Legalizing Medical Marijuana through the Utah Medical Cannabis Act: A Health Impact Assessment

Chelsi C. Alexander, MPH(c), BSN, RN

Egenia Dorsan, MPH(c), BS

Mamadou D. Tounkara, MD, MPH(c)

Brigham Young University

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Outline of the Health Impact Assessment

Executive Summary

Overview of the Initiative

The Utah Medical Cannabis Act (UMCA) is a ballot initiative that legalizes the use and production of medical marijuana in the state of Utah and provides an outline of regulations as to how the medical marijuana industry should operate. Under the UMCA, marijuana is obtained and managed using a cardholder system and electronic database. Qualifying illnesses for obtaining a medical marijuana recommendation include HIV, Alzheimer's, amyotrophic lateral sclerosis, cancer, cachexia (muscle-wasting), Crohn's disease, ulcerative colitis, epilepsy, multiple sclerosis, post-traumatic stress disorder, autism, and chronic or debilitating pain. Other conditions for medical marijuana use may be approved on a case-by-case basis if fewer than 200,000 individuals in the United States are reported to have the condition or the case is individually approved by a Utah Department of Health appointed board of physicians.[1]

The UMCA establishes boundaries for cannabis dispensaries and the advertisement of medical marijuana. If patients live more than 100 miles from an established dispensary, home-growing of marijuana for medical purposes will be permitted. Patients will be required to renew their medical marijuana card with their physician every 6 months, while tracking of marijuana purchases will only be saved within the database system for 60 days.[1]

The UMCA ballot initiative is presented and supported by the Utah Patients Coalition. The Utah Patients Coalition presented the initiative in June 2017 and will need to collect over 113,000 signatures by April 2018 in order for the initiative to go to ballot in the November 2018 elections.[2] The UMCA requires that the electronic database and cardholder system be operating by March 1, 2020, legalizes the possession and consumption of medical marijuana beginning July 1, 2020, and allows individual growing practices to commence after January 1, 2021.[1]

HIA Expectations

The Utah Medical Cannabis Act is gaining momentum and careful consideration of the potential population impacts is important. This HIA aims to address potential impacts on vulnerable populations and support recommendations to mitigate health disparities. "Health disparities are preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations."[3] Specifically, the HIA team wished to investigate the effects of the UMCA on the following populations: potential medical marijuana users, adolescents, individuals of low socioeconomic status, and recreational drug users. Overall, the purpose of this HIA is to characterize the effects of the UMCA on Utah's population as a whole and provide recommendations to maximize potential positive effects while reducing any potential negative impacts.

Findings

Information was collected from stakeholders, quantitative data sources, and literature reviews, resulting in the characterization of the impacts of medical marijuana legalization into 6 categories which include effects on chronic disease and pain management, recreational marijuana use and abuse, the opioid crisis, economic stability, road safety, and the use of other substances. Table 1 summarizes the anticipated impacts for each of these categories. Table 2 serves as a legend Table 1.

In order to mitigate potential adverse effects and maximize potential benefits, this HIA makes recommendations in the following areas:

- Qualifying conditions for medical marijuana use under the UMCA
- Regulations affecting state-level research
- Education of patients and physicians

Table 1 – Characterization of Effects of the Utah Medical Cannabis Act

Health Impact	Direction of Impact	Severity of Impact	Magnitude of Impact	Likelihood of Impact	Distribution of Impact
Access to Marijuana	**Mixed** LR – mixed STK – mixed DAT – mixed	Moderate	Moderate	Highly likely	Population of higher socioeconomic status
Chronic Disease and Pain Management	**Increase/Positive** LR – increase STK – increase DAT - limited	High	Small	Moderately likely	Population of higher socioeconomic status
The Opioid Crisis	**Decrease/Positive** LR – decrease STK – decrease DAT – limited	Moderate	Small	Somewhat likely	Chronic pain patients
Recreational Marijuana Use and Abuse	**Increase/Negative** LR – increase STK – increase DAT – limited	Moderate	Moderate	Moderately likely	Uncertain
Economic Stability	**Increase/Positive** LR – increase STK – neutral DAT – increase	Low	Small	Highly likely	Uncertain
Road Safety	**Decrease/Negative** LR – decrease STK – neutral DAT– decrease	High	Moderate	Moderately likely	Drivers
The Use of Other Substances	**Mixed** LR – mixed STK – mixed DAT – limited	Moderate	Moderate	Moderately likely	Uncertain

Table 2 – Legend of the Characterization of Effects Table

Characterization	Explanation
Direction of Impact	**LR** – Literature Review **STK** – Stakeholder Perspective **DAT** – Quantitative Data **Increase** – expands the influence of the presented health impact, may result in a positive or negative change **Decrease** – reduces the influence of the presented health impact, may result in a positive or negative change **Limited** – sufficient evidence is not available to support a conclusion **Mixed** – evidence exists to support the impact as both positive and negative
Severity of Impact	**Low** – the nature of the impact is of low significance **Moderate** – the nature of the impact is of moderate significance **High** – the nature of the impact is of high significance
Magnitude of Impact	**Small** – the affected population is small in size **Moderate** – the affected population is moderate in size **Large** – the affected population is large in size
Likelihood of Impact	**Not Likely** – the probability that this impact will occur is very small **Somewhat Likely** – the probability that this impact will occur is relatively small **Moderately Likely** – this impact is relatively likely to occur **Highly Likely** – this impact is very likely to occur
Distribution of Impact	*Based on the assessment, the expected affected population is described. **Uncertain** – the affected population could not be predicted from available information

Purpose of the Health Impact Assessment

The purpose of this health impact assessment is to characterize the effects of the Utah Medical Cannabis Act on Utah's population and provide objective recommendations to mitigate negative health impacts and maximize positive health impacts. The established steps for conducting an effective HIA were followed in evaluating the legalization of medical marijuana — these steps include screening, scoping, assessment, recommendations, reporting, and

monitoring.[4] By following this pattern, this HIA aims to serve as a resource for decision-makers and stakeholders in their assessments of the UMCA and its potential effects.

