EXECUTIVE SUMMARY

History and Recent Status of Marijuana Laws in the United States

The controversial discussion of state-level marijuana laws is intensifying in the United States. Of the 23 states with medical marijuana laws, 11 states legalized through statewide ballot initiatives and 12 states passed bills through their state legislatures. All the states allowing recreational marijuana were achieved through ballot initiatives (Colorado, Washington, Oregon, Alaska). Wyoming is listed as one of the states with a potential ballot initiative for medical marijuana in 2016—the Peggy A. Kelley Wyoming Cannabis Act.

Although the Peggy A. Kelley Act petition circulators did not get the requisite number of signatures to place the initiative on the 2016 ballot, state statute permits collection of signatures until early February 2017. If enough registered voter signatures are collected by that date (~25,000), the initiative could appear on the 2018 Wyoming statewide ballot.

RAND Corporation in its research report *Considering Marijuana Legalization: Insights for Vermont and Other Jurisdictions,* provides a succinct history of marijuana in the United States:

> Marijuana prohibition was universal across the United States through the 1960s, and those convicted of growing, possessing, or selling marijuana could receive sentences of incarceration. Then, in the 1970s, 12 states removed or substantially reduced criminal penalties for possession of small amounts of marijuana.[1] Many observers then believed that it was just a matter of time until the nation legalized the drug. Instead, the movement toward liberalization came to a sudden halt in 1978. One state (South Dakota) reversed its decriminalization, and no state initiated decriminalization in the subsequent 20 years. The end of the 1970s liberalization is often associated with the so-called parents' movement, itself a response to the rapid rise in frequent marijuana use among junior and senior high school pupils and the associated harms; in 1979, about one out of every ten high school seniors reported daily use of marijuana.
>
> In recent years, a handful of states, including California in 2011 and Vermont in 2013, have fully decriminalized possession of small amounts of marijuana. Vermont and more than 20 other states now allow marijuana to be used for medicinal purposes, but there is

[1] The 12 states were Alaska, California, Colorado, Maine, Minnesota, Mississippi, Nebraska, New York, North Carolina, Ohio, Oregon, and South Dakota. There is a lot of debate about what decriminalization actually means (see Pacula, MacCoun, et al., 2005, and MacCoun, Pacula, et al., 2009). For example, California has generally been considered a decriminalization state, but possession of small amounts for personal use was not exclusively a noncriminal offense until January 2011.

tremendous variation in how that marijuana is supplied and the uses that are allowed. California and Colorado receive a lot of attention in medical-marijuana debates, but they represent one end of a broad spectrum. They allow brick-and-mortar medical-marijuana stores (called dispensaries) and have very expansive definitions of what conditions justify obtaining a medical recommendation (Pacula, Chriqui, et al., 2002; Pacula, Powell, et al., 2015).

In some other states, including Vermont, the medical-marijuana system is more controlled, serving more as an adjunct to the health system than as a loophole for recreational users. Indeed, 11 (mostly southern) states in 2014 passed even more-restrictive medicinal laws, allowing only high-cannabidiol (CBD) and low–delta-9-tetrahydrocannabinol (THC) marijuana for medicinal purposes (Ingold, 2014c).

Why the new momentum for legalization? Certainly public sentiment has changed. Gallup has asked the same question about marijuana legalization since 1969: "Do you think the use of marijuana should be legal or not?" Support rose from 12 percent in 1969 to 28 percent in 1978, decreased to 23 percent in 1985, and then steadily rose; by 2013, 58 percent answered positively. (RAND, 2014)

The ballot initiative effort in Wyoming was no doubt encouraged by a public opinion poll of registered voters in October of 2014. The Wyoming Survey & Analysis Center (WYSAC) conducted a statewide election survey for University of Wyoming's Political Science Department. Questions on attitudes toward marijuana were included. Seventy-two percent of Wyoming residents supported adult use of marijuana if prescribed by a physician while only 25% opposed. Although Wyoming residents do not support legalization of marijuana for personal use, a majority responded in favor of reduced penalties for those found in possession of marijuana. Nearly two-thirds of those surveyed, 62 percent, believe the penalty for marijuana possession should not include time in jail; 32 percent support jail sentences. The 2014 WYSAC survey is the first scientifically sound statewide survey to ask Wyoming registered voters about opinions on marijuana laws (95% confidence interval, +/- 4%).

The Peggy A. Kelly Wyoming Cannabis Act of 2016, would be very prescriptive as to how the medical marijuana system in Wyoming would be implemented, monitored and taxed. The medical conditions and symptoms for which doctors can recommend marijuana treatments are explicit and have extensive implications. Below are key features of the Act.

