vermont**
Age restrictions		18+; unless parent, guardian or person having legal custody consents in writing to: Allow medical use of marijuana; serve as one of the qualifying patient's primary caregivers; & control the acquisition of the marijuana, the dosage, & the frequency of use (RIDH §3.2, 2012)	18+; unless the application is signed by both the patient & parent or guardian (VSB §4473, 2011)
Advertising restrictions			
High tax rate			
Background checks		Owners of marijuana related facility (RIDH §5.5, 2012)	All owners & employees of marijuana related facility (VSB §4474g, 2011)
Supply requirements			Only get from another registered dispensary (VSB §4474e, 2011)
Permitting personal cultivation		Permitted (NORML, n.d.)	Permitted (NORML, n.d.)
Tracking "from seed to sale"			
Non-residential purchase limits			
Limit supply		Limits number of plants a cultivation center can grow to 150 plants, 99 mature	Limits number of plants that cultivation centers can grow to 28 mature, 98 immature (VSB §4474e, 2011)
Determine DUI threshold		Zero tolerance per se drugged driving law for marijuana. However, a qualifying patient is not considered to be under the influence solely for having marijuana metabolites in his or her system (NORML, n.d.)	
Determine tool to measure impairment			
Product			• Strain (VSB §4474e, 2011)

labeling			
Product testing			
Chemical & pesticide restrictions			
Regulate indoor cultivation			

	Washington	**Washington D.C.**
Age restrictions	21+ (WAC §314-55-079, 2013)	18+; unless the parent or legal guardian of the minor signs a written statement consenting to the use of medical marijuana for the treatment of the minor's qualifying medical condition or treatment of the side effects of the minor's qualifying medical treatment; & to, or designates another adult to, serve as the caregiver for the qualifying patient & the caregiver controls the acquisition, possession, dosage, & frequency of use of medical marijuana by the qualifying patient (WDD §3, 2010)
Advertising restrictions	No advertising through any medium "within 1,000 feet of the perimeter of a school, playground, recreation center or facility; child care center, public park or library; or any game arcade, admission to which is not restricted to people over 21." Also, forbids advertising that depicts a child or other person under legal age to consume marijuana or includes objects such as toys, characters, or cartoon characters suggesting the presence of a child or any other depiction designed in any manner to be especially appealing to children or other persons under legal age to consumer marijuana or is designed in any manner to be especially appealing to children or other persons under the age of 21 (WAC § 314-55-155(a), 2013)	
High tax rate	25% excise tax will be levied at three transaction points: from cultivator to processor, from processor to distributor, and from distributor to the consumer (WAC §314-55-089, 2013)	
Background checks	Facility owners submit fingerprints and agree to a criminal history background check before being approved for a license to operate (WAC § 31-55-020 3(a), 2013)	
Supply requirements		
Permitting personal cultivation	Not allowed (NORML, n.d.)	
Tracking "from seed to sale"	Requires all marijuana licensees to track marijuana from seed to sale, specific system of tracking to be determined (WAC §314-55-083, 2013)	
Non-residential purchase limits		
Limit supply	The Washington Liquor Control Board will conduct a survey and determine the	No more than 5 dispensaries. May increase the number to as many as 8

	number of cultivation permits issued based on the results (WAC §314-55-081, 2013)	(WDD §7, 2010)
Determine DUI threshold	Through a blood test "five nanograms or more of delta 9- tetrahydrocannabinol (THC) per milliliter" (NORML, n.d.)	
Determine tool to measure impairment		
Product labeling	Must include: • Batch number • Producer information • Lab results • Concentration of THC, THCA, CBD • Potency profile • Harvest date • List of all ingredients with any allergy warnings (WAC §314-55-105, 2013)	Provides sufficient information for qualifying patients to be able to make informed choices (WDD §14, 2010)
Product testing	Private labs required to test • Potency • Residue solvency test • Microbiological screening • Moisture content • Foreign matter inspection Must follow the most current version of the Cannabis Inflorescence and Leaf monograph published by the American Herbal Pharmacopoeia (WAC §314-55-102, 2013)	
Chemical & pesticide restrictions	Only substances that are registered with the Washington State Department of Agriculture (WSDA) or the Organic Materials Review Institute are allowed to be used on marijuana plants (WAC 314-55-084, 2013)	
Regulate indoor cultivation		

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