Screening

Medical marijuana legislation has been presented within the state of Utah on a number of occasions but has only succeeded to be written into law on one occasion, in 2014. At that time, it became legal for patients with intractable epilepsy that is unreactive to other medications to possess CBD oil (made from a cannabis-extract) that meets certain chemical conditions.[5] These patients, however, are still unable to obtain that oil without traveling out of state, as production within Utah remains illegal.[5] The UMCA was presented by the Utah Patients Coalition in June 2017 and is one of the most recent propositions for the legalization of medical marijuana in the state of Utah. The UMCA is a ballot initiative that, if sufficient signatures are collected by April 2018, will be voted on in the general election of November 2018.[2]

The screening process provided for the identification of a number of potential stakeholders including the Utah Patients Coalition (representing patients with chronic conditions), the Utah Department of Health, local law enforcement, members of state legislature, healthcare providers/clinics, potential cannabis distributors, drug control coalitions, and the general community. Early stakeholder perspectives were noted at this time and, in combination with scholarly and media sources, were used to lay the foundation of the scoping process described below. An overview of the screening and scoping processes is found in Appendix A.

Scoping

The scoping process "defines priority issues, research questions and methods, and participant roles."[4] Before an understanding of priority issues can be reached, however, baseline

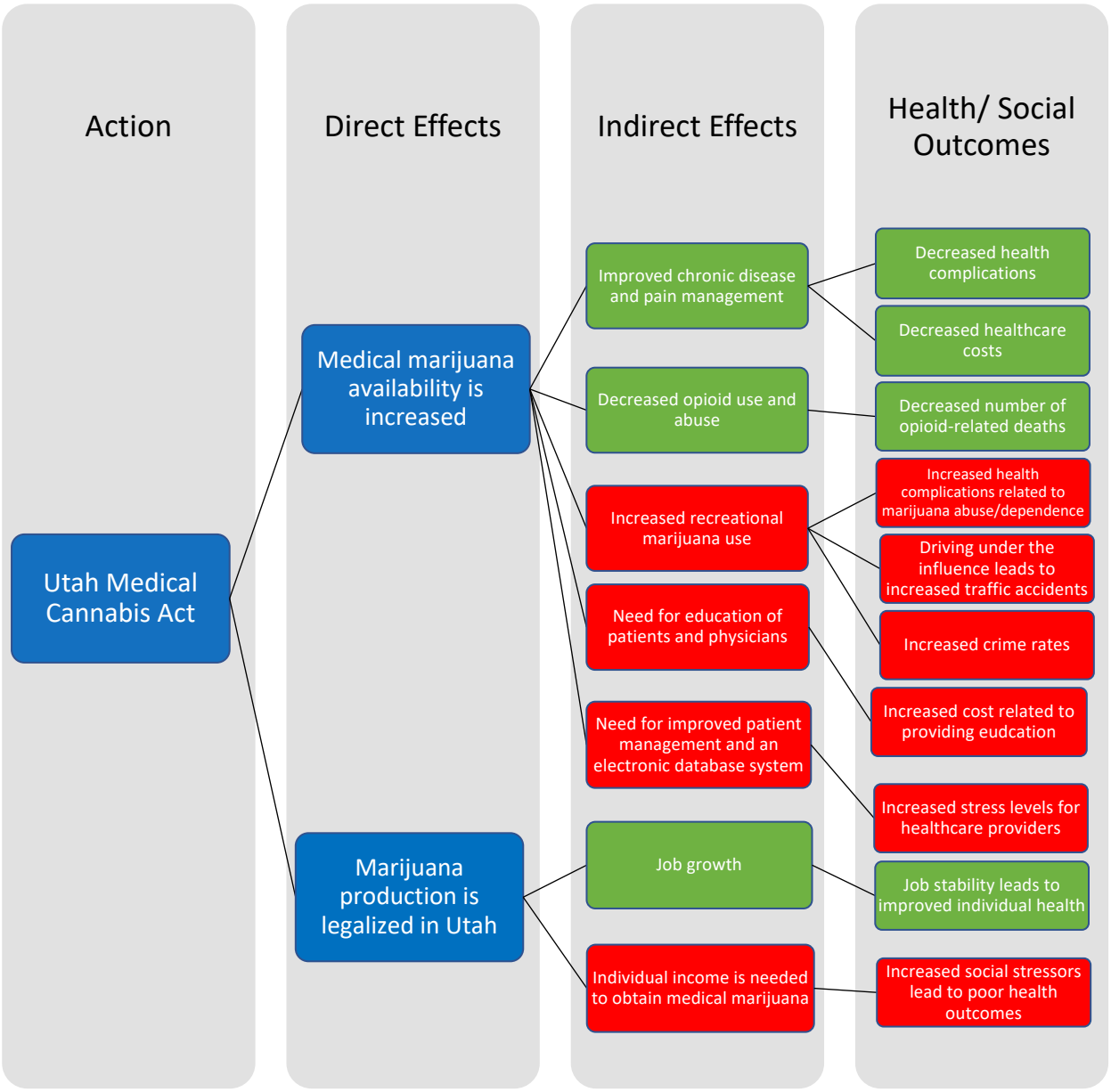
conditions of the population being studied must be noted. The population of Utah is unique from other states across the country; with greater than 30% of the population under age 18, Utah is home to the youngest population in the United States and is the fifth fastest growing state.[6,7] Home to more than 3 million people, Utah's population is largely urban-based.[6] Understanding the demography of Utah's population allows a thorough and accurate assessment of the baseline conditions that have been formed by current medical marijuana legislation in Utah and the culture surrounding its use and distribution.

Current medical marijuana legislation allows an individual to possess CBD oil (hemp extract) that is obtained from outside the state if that individual has intractable epilepsy that is resistant to treatment from other medications.[5] There are a limited number of individuals who currently possess medical cannabis ID cards and many individuals have allowed their registration to lapse.[8] Because it is not legal at this time, the number of individuals currently using other forms of medical marijuana is unknown. Calculating the number of residents that would use medical marijuana if it were available for a wider range of diseases is difficult as the qualifying conditions under the UMCA are broad. The number of individuals with qualifying conditions in Utah could reach into the tens or hundreds of thousands.