- The Kelly Act states that a Wyoming-licensed physician can issue a medical marijuana certification for a debilitating medical condition defined as "cancer, glaucoma, positive status for human immunodeficiency virus, or acquired immune deficiency syndrome, hepatitis C, amyotrophic lateral sclerosis, Crohn's disease, sickle cell anemia, ulcerative colitis, dementia, Alzheimer's disease, or treatment for such conditions, which produces, for a specific patient, one or more of the following, and which, in the professional opinion of the patient's physician, foreseeably may be alleviated by the use of medical

marijuana: cachexia, post-traumatic stress disorder, severe pain, severe nausea, seizures, including those that are characteristic of epilepsy, or persistent muscle spasms, including those that are characteristic of multiple sclerosis."

- The Kelly Act permits distribution and retail sales of medical marijuana through privately held, state-regulated dispensaries. The Act states that dispensaries selling marijuana and marijuana-infused products "...shall be subject to any state commercial activities tax, including any applicable sales, use or excise tax as applied to businesses in general and all other local taxes, assessments, fees and charges as applied to businesses in general, but shall not be subject to any special taxes, assessments, fees and charges, other than the licensure fees set forth herein."
- The Kelley Act "...vests the Wyoming Department of Revenue Liquor Division to regulate the state's medical marijuana industry in a manner similar to the state's regulation of alcohol."
- The Kelly Act states "...medical marijuana establishments may be established in each locality within the State of Wyoming pursuant to this chapter and regulations set by Liquor Division."
- The Kelley Act allows a person with a valid medical marijuana certification to "possess, grow, process, or transport no more than six (6) medical marijuana plants, with three or fewer being mature, flowering plants." Under the act, growers with valid medical marijuana cards would also be able to transfer up to three ounces to other cardholders without remuneration. On average, a single mature marijuana plant can yield around one pound or more or dried marijuana.

Under federal law, marijuana possession, distribution and production is still illegal. The U.S. Department of Justice (DOJ) in 2013 issued the "Cole Memo," which provides guidelines to federal prosecutors. It is important to remember that the legalization structures in Colorado or other states are not approved by DOJ. RAND's *Considering Marijuana Legalization* reminds that "Any administration could withdraw these guidelines at any time" (RAND, 2014).

<u>From the 2013 Cole Memo:</u>

The Department of Justice is committed to enforcement of the Controlled Substances Act... The Department is also committed to using its limited investigative and prosecutorial resources to address the most significant threats in the most, effective, consistent and rational way. In furtherance of those objectives, as several states enacted laws relating to the use of marijuana for medical purposes, the Department in recent years has focused its efforts on certain enforcement priorities that are particularly important to the federal government:

- Preventing the distribution of marijuana to minors.

- Preventing revenue from the sale of marijuana from going to criminal enterprises, gangs, and cartels.
- Preventing the diversion of marijuana from states where it is legal under state law in some form to other states.
- Preventing state-authorized marijuana activity from being used as a cover or pretext for the trafficking of other illegal drugs or other illegal activity.
- Preventing violence and the use of firearms in the cultivation and distribution of marijuana.
- Preventing drugged driving and the exacerbation of other adverse public health consequences associated with marijuana use.
- Preventing the growing of marijuana on public lands and the attendant public safety and environmental dangers posed by marijuana production on public lands.
- Preventing marijuana possession or use on federal property.

Medical Benefits and Consequences of Marijuana Use

What does the current scientific literature tell us about the health and behavioral consequences associated with marijuana consumption? A great deal of research has been published on this topic, especially in recent years, and as a result we can identify some clear acute and chronic health effects, especially of frequent, high-dose marijuana use. Acute risks include traffic crashes and impaired cognitive functioning while intoxicated, as well as anxiety, dysphoria, and panic. These effects have been demonstrated using controlled laboratory experiments as well as more naturalistic observations.

The most concerning problem associated with longer-term use is dependence, with roughly 10% of users at risk of addiction. Also, there is substantial evidence that chronic heavy use increases the risk of chronic bronchitis. Research on people using different amounts of marijuana has a fundamental limitation; although marijuana use is *correlated* with many adverse outcomes, it is much harder to ascertain whether marijuana use *causes* those outcomes. For example, there is evidence that those adolescents who begin using marijuana are more likely to already have a history of both behavioral and academic problems in school, so it is unclear to what degree marijuana use contributes to the development or exacerbation of these problems.

Rates of marijuana use have been found to correlate with a wide variety of problems, such as psychotic symptoms, cardiovascular disease, male testicular cancers, lower IQ, cognitive difficulties, small differences in brain structure, lung cancer, and lower workplace productivity.

The current state of the scientific literature in each of these areas is insufficient to determine the extent to which marijuana use is causally linked to any of these outcomes. For example,

although the literature showing a relationship between marijuana use and crime is extensive, there is little evidence that use itself increases criminal behavior, so one would not expect legalization to have important effects on nondrug crime.

Most of the research to date has been based on use of smoked marijuana, containing largely unmeasured amounts of cannabinoids (therefore unknown potency levels). Medical marijuana dispensaries in other states contain a wide variety of additional products, and so some of the prior research might not apply directly.

On the topic of emerging new state marijuana models, the encyclopedic RAND report produced for the state of Vermont titled *Considering Marijuana Legalization: Insights for Vermont and Other Jurisdictions* is used extensively throughout this report. Permission to quote their research liberally was graciously given by Dr. Beau Kilmer, coauthor of the report and co-director of the RAND Drug Policy Research Center.

> In addition, the effects of marijuana use in the past, under prohibition, might not accurately predict the effects of marijuana use in the future under some alternative legal regime. To date, researchers have based their findings largely on observational data that reflect use of a substance containing largely unmeasured amounts of cannabinoids. Furthermore, no one knows precisely how legalization will affect use—specifically, the extent to which heavy or harmful use will rise, which is directly relevant for understanding the public-health and safety consequences. Nor can one know how the product might change (e.g., potency, mode of use) or how these changes might influence the relationships between use and harms identified here. Thus, it is difficult to say whether the associations identified in the past accurately assess those that will exist in the future.
>
> Can we just look to Colorado and Washington to determine whether legalization is a good idea? Unfortunately, it is too early to know how the new regulatory regimes in Colorado and Washington will fare in the short and long runs. Industry structure and behavior will take years, if not decades, to mature, and consumer responses will develop over similar periods. (RAND, 2014)

According to the (inexact) estimates from the National Survey on Drug use and Health, in 2002-03 6.2% of those aged 12 and over reported using marijuana within the 30 days prior to the survey. This national figure compares to 5.5% in Wyoming (below the U.S. average) and 8.5% in Colorado (above the U.S. average, even before medical marijuana was introduced). By 2013-14, the U.S. figure had risen 29%, to 8%. Colorado, which had introduced medical (using a very liberal model) and was beginning to sell recreational marijuana, rose by 75% over that same period (to 14.9%), while Wyoming's rate had increased only by 16%, to 6.3%. These estimates indicate the complexity of trying to determine the effects of any law change in Wyoming. If Wyoming had adopted the same law changes as Colorado at the same times,

would we also have experienced a larger-than average increase in usage? Or, are there simply fewer people in Wyoming interested in using marijuana?

Traditional smoked marijuana is not an FDA-approved medication and it is unlikely that it ever could achieve that status, for at least four reasons. First is continuing opposition from those seeking to continue federal prohibition of marijuana. Second, medicines based on plants themselves ("botanicals") were historically important but began to go out of favor around 100 years ago as they were replaced by pure chemicals extracted from those plants (e.g. morphine from opium, digitalis from foxglove). Marijuana plants contain a variety of cannabinoid chemicals in varying concentrations, making it difficult to understand effects from one sample to the next. The FDA would be unlikely to favor such a variable product. Third, the long-term safety of any plant product designed to be burned and smoked would be a serious impediment given our history with tobacco. Fourth, virtually all new FDA drug approvals are based on a company's willingness to invest about 10 years and perhaps billions of dollars conducting the required research to demonstrate safety and effectiveness, in exchange for an exclusive 20-year patent through which the company earns back its investment[2].

Since the first use of marijuana as a medicine was over 4000 years ago, it would be difficult to obtain a patent on any given strain or variety of a cannabis plant, and therefore nearly impossible to recover the necessary investment. Thus, in those states that have legalized medical use of marijuana, its status is more akin to that of "herbal supplements" (e.g. ginko biloba or St. John's wort). These products are not treated as drugs by the FDA, there is no requirement that they be demonstrated to be effective, and they vary widely in chemical composition. Physicians in those states may recommend that their patients try marijuana or derived products, but they do not prescribe it.