The use of recreational marijuana in the state of Utah is low compared to the national average, but rates have been steadily rising over the last several years.[9] The highest rates of reported recreational marijuana use was among 18-25 year olds, followed by 12-17 year olds; in 2014, 5.4% of 12-17 year olds reported recreational marijuana use within the past 30 days.[9] The impact of medical marijuana legislation on recreational marijuana use was one of the primary concerns of stakeholders and the HIA team. A causal model was used in the identification of this and other potential impacts, including those impacts discussed in the final assessment. Causal

models are used to identify research questions and target appropriate interventions in public health.[10] Diagram 1 presents the causal model identifying potential impacts of the UMCA on Utah's population.

Diagram 1 – Causal Model for the Utah Medical Cannabis Act



Blue – effects of policy implementation **Green** – positive impacts **Red** – negative impacts

Methods of Assessment

An effective health impact assessment considers information from stakeholders, literature review, and quantitative databases.[10] Balancing all of the gathered information provides an accurate and objective assessment of potential impacts. Each of these sources of information is identified in relation to health impacts in Table 1. Stakeholder input for this HIA was gathered through personal interviews, question/answer sessions in group settings, and the media. Quantitative data and sources of literature were obtained through searching scholarly databases for information that both supported and opposed the formed research hypotheses (Appendix B). A description of specific stakeholders and data/literature collection methods is presented in Appendix C.

Assessing general community views can be difficult without extensive surveying. The HIA team recognized the importance of community input due to the nature of the Utah Medical Cannabis Act as a ballot initiative. Interestingly, 14 out of 29 states where medical marijuana use has been legalized have passed policies through ballot initiative measures.[11] It would seem, then, that many citizens across the country are in favor of medical marijuana legalization. In order to assess community member views specifically in the state of Utah, the HIA team collaborated with Utah-based coalitions, pulled information from media articles, and spoke with members of the community about their perspectives of medical marijuana use and policies.

Assessment of Effects of the Utah Medical Cannabis Act

The Utah Medical Cannabis Act would increase access to marijuana for Utah's citizens. A description of this impact, along with the characterization of effects in 6 separate categories are presented in Table 1; these categories are chronic disease and pain management, recreational marijuana use and abuse, the opioid crisis, economic stability, road safety, and the use of other substances. The assessment of each of these impacts is discussed in detail below.

Baseline conditions were studied prior to the assessment of health impacts. A few current conditions are of note in understanding the distribution of expected impacts. First, the social and political influences shaping Utah's society and culture are distinct from many of the states that have previously passed medical marijuana legislation.[11,12] Utah has a largely Republican constituency, a party which is known to be more hesitant in regard to medical marijuana legislation. Approximately two-thirds of Utah residents are members of the Church of Jesus Christ of Latter-Day Saints[13], whose most recent statement, made in June 2017, states that "society is best served by requiring marijuana to go through further research and the FDA approval process that all other drugs must go through before they are prescribed to patients."[14] The Utah Patients Coalition has noted this influence in recent polling – LDS women who are active in their faith constituted the largest group of individuals opposing medical marijuana legislation (A. Iorg, MPP, oral communication, November 8, 2017).

In order to fully understand the potential health impacts of the Utah Medical Cannabis Act, the HIA team assessed the effects of maintaining current medical marijuana legislation. A description of this legislation and a characterization of effects for keeping the legislation as is are found in Appendix D.

Chronic Disease and Pain Management

Historical records indicate that cannabis has been used for centuries as a remedy for pain, inflammation, nausea, and more.[15] Current research is focusing on the use of medical cannabis in the treatment of 21st century chronic diseases such as multiple sclerosis, epilepsy, Crohn's disease, cancer, rheumatoid arthritis, and glaucoma.[15-17] Evidence exists to support the beneficial use of medical marijuana to treat epilepsy, cancer, chronic pain, autism, multiple sclerosis, and

post-traumatic stress disorder.[18,19] Individual testimonials supporting the beneficial effects of medical marijuana are abundant. One cancer patient stated that:

> Marijuana took away my nausea, so I could eat healthy. It took away the severe restlessness and anxiety, so I could relax. It allowed me to eat, sleep and be up and active when I was awake – all of which are critical to recovery. It didn't get me "high"; it made me feel halfway normal (as opposed to the prescriptions, which left me feeling drugged and weak). It gave me the strength to continue with chemotherapy when I had reached a point where I really couldn't tolerate it anymore.[20]

The goal of the Utah Patients Coalition is to advocate for patients who are sick and suffering as a result of chronic disease.[2] In contrast to these therapeutic benefits, however, the use of cannabis has also been associated with negative side effects including psychosis, anxiety, paranoia, and acute cardiac events.[16,21] One of the main concerns of current research is regulating the preparation, chemical make-up, and dosing needed to emphasize the medical benefits and limit potential side effects.[22]

Medical marijuana is currently being recommended nationally and internationally for a broad array of diseases, as an alternative treatment method for pain, inflammation, and seizures, and to treat side effects associated with a variety of conditions and medications.[23] Recent studies have shown the benefits of medical marijuana under very specific circumstances – for example, chemotherapy-induced nausea and muscle spasticity associated with multiple sclerosis.[22] Some researchers recommend that the use of medical cannabis be limited to patients who have failed conventional, well-established pain and disease management processes[16]; however, the expanding legalization of medical marijuana across the country and internationally makes medical marijuana accessible for individuals with a broad range of diseases, some of which have not been thoroughly researched.[22,23]

While the long-term adverse effects and risks of medical marijuana use are not well understood, research has shown the benefits of medical marijuana use in managing specific chronic conditions.[22] Considering this evidence, along with testimonials from medical marijuana users, the HIA team determined that the Utah Medical Cannabis Act would have a positive impact on chronic disease and pain management, as illustrated in Table 1.