Nevertheless, there is considerable evidence supporting the idea that various constituents of marijuana could be useful in treating a wide variety of disorders. Dronabinol (Marinol), made from THC synthesized in a laboratory, has been available throughout the U.S. as a prescription medication since 1985. Its approved uses are to reduce nausea and to stimulate appetite. Nabilone, a slightly different synthetic cannabinoid, was also approved for these uses in 1985 but not marketed in the U.S. until 2006. In addition, pharmaceutical companies in the U.S. and other countries have been in the process of testing various marijuana extracts as well as other newly-synthesized drugs designed to act at one of the known types of cannabinoid

---

[2] The final cost of bringing one product to the market depends on a number of variables, including the amount of time needed to obtain promising treatments, the number of subjects enrolled in each phase of the clinical trials, the complexity of the product delivery, the disease being treated, time needed for data assessment, and other considerations. However, various sources indicate that it can cost more than $1 billion to bring one product to the market, including approximately $50-840 million to bring treatments through the stages of Basic Research/Drug Development and Pre-Clinical/Translational Research, and approximately $50-970 million to complete the Clinical Trials (Phases 1, 2, and 3). (BrightFocus Foundation).

receptors. Cannabidiol oil, a non-psychoactive extract from marijuana, has been suggested to treat intractable seizure disorders in children, and Wyoming has recently legalized its use. Epidiolex, a highly purified CBD extract, is currently in clinical trials with seizure patients, but has not received approval for sale in any country. Sativex, a cannabis extract containing both THC and CBD, has been approved in 15 countries (not the U.S.) to treat muscle spasms in multiple sclerosis. It has also been in trials for treating pain in cancer patients, but apparently with less success.

Both, anecdotal and limited clinical research, indicate the possibility cannabinoids might provide some relief from other disorders, such as migraines, irritable bowel syndrome, fibromyalgia. However none of these potential uses has been sufficiently demonstrated to be considered a valid claim at this time.

Some advocates claim there is evidence that cannabis products can "cure cancer." Several studies have grown isolated cultures of human cancer cells in petri dishes and have demonstrated that when cannabinoids are added directly to the tissue culture the growth of the cells is slowed (not stopped). However, it is not clear that when cannabis products are consumed the cannabinoids would reach the target tissue at a sufficient concentration to slow tumor growth. In this literature review, we did not find any published research in which cannabinoids consumed by actual patients resulted in slowing or halting tumor growth.[3]

In summary, there is little doubt that if medical marijuana were available in Wyoming some individuals would experience a degree of symptom relief after using it. But it is impossible to estimate either the number or percentage of Wyoming residents who might be thus benefitted.

> We hope that readers now understand why findings like this are not as straightforward as often discussed, not because of any failings by the researchers but because of the inherent ambiguity that accompanies nonexperimental findings on complex human phenomena involving many potential causal pathways. It is premature to argue that long-term cognitive impairment has been clearly established, but just as premature to argue that the risks are nonexistent. (RAND, 2014)

Youth and Wyoming's Educational System

> Even the most ardent supporters of liberalized marijuana laws do not wish to see widespread recreational use of cannabis by young people. The two most important areas of concern for young people are an increased risk of dependence and interference with

[3] From the National Cancer Institute website: The U.S. Food and Drug Administration has not approved Cannabis as a treatment for cancer or any other medical condition. The potential benefits of medicinal cannabis for people living with cancer include antiemetic effects, appetite stimulation, pain relief, and improved sleep. Although few relevant surveys of practice patterns exist, it appears that physicians caring for cancer patients in the United States who recommend medicinal cannabis do so predominantly for symptom management.

success in school. Individuals who begin cannabis use during adolescence are approximately twice as likely to develop cannabis dependence, compared to those who begin use after the age of 25. Numerous studies point to the negative relationship between cannabis use and school performance. The causal nature of this relationship cannot be established scientifically, because there is evidence that those who begin using cannabis at earlier ages are already more likely to have both behavioral and academic problems in school.

A persistent inferential problem, even in strong observational studies, involves the classic difficulty of differentiating among three interpretations of any observed association:

- A can cause B (e.g., marijuana use can cause some health outcome).
- B can cause A (e.g., people with the health problem seek out more marijuana, e.g., to self- medicate)
- Some third variable C can cause both A and B (e.g., the children of neglectful parents are more likely both to start using cannabis at younger ages and to do badly in school), making the A–B correlation spurious.

So, almost certainly, some of the observed associations between marijuana use and poor outcomes are not causal. But it is much harder to judge whether that means that 90 percent of the association is causal, or only 10 percent, or even none at all. To raise these concerns is not to diminish the seriousness of the potential harms associated with marijuana. Readers will differ in their sense of where the burden of proof lies; should we err on the side of assuming that marijuana causes the associations until proven otherwise (a sort of precautionary principle)? Should we assume the opposite? Or should we split the difference and assume expected harms that have been discounted for uncertainty?

In the abstract, the situation is similar to that posed by correlational evidence linking tobacco and cancer. Health experts were willing to act on a causal interpretation (tobacco causes cancer) well before it could be established rigorously—a decision that seems wise and prudent when considered today. However, for marijuana, there is a plausible hypothesis that its use is a form of self-medication for people coping with other health and behavioral problems. (As we note below, researchers are beginning to test this hypothesis; so far, it does not appear to be a major part of the associations, but more research is needed.)