Opioid Crisis

The opioid crisis is increasing at an unprecedented rate and is the leading cause of injury death in the United States.[24] Medical marijuana has been presented as one viable substitute for opioid therapy; this suggestion is largely debated by health professionals and stakeholders alike, as little is known about the long-term effects of marijuana use. There are, however, a number of studies available relating medical marijuana use to a decreased use of prescription opioids, fewer opioid-related hospitalizations, and lower rates of opioid overdose and misuse.[25] A Canadian case study followed the case of a liver transplant patient with acute postoperative pain who was able to significantly reduce opioid consumption with the initiation of medical cannabis treatment.[26] After initiating the medical cannabis treatment, there was a noted improvement in the patient pain profile and significant reduction in opioid-related side effects.[26]

Medical cannabis has been shown to effectively decrease acute pain in recent case studies.[26] This connection is valuable, as the emergence of opioid dependence is often associated with acute and/or postoperative pain, especially with orthopedic surgeries.[27] As the prescribing of opioid analgesics has increased, so have the rates of opioid misuse and overdose.[28] In addition to acute and chronic pain management, the prevention of opioid dependence and substance abuse disorders are also of significant importance when considering the effects of the UMCA on the

opioid crisis; in the United States, approximately 33,000 deaths per year have been related to opioid misuse.[29,30]

Initial measurements in Colorado have shown a decrease in opioid-related deaths since the legalization of recreational marijuana.[21] The Utah Patients Coalition supports the association between medical marijuana use and a reduction in opioid abuse (A. Iorg, MPP, oral communication, November 8, 2017). At the same time, other stakeholders posit that medical marijuana should not be used as a solution to the separate problem of the opioid epidemic (D. Davis, JD, oral communication, November 20, 2017). In compiling the data and stakeholder perspectives, the UMCA is expected to have a positive impacted on the Opioid Crisis, as described in Table 1.

Recreational Marijuana Use and Abuse

Strong opinions are present from stakeholders both supporting and opposing a relationship between medical marijuana legalization and recreational marijuana use. The Utah Patients Coalition posits that the UMCA will not increase the availability and accessibility of recreational marijuana because marijuana under this initiative will be available for and designed for medical use (A. Iorg, MPP, oral communication, November 8, 2017). The UMCA also restricts the advertising and packaging of medical marijuana so it is not appealing to the general population.[1] The concern of other stakeholders, including the SMART Coalition and Representative Tim Quinn, is that legalizing medical marijuana will lead to a culture of acceptance of marijuana use in general, especially among adolescents (M. Allen and H. Lewis, oral communication, November 17, 2017; T. Quinn, oral communication, November 13, 2017). While research supporting this concern is limited, higher rates of marijuana abuse and

dependence among the general population (recreational marijuana users) have been noted in some states following medical marijuana legalization.[31]

The chemical make-up, additives, and dosing of marijuana can change significantly from one plant to another or from one form of use to another (D. Davis, JD, oral communication, November 20, 2017). Due to the variety of the types of marijuana available the long-term effects of marijuana use remain largely misunderstood; the SMART coalition and Representative Tim Quinn presented concerns that marijuana use may adversely affect cardiovascular and respiratory health, mental health, and more (M. Allen and H. Lewis, oral communication, November 17, 2017; T. Quinn, oral communication, November 13, 2017). Research has associated marijuana use with acute cardiac events, paranoia, hyperemesis, psychosis, and anxiety.[16,21,32] From this point of view, the unknown risks may outweigh the presently known benefits of marijuana use, whether recreational or medical.

The distribution of medical marijuana will take place through medical marijuana dispensaries, as federal regulation will not permit the distribution of marijuana from licensed pharmacies.[1,33] The security and integrity of those dispensaries is a concern; poor security or regulations may result in recreational marijuana access for the surrounding community (D. Davis, JD, oral communication, November 20, 2017). The presence of these dispensaries may also contribute to a general cultural acceptance of marijuana use (M. Allen and H. Lewis, oral communication, November 17, 2017).

The UMCA limits marijuana use to ingestion, inhalation, vaping, or smoking at temperatures less than 750 degrees[1]; this clause is meant to serve as a safeguard, lessening the appeal of recreational use by preventing the smoking of marijuana (A. Iorg, MPP, oral communication, November 8, 2017). A concern of the SMART Coalition is that smoking will

still be feasible and appealing to recreational marijuana users if non-combustible heat sources, such as the cigarette lighter in an automobile, are used (M. Allen and H. Lewis, oral communication, November 17, 2017).

The concerns presented by stakeholders and the available data and research point to the negative impact that the UMCA will have on recreational marijuana use and abuse (see Table 1). This impact is of greatest concern to the general community and should be considered carefully in association with any medical marijuana legislation or policy proposals.

Economic Impacts

The UMCA would legalize the production and distribution of medical marijuana in the state of Utah through dispensaries.[1] This would lead to new business and job growth in the community. Whether that business would initiate in Utah or carry over from other states is unknown at this time (A. Iorg, MPP, oral communication, November 8, 2017; D. Davis, JD, oral communication, November 20, 2017). Under the UMCA, medical marijuana sales would remain tax free, but program profits would provide the revenue to continue to support the state-level management of issuing ID cards, managing the electronic database, and regulating dispensaries.[2] Whether the profits would retain sufficient revenue to provide this support in coming years remains to be seen.

The cost of medical marijuana to the individual would depend on competition within the free market. At least in the beginning stages, the cost to the individual could be stressful or unfeasible for persons with limited budgets. Economically, obtaining marijuana would be more feasible for individuals of a higher socioeconomic status (A. Iorg, MPP, oral communication, November 8, 2017). Insurance companies are unable to provide financial reimbursement for medical marijuana under the current federal law (D. Davis, JD, oral communication, November

20, 2017). Medical marijuana could become an individual financial burden, but may save money in other areas.

One suggestion is that medical marijuana legalization would decrease criminal justice costs for enforcing marijuana laws and that marijuana profits could be used to further research and improve policy relating to medical marijuana use.[34] Jeffrey Miron, a Harvard economist, proposed that the legalization of medical marijuana on a federal level would decrease the cost of prosecutorial, judicial, correctional, and police resource spending by approximately $7.7 billion – $13.7 billion per year.[35] With implementation of the UMCA, all disciplinary action currently being carried out for the possession of medical marijuana would be immediately pardoned.[1]

Quantitative data directly related to Utah's economy is difficult to measure and the stakeholders interviewed did not carry significant perspectives related to the impact of the UMCA on the economy, but the initiative is expected to have an overall positive impact on Utah's economy (see Table 1).

Road Safety

The UMCA prohibits the practice of driving under the influence of marijuana, even for marijuana used for medicinal purposes.[1] The initiative could have a negative impact on road safety if medical or recreational marijuana users fail to comply with this regulation. As with psychotropic drugs that have been prescribed in the past, physicians should warn patients of potential effects on cognitive and psychomotor functions, especially when driving or operating machinery. Physicians, law enforcement, and government officials have a duty to safeguard the population by keeping impaired drivers off the roads.

In the United States, traffic fatalities are the leading cause of death among Americans ages 5 through 34.[36] One study, conducted in the state of Washington, measured the relationship

between road safety and marijuana use by measuring THC levels (an essential chemical found in marijuana that alters brain functioning[37]) following the legalization of medical marijuana in 1999 and the legalization of recreational marijuana in 2012.[38]

- Between 2005 and 2014, the proportion of Washington state DUI and collision cases that involved THC (excluding those that tested positive for alcohol) increased from 20 percent to 30 percent.[38]
- Following a DUI (again excluding those that tested positive for alcohol), the median blood level of THC increased significantly from 4.0ng/ml in 2005 to 5.6ng/ml in 2014 (P value = 0.015).[38]
- Among drivers suspected of DUI in the absence of a collision, 11 percent were positive for THC in conjunction with another potentially impairing substance. An additional 26 percent tested positive for THC only.[38]

A review of these findings shows the potential correlation between the legalization of medical marijuana and poor road safety. Research conducted in New Zealand compared safe drivers with drivers involved in motor-vehicle crashes and found that habitual marijuana use is associated with 10 times the risk of a car crash injury or death.[39] Stakeholder perspective linking medical marijuana legislation and a decrease in road safety was limited; considering the review of data and literature, the UMCA is expected to have a negative effect on road safety which is further described in Table 1.

Use of Other Substances

Alcohol is the substance most researched in relation to levels of marijuana use. One study found that marijuana actually served as a less acutely dangerous substitute for alcohol[40]; a number of other studies have focused on the hazards associated with the concurrent use of alcohol and marijuana.[41] Having alcohol in the blood leads to a faster absorption of the THC component of marijuana, resulting in a much stronger effect.[41] Effects such as panic, anxiety, vomiting, paranoia, and extreme dizziness/fainting are strongly associated with a combination of

alcohol and marijuana use.[41] The impairment associated with mixing alcohol and marijuana may also have a negative impact on road safety, personal decision-making (awareness of surroundings and conscience control of self are limited), and the use of additional substances.[41]

There has been little research conducted on marijuana as a gateway drug; research can only be collected through self-reports, which often results in underreporting of marijuana use (A. Iorg, MPP, oral communication, November 8, 2017). A recent study reported that 44.7% of lifetime cannabis users went on to use an illicit drug at some time in their lives.[42] In our discussions with general community members, the association of marijuana use leading to harder drug use had been observed and was a cause of concern. After observing the drug use patterns of her son and his friends, one community member stated that "marijuana led to the use of other, harder drugs" (Anonymous, oral communication, October 24, 2017). Based on the conflicting conclusions between stakeholders and available data, the HIA team determined that the UMCA will have a mixed effect on the use of other substances (see Table 1).

Limitations

Federal law has classified marijuana as a Schedule I drug, which has resulted in a limited amount of quantitative data available within the United States.[33] The effects of long-term marijuana use, the effect of medical marijuana distribution on vulnerable populations, such as adolescents, and consistent dosing and preparation standards are all areas in which research is lacking. More research on the effects of medical marijuana legalization on recreational marijuana availability is also needed. Many studies and theories posit ways in which patient and physician education about medical marijuana can occur, but evaluations of proposed methods of education were lacking in the literature review. Where appropriate, quantitative data and literature reviews

from outside the United States were utilized in forming the research opinions presented in this HIA.

Stakeholders were particularly concerned with the impacts of medical marijuana legalization on adolescent and pediatric populations, but this is an area in which information was quite limited. There was uncertain evidence supporting an association between medical marijuana legalization and the availability of recreational marijuana to adolescents, but research was not sufficient to establish a conclusion of impact. Limited data also associated medical marijuana legislation with an increase in accidental exposure or ingestion of marijuana by children.[43] The impact of the UMCA on these vulnerable populations was not well established due to a lack of sufficient information.

An initial research question of this HIA questioned the association between the UMCA and crime rates. Some studies found a correlation between recreational marijuana use and criminal behavior.[44,45] Research has not been done linking medical marijuana legalization to increased crime. Some stakeholders argue that the UMCA would increase property crime or burglary in medical marijuana dispensaries or homes where marijuana would be grown, but research completed on this topic found no correlation between medical marijuana dispensaries and property or violent crime.[46] The association between medical marijuana legalization and crime was also studied in a Kansas-based HIA and findings were similarly inconclusive.[47]

Recommendations

Comparing medical marijuana legislation in states across the country provides valuable insight into the best practices of legalizing medical marijuana. Medical marijuana has been legalized in 29 states at this time[11], and each of these states has faced challenges individually and collectively. The challenge that Utah now faces is implementing the policies and legislation that

will appropriately consider the evidence-based data that has been collected and take in to account the state's unique culture and population demographics.

Practices in Utah surrounding alcohol and tobacco control are relatively strict.[48] The Church of Jesus Christ of Latter-day Saints is a strong advocate of maintaining tight control over alcohol use; the benefits to society have been evident when noting Utah's low levels of drunk driving and binge drinking.[12,49] Similarly, tobacco control practices across the country have been shown to reduce smoking prevalence, healthcare complications, and healthcare costs.[50] Alcohol and tobacco control provide an example of the importance of limiting a culture of substance dependence in order to safeguard the population health. The HIA team recommends that the UMCA consider the stakeholder perspectives and general community support of limiting substance use, and specifically marijuana access, to the general population. There are a number of ways that this can be done while advocating for the vulnerable population of chronic disease and pain patients. The recommendations of this HIA are based on the practices and findings of medical marijuana legislation in other states and on the unique culture and population that is found in the state of Utah.

Recommendation: The Utah Medical Cannabis Act should limit the qualifying conditions for medical marijuana use to epilepsy, cancer, autism, multiple sclerosis, and post-traumatic stress disorder.