Scientists and activists alike vigorously debate the claim that marijuana use produces cognitive impairment, much like earlier arguments about an amotivational syndrome. Even if one is convinced about the acute effects, establishing that there are chronic, cumulative effects—possibly even irreversible effects—is much more challenging. Science is working hard to try to answer this question but cannot definitively answer it at this time. Even if any impairment is limited to the period of heaviest use (usually late

adolescence), however, there might be long-term consequences due to processes that are social or developmental rather than neurological. For example, even a few years of poor academic performance during high school can have cascading effects on college and career prospects. (RAND, 2014)

Any time young people are exposed to powerful psychoactive drugs, legal or not, over a long period of time, we should be concerned about the potential for effects on the brain's neurochemical development. Like being under the influence of alcohol, being under the influence of marijuana at school or work can impede development for some people by making it harder to learn and concentrate. And if intoxication leads users to skip school or work, or, in the case of school, not complete their homework, this could have a negative effect on future performance. Because THC is fat-soluble and can stay in the system long after a use episode, there is concern about the residual effects of marijuana on cognitive functioning. (RAND, 2014)

At the present time, our best evidence is that approximately 6% of 12-17 year olds in Wyoming report using marijuana within the past month, which is below the national average. Among college students at the University of Wyoming, the most recent data found 17% reported past-month usage. The question then becomes whether, and to what extent, use among these young people would increase after the implementation of legal medical marijuana in Wyoming. As with other impacts, the specifics of the law and how it would be implemented would play a large role in determining any such effects. There is some evidence from Colorado that usage rates there have increased more rapidly than the national average, and also a report indicating some underage users were obtaining marijuana that was diverted from the medical market.

An issue for all schools is that the federal Drug Free Schools And Communities Act requires a zero-tolerance policy for illicit drugs, including all forms of cannabis. Therefore, schools would need to develop clear policies prohibiting on-campus cannabis use by students or staff, even those otherwise allowed to use medical cannabis.

Criminal Activity

There is a long-established positive correlation between marijuana and crime (Dembo et al., 1987; Dawkins, 1997; Baker, 1998). People who commit criminal acts are more likely than those who do not to use marijuana (Taylor and Bennett, 1999; Makkai and Fitzgerald, 2000), and people who use more marijuana commit more criminal acts than those who use less marijuana (McRostie, Castle, and Marshall, 2001). Still, most experts believe that the correlation could be due to common risk-seeking or delinquency factors that generate a spurious association between marijuana use and crime. (RAND, 2014)

Numerous studies have examined the relationship between marijuana use and crime. But as discussed throughout this report, a "causal link" is extremely hard to establish. Was the crime

committed while the person was intoxicated on marijuana or was the offender identified and arrested days later? And to take it a step further, would the same person in the same situation, not intoxicated on marijuana have made a different decision? Longitudinal analyses of cohorts provide the clearest evidence (Arseneault et al., 2000; Markowitz, 2005), "but even when a statistically significant association remains in these studies, the studies have never been able to demonstrate that the people being studied were actually under the influence of marijuana at the time of the offense (suggesting that intoxication was a direct cause). Thus, they never completely eliminate the possibility that a third unobserved factor is causing the statistical association" (RAND 2014).

> For example, a paper by Green et al. (2010) identified a link between marijuana use and property crime by applying propensity-score matching to a longitudinal community cohort of blacks in Chicago. After matching, the two groups were similar in important observable characteristics (measured from the survey), including personality traits (such as aggression), family situation (such as mother's use of discipline), and elementary school adaption and achievement (such as teacher's rating of conduct problems). Using these matched groups, heavy marijuana use in adolescence was associated with crime generally, but, when the authors decomposed their findings by different types of crimes, they found that the association held for drug-related crime and property crime, not violent crime. (RAND 2014)

Speaking of the early crime report results in Denver and the discrepancies between sources, the RAND Vermont report states:

> They cite sources suggesting that total crime in Denver actually went up 7 percent in the first six months of 2014 from rates in 2013 (see, e.g., Thurstone, 2014). The story depends on what offenses are being considered, what data sources are used, and whether crime reports are being combined with arrest statistics. After commissioning a similar study of crime in Denver, the head of the National Association of Drug Court Professionals noted that "we are promoting the position that the question remains open, and at best we can say there is contradictory evidence when trying to draw conclusions about the effect marijuana legalization has had on crime" (as quoted in Thurstone, 2014). To make any sense of crime statistics in Colorado or Washington State, a more comprehensive multivariate analysis is needed, including crime trend data from non-legalization states. The implementation of legalization in Alaska, Oregon, and Washington, D.C., will provide additional evidence. Unfortunately, a convincing study will require a longer post-change period, so we might not know more for several years. (RAND, 2014)

Marijuana a substitution or complement for other substances?

> Suppose that legalization led to a doubling of marijuana consumption of all sorts, including not only a doubling of controlled recreational use but also a doubling of

compulsive abuse and dependence. One might well view this as a net bad because of all of the marijuana-related harms discussed above.

However, the total social cost associated with alcohol abuse is very much larger than all costs and outcomes related directly to marijuana use. So if the doubling of marijuana use came about because all these new marijuana users switched from drinking alcohol, that could be a net win from a public-health perspective, particularly if these people would otherwise have been binge drinking (Caulkins, Hawken, Kilmer, and Kleiman, 2012). Indeed, Caulkins, Hawken, Kilmer, and Kleiman (2012) found that even a 10-percent reduction in alcohol abuse accompanying the doubling in marijuana use could be a net win for society.

Doubling of marijuana use would not lead to even a halving of all drinkers, because there are nearly ten times more drinkers than people who use marijuana. According to the 2013 NSDUH, there were 136.9 million past-month alcohol users and only 19.8 million past-month marijuana users (unadjusted for underreporting). Indeed, there were three times more binge drinkers in 2013 (60.1 million) than there were marijuana users. So a doubling of marijuana users—even if all the new users had been binge drinkers and became teetotalers—would reduce the social cost of binge drinking by only about one-third.

If marijuana and alcohol proved to be complements, and legalization led to any sizable increase in alcohol use and abuse, then legalization would be a net loss. Even if all marijuana-related costs magically disappeared, that could not offset the harm caused by a 10-percent increase in alcohol-related problems.

Consider the one substance that could cause even greater social harms than alcohol—namely, tobacco. The overlap between marijuana and tobacco use is at least as strong as the overlap between marijuana and alcohol use. Past-month marijuana users are three times as likely as nonusers to smoke cigarettes (59 percent versus 19 percent), a ratio that rises to 6:1 for those under the age of 21 (53 percent to 9 percent). Ninety-five percent of marijuana users report using tobacco at some point in their lives. In Europe, mixing tobacco with marijuana or hashish in the same cigarette or joint has long been the norm (Leggett, 2006); it is not hard to imagine tobacco companies wanting to promote that practice in the United States after legalization.

Suppose that legalizing marijuana caused even a 1-percent increase in tobacco smoking. Because tobacco kills well over 400,000 people in the United States every year, then, in that hypothetical, legalizing marijuana might—in the long run—cause 4,000 additional pre-mature deaths per year, an outcome that could outweigh any plausible benefits of marijuana legalization.

> Legalization could also affect the use and abuse of other illegal drugs. Long ago, there was great concern that trying marijuana could be a gateway that caused users to go seek stronger and stronger highs. Those fears arose from the combination of conditional probabilities (children who use marijuana are much more likely to progress to harder drugs) and sequential order (marijuana usually predates use of harder drugs). But those facts together do not imply causality. Various observers (e.g., Morral, McCaffrey, and Paddock, 2002) have shown that the same patterns could emerge if third variables (e.g., broken homes, risk-seeking personalities) cause use of both marijuana and hard drugs, and marijuana gets used first simply because it becomes available to children first.
>
> But, showing that the data does not imply that a causal version of the gateway hypothesis holds, is not the same as showing that there is no causal effect. Third variables could account for some but not all of the correlation. Furthermore, the connection need not be purely bio-chemical. For example, use of marijuana could lead teens to spend more time with others who use marijuana... and those marijuana-using peers might have more-positive attitudes toward use of other drugs or know how to obtain those other drugs. Likewise, marijuana use might lead the individual to self-identify and to be identified by others (labeling) as being the sort of person who uses drugs of all kinds.
>
> So there could be a causal path from greater marijuana use to use of hard drugs that is social or psychological, even if there is no biochemical link. Hence, although confidence in the old-fashioned version of the gateway hypothesis went beyond the empirical evidence, confidence in the irrelevance of the gateway hypothesis might be equally naïve.
>
> It is also worth noting that the vast majority of initiation into the use of any of these drugs, including marijuana but also other illegal drugs, alcohol, and tobacco, occurs before the age of 21, so the legal status of most potential initiates would not change. What would change is the supply, variety, price, and availability of marijuana products.
>
> One goal of the either–or discussion in the preceding paragraphs is to shake readers from any strong prior convictions that they can just know that legalizing marijuana will increase or that it will decrease use or abuse of this or that other substance. It is easy to assemble deductive arguments in either direction, as advocates on both sides of the marijuana-legalization debate routinely do. (RAND, 2014)

RAND conducted a literature review that "captures the gist of this complicated literature in the simplest possible terms, distinguishing along just two dimensions: (1) size of the literature underpinning the estimates and (2) degree of consensus among those studies" (RAND, 2014). The results are presented in the table below.