Evidence-based research supports the use of medical marijuana to treat the above conditions.[19,22] Limited research also supports the use of medical marijuana for managing chronic pain[18], but this association should be researched more thoroughly before allowing access to the general population. Researchers have also recommended that the use of medical cannabis should be limited to patients who have failed conventional, well-established disease management

procedures.[16] In other words, medical marijuana should be used as a secondary line of defense when considering disease treatment options.

Limiting the qualifying conditions of the UMCA to conditions that have been well-researched in correlation with marijuana use will initially make medical marijuana available for fewer patients. However, this will also make medical marijuana less accessible to the general population and reduce the risks of recreational marijuana use and abuse. Mitigating the potential negative impacts of the UMCA in this way is consistent with available research and stakeholder concerns and also supportive of the other recommendations of this HIA.

Recommendation: The Utah Medical Cannabis Act should support state and university level research by incentivizing research institutions and allowing state database information to be saved and made available to these institutions.

As is evident throughout this HIA, further research is needed to appropriately understand marijuana, its appropriate uses, long-term effects, dosing and production, and the health implications of wide-spread availability on the general population. Supporting effective research will require advocacy at the federal-level to change the federal classification of marijuana as a Schedule I drug. Utah Senator Orrin Hatch has presented the Marijuana Effective Drug Study Act of 2017, which is a federal-level proposal that would support the needed research.[51] While federal-level policy is beyond the scope of the UMCA, the Utah Patients Coalition can support needed research by placing stipulations within the UMCA that incentivize research and provide needed data from medical marijuana users.

The database approach for registering and managing the recipients of medical marijuana has been an effective approach for other states and is a strength of the UMCA. However, the UMCA limits tracking of marijuana possession to a 60-day period, after which time information

is erased.[1] Information in this database should be saved indefinitely and shared with research institutions so that quality improvement studies may commence; the database should also be expanded to include the effectiveness of marijuana in disease management and any adverse effects that are experienced. This approach will require collaboration between dispensaries, physicians, research institutions, and the Utah Department of Health.

A portion of the revenue that is obtained from medical marijuana sales and management should be allocated to support research institutions at the state and university levels. Providing funding for research will support the scientific community in collaborating and studying the appropriate and safe utilization of medical marijuana within the healthcare system.

Recommendation: The Utah Medical Cannabis Act should mandate physician education and provide standardized patient education materials to physicians.

The state of New York has implemented a licensing system that gives a specific physician the authority to recommend medical marijuana only after completing a standard online education course and filing for state registration in the New York Medical Marijuana Program.[52,53] A similar system has also been implemented in Florida.[52] The education of physicians in medical marijuana practice is of primary importance; mandating marijuana-specific education for physicians is one way to improve patient safety, patient education, and regulate more closely the physicians who are able to recommend medical marijuana. The recommendation of this HIA is that the UMCA implement a mandatory education program for physicians before licensing them to recommend medical marijuana.

Standardized patient education materials should be made available as a tool to those physicians who are licensed to recommend medical marijuana. This practice is used to educate

patients on a variety of available medical treatments. Educating both patients and physicians will ensure that best-known practices are utilized with medical marijuana treatment.

Future Monitoring

Moving forward, it is important that medical marijuana legislation be monitored, evaluated, and changed as changes in best practice are identified. The recommendations of this HIA for the UMCA to support both research and education are one way to improve medical marijuana policy in the future. Multi-disciplinary collaboration is essential and should include government representatives, healthcare institutions, licensed physicians, medical marijuana users, lay community members, and coalitions. Improvements to medical marijuana policy are expected as an understanding of its individual and community effects become better understood.

Already, future policy proposals are being formed. In November of 2017, Representative Brad Daw presented a preliminary report to the Health and Human Services Interim Committee regarding a legislative proposal that he will be sponsoring in 2018.[54] The main points of this bill will be to:

- charge the Utah Department of Agriculture and Food with regulating the safety, consistency, and labeling of cannabidiol;
- authorize the Utah Department of Agriculture and Food, for purposes of research, to explore the production of cannabis strains not currently produced by the federal government;
- authorize access to certain cannabis by end-of-life patients who have not responded to any other treatment; and
- create a framework for regulating the production, processing, and dispensing of medical cannabis[54]

The primary responsibility of monitoring medical marijuana outcomes and coordinating appropriate research should be held by the Utah Department of Health. Measures of effectiveness will include health outcomes for individuals and the population and the mitigation of the

potential negative health impacts presented in this HIA and any further negative impacts that have not yet been identified. Research institutions, universities, healthcare systems, state legislative bodies, law enforcement, and all vested stakeholders should support the evaluation of current policy and implementation of best practice in the future.

Conclusion

This HIA aims to understand and address the potential health effects, both intended and unintended, of the Utah Medical Cannabis Act. The general community and specific vulnerable populations were considered through the processes of screening, scoping, and assessment; these populations should also be carefully considered in future evaluations and changes to policy. Adjustments to the Utah Medical Cannabis Act should reflect the findings of this HIA, which are based on quantitative data, literature review, and stakeholder input. The recommendations that have been presented include setting limitations to the qualifying conditions of the UMCA, supporting state-level research within the initiative, and mandating education for physicians. The purpose of this HIA is to serve as a tool for stakeholders, community members, and policy makers who wish to assess the impacts of the Utah Medical Cannabis Act.

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Appendix A – Screening

Screening of the Utah Medical Cannabis Act assessed the feasibility of conducting a health impact assessment (HIA). It was determined that an HIA would be a valuable tool for stakeholders and decision makers. Primary stakeholders were identified as individuals/organizations who had a vested interest in the policy outcomes. Key actors were identified as individuals/organizations who would determine or influence the policy outcomes. Intermediary players are those who would have influence or be influenced to a degree by the Utah Medical Cannabis Act, but their interest or power was not equal to that of the key actors or intermediary players. Table 1A presents potential stakeholders that were identified in the scoping process.