Summary of Literature on the Extent to Which Marijuana Is a Substitute for or Complement with Other Drugs

Substance	Studies	Agreement Among Studies	Finding
Alcohol	Many	No consensus	Unknown
Tobacco	Many	High consensus	Complementarity
Prescription opioids	Few	Consensus	Substitution
Illegal drugs	Few	No consensus	Unknown

Models of Implementation, Monitoring & Taxing

RAND in *Options and Issues Regarding Marijuana Legalization* states that

> …marijuana policy should not be viewed as a binary choice between prohibition and the for for-profit commercial model we see in Colorado and Washington State; several intermediate supply options could be considered, particularly given the variety of different goals a jurisdiction might be hoping to accomplish by changing the policy. The supply option for a jurisdiction focused on revenue enhancement might be fundamentally different from that of a jurisdiction focused on eliminating the black market or individual harm reduction.

The Peggy A. Kelly Wyoming Cannabis Act of 2016, is quite specific in defining implementation, monitoring and taxation. The medical conditions for which doctors can recommend marijuana treatments are explicit and have extensive implications. Unlike the Peggy Kelly Act proposed in Wyoming, Vermont (similar in population and rural/urban split) has a circumscribed medical marijuana model although in 2013 they decriminalized one ounce of marijuana or less ($200 fine for first offence). Vermont's medical marijuana program is managed by the Department of Public Safety. Eligibility is contingent on having a debilitating medical condition.

> The original statute limited the number of registered patients to 1,000, but this changed with the passage of S. 247 in May 2014; as of this writing, there are now 1,600 patients on the registry (Wells, 2014). Vermont's first dispensary opened in June 2013, only four may exist at any one time, and each patient must register with one specific dispensary. Each registered patient or registered caregiver may cultivate indoors "up to two mature marijuana plants, seven immature plants, and [possess] two ounces of usable marijuana" (RAND, 2014)

When people use the term *legalize* without further elaboration, they might often have in mind what might be called the standard commercial model, leaving production, distribution, and sale to the competitive private market, subject both to the standard laws and regulations that apply to all economic activity and to some additional rules specific to that product. For marijuana, these additional rules mostly pertain to the following:

- who can use (e.g., anyone over 21)
- quality control (e.g., testing requirements)
- packaging (e.g., requiring certain labeling)
- industry structure (e.g., requiring or banning vertical integration between producers, distributors, and retailers)
- product selection (e.g., whether to allow the sale of concentrates and edibles, whether to restrict potency)
- retail operations (e.g., rules that keep a minimum distance between stores and sensitive locations, such as schools; require vendor training; ban special sales and volume discounts; limit amount either per transaction or per user per day or month) (RAND, 2014)

Some states allow adults to grow their own plants with limits on the number of mature and immature plants in development. For example, the Peggy Kelley Act would allow a person with a valid medical marijuana certification to "possess, grow, process, or transport no more than six (6) medical marijuana plants, with three or fewer being mature, flowering plants." Under the Kelley Act growers with valid medical marijuana cards would also be able to transfer up to three ounces to other cardholders without remuneration. A single mature marijuana plant can yield around one pound or more of dried marijuana with the primary constraint on size determined by wattage of the lights used to grow plants. Strictly grow-your-own and share models do not produce much revenue for government, and one has to consider the costs for government to monitor/regulate growers and then enforce those regulations. The Kelly Act includes dispensary distribution.

A government run supply chain has its benefits and risks. While diversion of marijuana products would be less likely if production and distribution were controlled by government, there is risk that the state and its employees could be in violation of federal law (Mikos, 2013 as cited in RAND, 2014). A hybrid supply model could have a public authority authorized by legislation for the express purpose of operating the supply chain: "Under a public-authority model, the state would not itself possess or distribute marijuana." Yet another alternative would have the state chartering non-profit organizations to operate in the public interest. Finally, a state could license a small number of closely monitored for-profit organizations to run the supply chain. (RAND, 2014)

The Colorado model does not limit the number of dispensary licensees. Neither does the Peggy Kelly Act limit the number of dispensaries, but unlike Colorado's law that permits counties or towns to prohibit establishment of dispensaries within their boundaries, every "locality" in Wyoming *would have to permit dispensaries*. From the Peggy Kelley Act: "All provisions of this chapter shall apply in equal force to all localities within the State of Wyoming, whereby medical marijuana establishments may be established in each locality within the State of Wyoming pursuant to this chapter and regulations set by Liquor Division." The Peggy Kelly Act would prohibit local control over whether communities do or do not want medical marijuana dispensaries.