Table 1A – Stakeholders

Primary Stakeholders	Key Actors	Intermediary Players
Chronic Disease Patients (including patients with cancer, epilepsy, and autoimmune diseases)	Utah Patient Coalition	Utah Department of Health
Chronic Pain Patients	Voters/Citizens	Medical Cannabis Producers/Distributors
Physicians/Prescribers	Utah Legislation/Government	Utah Department of Transportation
Voters/Citizens	United States Senator Orrin Hatch	Utah Department of Environmental Quality
Caregivers	Physicians/Prescribers	Law Enforcement
Sutherland Institute	American Chronic Pain Association	Utah State Chamber of Commerce
Utah Eagle Forum	Utah Senator Brian Shiozawa	Utah Chamber of Commerce
National Fibromyalgia & Chronic Pain Association	Utah Governor Gary Herbert	Utah Governor's Office of Economic Development

American Cancer Society	Utah Department of Health	Physicians/Prescribers
Recreational Marijuana Users	Wasatch Pain Solutions	University of Utah Pain Management Center
Smart Approaches to Marijuana (SAM)	National Organization for the Reform of Marijuana Laws (NORML)	Intermountain Healthcare Pain Management Services
Police Unions & Private Prison Companies	Drug Policy Alliance (DPA)	Utah Justice Department

The purpose of this HIA is to determine the health impacts of the implementation of the UMCA. The use of medical marijuana for management of chronic conditions such as epilepsy, cancer, autism, multiple sclerosis, and post-traumatic stress disorder continues to be proven.[15,16] Effects on the general population will also be addressed; areas of assessment may include crime rates, road safety, youth access to marijuana, influence of medical marijuana use on the opioid epidemic, and accidental exposure to marijuana especially among children. This HIA will provide accurate information to the appropriate stakeholders, assess the needs of vulnerable populations, measure the influence of the UMCA on public health, and facilitate the decision-making process for Utah voters.

Appendix B – Scoping

The use of a causal model (Diagram 1) led to the formation of research questions and identified stakeholders whose input would be valuable in responding to those questions. Stakeholders were classified into four main categories: potential medical marijuana users (chronic disease/pain patients), physicians/prescribers, the general community, and other organizations (coalitions, legislative bodies, law enforcement, etc.). Table 1B outlines the research questions identified, the populations that would be affected by each topic, and the planned methods of collecting information.

Table 1B – Research Questions

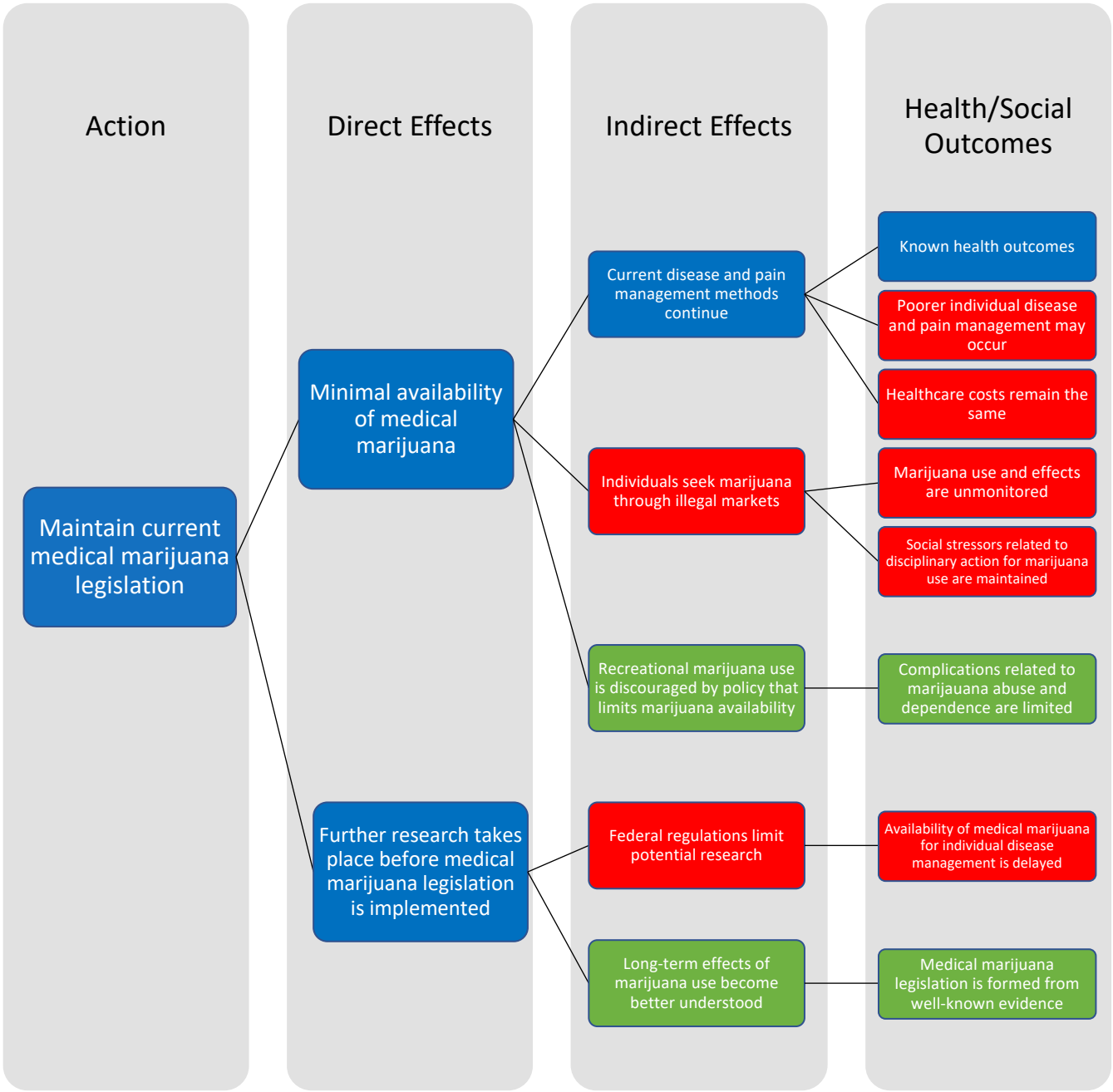
Research Question	Population Addressed	Method of Research
Will medical marijuana legislation increase job growth and boost the economy?	-Community -Cannabis production and distribution facilities	-Literature review of implementation in other states -Collaboration with political leaders
Will medical marijuana legislation increase the use and availability of recreational marijuana?	-Community	-Literature review of implementation in other states
Will medical marijuana legislation serve to combat the opioid epidemic?	-Physicians/prescribers -Community	-Literature review of implementation in other states -Collaboration with pain clinics/physicians and the Utah Cancer Action Network -Interviewing community members
How effective is medical marijuana in improving management of chronic conditions?	-Potential medical marijuana users	-Literature review of implementation in other states -Personal testimonials of medical marijuana users
What long term effects of marijuana use should be considered?	-Potential medical marijuana users -Physicians/prescribers	-Literature review of marijuana in general
How will education about medical marijuana take place for potential users and prescribers?	-Potential medical marijuana users -Physicians/prescribers	-Utah Patients Coalition -Utah Department of Health
How will medical marijuana legislation affect crimes rates?	-Community -Law enforcement	-Literature review of implementation in other states -Collaboration with law enforcement

How will medical marijuana legislation affect road safety?	-Community -Law enforcement -Utah Department of Transportation	-Literature review of implementation in other states
What costs will be associated with medical marijuana program maintenance?	-Community -Utah Department of Health -Law enforcement	-Collaboration with the Utah Patients Coalition, Utah Department of Health, and law enforcement
At what level will individuals seek marijuana if it is not legalized?	-Community -Law enforcement	-Literature review of implementation in other states -Collaboration with pain clinic/physicians -Interviewing community members
Is more research appropriate in developing medical marijuana legislation?	-All stakeholders	-Literature review of implementation in other states -Collaboration with political leaders and physicians -Interviewing community members

The implementation of the UMCA is intended to address the needs of potential medical marijuana users by providing access to marijuana for the management of chronic disease and pain. Serving the needs of this vulnerable population is vitally important. A health impact assessment provides a way for vulnerable populations to engage in the process of decision making.[10] Unintended consequences on the population of chronic disease and pain patients may include the substantial costs of medical marijuana and a lack of knowledge about its use and long-term effects.[55,56] Similarly, other groups of stakeholders may experience both positive and negative impacts to varying degrees. In contrast to the impacts outlined in the causal model of Diagram 1, Diagram 1B presents a causal model assuming that current medical marijuana laws are maintained in Utah.

Maintaining Utah's current medical marijuana legislation would pose its own unique set of effects. Fewer disease management options could lead to poorer management of chronic pain and disease and increased medical costs. Individuals could pursue medical marijuana use illegally, impacting the illegal drug market and the costs of law enforcement. Further research

Diagram 1B – Causal Model for Utah's Current Marijuana Laws



Blue – effects of policy implementation **Green** – positive impacts **Red** – negative impacts

could also lead to an improved understanding of the long-term and population effects of medical marijuana use that would improve the formation of appropriate medical marijuana policies.

Appendix C – Methods

Stakeholder input was collected for this health impact assessment from organizations and individuals both supporting and opposing the Utah Medical Cannabis Act. Individual interviews were conducted with Alex Iorg, the campaign manager of the Utah Patients Coalition, and Michelle Allen and Heather Lewis, board members of a Utah County-based coalition, SMART (Substance Misuse and Abuse Reduction Team); input was received in a group setting from Representative Tim Quinn of the Utah House of Representatives and David Davis, president of the Utah Retail Merchants Association. Information was also collected through attendance at the Health and Human Services Interim Committee meeting at the Utah State Capitol on November 15, 2017, where information on alternative medical marijuana legislation was discussed by the legislative sponsor, Representative Brad Daw of the Utah House of Representatives. Other stakeholder input included in this HIA was collected from the cited media articles and organization sites.

Quantitative data was synthesized from current available research in combination with a literature review of scholarly articles. Scholarly databases were searched using the terms "marijuana" and "cannabis" in conjunction with a variety of terms relating to medical use, recreational use, legislation, access, short and long-term effects, and the use of other substances. Collected information consisted of both sources within and outside of the United States; when appropriate, international information was utilized to characterize effects. When available, data was reviewed that both supported and refuted the expected causal hypotheses that were identified in the scoping phase of this HIA.

Appendix D – Current Utah Medical Marijuana Legislation

Current medical marijuana legislation allows an individual to possess CBD oil (hemp extract) that is obtained from outside the state if that individual has intractable epilepsy that is resistant to treatment from other medications.[5] Since July of 2014, there have been 231 hemp extract registration cards issued to Utah residents, more than 160 of which were under the age of 18.[6] These registration cards expire after 1 year of issuance if they are not renewed, and only 119 residents hold active cards as of November 2017.[8] Research on hemp extract by institutions of higher education in the state is currently permitted and taking place; a resident survey in 2017 showed that 22% of respondents reported a greater than 50% improvement in seizure intensity and frequency and 41% reported slight improvements or worsening of seizure intensity and frequency while using hemp extract.[6] The production or distribution of marijuana in any form is illegal in the state of Utah.[5]

Table 1D is a characterization of effects for the maintaining the legislation described here. The legend found in Table 2 serves as a reference for Tables 1 & 1D.

Table 1D – Characterization of Effects for Current Marijuana Legislation

Health Impact	Direction of Impact	Severity of Impact	Magnitude of Impact	Likelihood of Impact	Distribution of Impact
Access to Marijuana	**Mixed** LR – mixed STK – mixed DAT – mixed	Moderate	Moderate	Highly likely	Population of higher socioeconomic status
Use of Current Disease Management Techniques	**Mixed** LR – mixed STK – mixed DAT – mixed	Moderate	Moderate	Highly likely	Chronic pain and disease patients
Recreational Marijuana Use and Abuse	**Decrease/Positive** LR – decrease STK – decrease DAT – limited	Moderate	Moderate	Moderately likely	Uncertain
Law Enforcement Costs	**Increase/Negative** LR – increase STK – increase DAT – limited	Moderate	Small	Moderately likely	Taxpayers
Understanding of Medical Marijuana	**Increase/Positive** LR – increase STK – increase DAT – limited	High	Large	Moderately likely	Broad
Future Marijuana Research	**Increase/Positive** LR – increase STK – increase DAT – limited	High	Moderate	Moderately likely	Broad