Taxes and Other Sources of Income

Marijuana can be taxed through several methods including ad valorem tax (sales tax), tax on gross weight, tax per unit of THC. Each has advantages and disadvantages.

- An ad valorem tax—meaning one based on sales value, as with a typical sales tax—is simple to implement but will fall if market prices fall. If the policy goal is to keep the after-tax price at some target level, ad valorem taxation is not the way to go.
- A tax on the gross weight of marijuana produced or sold creates an incentive for producers to pack as much intoxicating power as possible into as little plant material as possible. This gives a market advantage to highly potent forms of marijuana. For those who believe that those forms are more dangerous than other forms, that count as a disadvantage of taxation on gross weight.
- Taxation per unit of THC has attractive features but depends on accurate and honest testing procedures.
- Policymakers also need to decide how to tax concentrates and edibles, as opposed to herbal marijuana; those product forms have been growing in market share in states with medical dispensaries or commercial sales. A combination of strategies is also possible, such as taxing THC or weight for some products at the production stage and taxing value at the retail stage. (RAND, 2014)

The Peggy Kelley Act states that dispensaries selling marijuana and marijuana-infused products "...shall be subject to any state commercial activities tax, including any applicable sales, use or excise tax as applied to businesses in general and all other local taxes, assessments, fees and charges as applied to businesses in general, but shall not be subject to any special taxes, assessments, fees and charges, other than the licensure fees set forth herein."

Additionally, the Kelley Act states: "This chapter vests the Wyoming Department of Revenue Liquor Division to regulate the state's medical marijuana industry in a manner similar to the state's regulation of alcohol."

The Wyoming Department of Revenue and Department of Agriculture were tasked with evaluating the requirements of the Peggy Kelley Act (also called the Wyoming Cannabis Act of

2016). They analyzed "marijuana testing requirements, labeling of products, product standards, auditing requirements, budgetary requirements, licensing and revenue generation" (GMIAC revenue subcommittee report). Additionally, the Departments explored the Liquor Division's requirements: regulation of the acquisition, growth, cultivation, extraction production, processing manufacture, testing distribution, retail sales, licensing and taxation of medical marijuana.

Key findings of the Revenue Report below are taken from the report unedited (other than bolded text):

- The department assumes that the staffing of the Marijuana Division will be similar to that of Colorado scaled to represent our relative population but recognizing the similar duties. The Division would be staffed with 18 employees divided between two sections, Accounting and Compliance.
- Start-up costs would include office space, furniture and computer equipment and vehicles for the field staff. Estimated cost to begin operations is $2,724,693. Ongoing budget for administration of the program are estimated at $1,737,800 annually.
- Revenue from the administration and sale of medical marijuana are projected to come from two sources; licensing fees for dispensaries, cultivation, marijuana infused products facilities and testing facilities and from sales taxes paid on the retail sale of medical marijuana.
- In the current projection the department is assuming that licensing fees will be similar to what is already charged for liquor licenses. Currently local governments impose a $1,500 annual fee for liquor licenses. We're assuming that there will be 23 dispensaries opening in the state and 23 cultivation facilities. Marijuana infused products facilities are estimated at 5 in the state and possibly 2 testing facilities. Total annual licensing revenue from the facilities is estimated at $79,500.
- Revenue from sales taxes will depend on the number of patients registered for medical use and the amount of product sold. The department reviewed the number of patients registered in Colorado and adjusted that figure based on Wyoming's population relative to Colorado. We assumed that there would be 10,000 patients registered in Wyoming for the purposes of estimating the product sold.
- Average price in Colorado for an ounce of marijuana was $160/ounce. This does vary by strain sold but is a reasonable average. The average dosage prescribed varies widely depending on the source of information but an ounce of product per month looked to be a reasonable estimate. We estimated that 120,000 ounces of product would be sold annually. The estimated revenue generated would be $529,920 in state general fund revenue from sale of medical marijuana. The local taxes distributed to the counties would be $504,960.
- **Based on the assumptions made, the revenue generated from licensing and sales will not be sufficient to pay for the administration of the program.**

- **Without further revenue support the program administration would be funded by other state revenue.**

Because the Kelley Act is written to limit revenue generation through taxation of medical marijuana sales, it appears that fees might be the only route to keep medical marijuana from becoming a drain on general fund revenues. RAND discusses fee strategies in states with various forms of legal marijuana: "In Vermont, applicants to run medical-marijuana businesses pay a $2,500 nonrefundable fee. Successful applicants then pay a "registration fee of $20,000 for the first year of operation, and an annual fee of $30,000 in subsequent years... Colorado collects a fee from marijuana businesses that depends on the number of their plants" (RAND, 2014).