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POTENTIAL HEALTH EFFECTS OF LEGALIZING MEDICAL MARIJUANA IN KANSAS

Kansas Health Impact Assessment Project

SEPTEMBER 2015

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KHI/15-19

Table of Contents

Table of Contents (continued)

Introduction

This report is intended to be an accessible and informative resource for Kansas policymakers as they consider whether or not to legalize medical marijuana in Kansas. This report describes the potential health effects associated with this policy issue in an effort to inform the decision-making process.

Acknowledgements

Over the course of the project, the Kansas Health Institute's Health Impact Assessment Team—further on referred to as the HIA Team—received valuable input and participation from various stakeholders including state officials, state legislators, academic researchers and representatives of social service organizations. We thank them for dedicating their time, energy and expertise to the project.

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Disclaimer

The authors of this report are responsible for the facts and accuracy of the information presented. Any findings, conclusions or recommendations expressed in this HIA report are those of the authors and do not necessarily reflect the view of the medical marijuana policy experts and stakeholders who provided their perspectives during the process.

The Kansas Health Institute does not endorse or oppose the proposed legislation. KHI delivers credible information and research enabling policy leaders to make informed health policy decisions that enhance their effectiveness as champions for a healthier Kansas. The Kansas Health Institute is a nonprofit, nonpartisan health policy and research organization based in Topeka. KHI was established in 1995 with a multi-year grant from the Kansas Health Foundation.

Proposed Policy

During the 2015 legislative session, Kansas lawmakers considered three bills to legalize medical marijuana in Kansas. Senate Bill 9 and House Bill 2011 were proposed to legalize multiple forms of marijuana for a range of debilitating medical conditions such as cancer, glaucoma, hepatitis C and Crohn's disease, among others. House Bill 2282 included more restrictive provisions and only allowed for the use of marijuana among those with seizure-related conditions, including those characteristic of epilepsy. The Kansas Health Institute (KHI) conducted a Health Impact Assessment (HIA) to examine how the legalization of medical marijuana might positively or negatively affect the health of Kansas residents.

An HIA is a practical tool that assesses the health impacts of policies, strategies and initiatives in sectors that aren't commonly thought of in relation to health—such as transportation, housing and the environment. The overall goal of an HIA is to inform policymakers of the potential health effects of a proposed policy during the decision-making process. The HIA provides evidence-based findings about health impacts and also identifies recommendations to maximize health benefits and mitigate health risks.

In order to assess the potential health effects of legalizing medical marijuana in Kansas, the HIA Team reviewed existing literature, analyzed state and national data and gathered stakeholder input from multiple groups, such as individuals with debilitating medical conditions, representatives of prevention organizations, school officials, academic researchers and public health professionals.

Research Questions

The assessment of health effects was guided by several research questions related to medical marijuana, including:

How will the legalization of medical marijuana affect the following factors? How will changes in these factors affect health?

- Access to marijuana
- Consumption of marijuana
- Crime
- Driving under the influence of marijuana
- Accidental ingestion of marijuana
- Vulnerable populations
- *State and local tax revenue*
- *Employment*

The review of existing literature revealed limited evidence related to the impacts of medical marijuana on jobs and state and local tax revenue. As a result, the HIA Team excluded *the last two factors from further assessment*, but included stakeholder perspectives on economic impacts of the legislation in order to highlight the importance of the issues to community members. However, the HIA report does not include any findings, recommendations or projections on state and local tax revenue or employment.

The HIA assessment primarily focused on the research questions related to marijuana consumption, crime, driving under the influence, accidental ingestion and vulnerable populations. Throughout the report, special attention was given to populations that could be disproportionately affected by this policy, including at-risk youth.

Summary of Findings and Recommendations

The analysis presented in this HIA suggested that there might be little to no impact on marijuana consumption among the general population or on property and violent crime rates. However, some increase in marijuana consumption might occur for at-risk youth. Analysis also identified that the legalization of medical marijuana may result in some increase in driving under the influence and accidental ingestion of marijuana by children. Increased access to medical marijuana may lead to some decrease in the use of other substances.

Findings

Access to Marijuana: The legalization of medical marijuana may result in increased access to marijuana for certain groups. Access will likely increase for individuals with qualifying medical conditions. Additionally, while literature points to the possibility that medical marijuana may be sold or given to youth and adults who are not authorized to use it, the extent to which this occurs may depend on regulation and law enforcement practices.

Consumption of Marijuana: The legalization of medical marijuana may result in little to no impact on consumption of marijuana among the general population in Kansas. However, some increase in marijuana consumption might occur for at-risk youth. It is important to note that changes in youth consumption would also depend on regulations and other state-level factors, such as cultural norms and law enforcement practices. Additionally, findings from the literature review suggest that the medical marijuana distribution model (e.g., self-grow, dispensaries) could impact consumption of marijuana.

Crime: The legalization of medical marijuana may have no impact on violent and property crime rates. However, areas that are located in close proximity to dispensaries might experience increases in crime. This could be in part due to dispensaries being more likely to open in areas with higher crime. The data analysis found that in all but one of the states studied (Colorado), rates of violent and property crimes remained unchanged or decreased after medical marijuana was legalized. It is important to note that decreases in property and violent crimes might be attributed to other factors (e.g., economic conditions).

Driving Under the Influence of Marijuana: The legalization of medical marijuana may result in an increase in driving under the influence of marijuana and related traffic accidents. Studies consistently show that marijuana use could impair driving. Literature that examined whether legalization of medical marijuana would increase or decrease driving under the influence and/or traffic accidents showed mixed results. However, studies leaned toward an increase, particularly in states with dispensaries. Nationally, the rate of marijuana-related traffic fatalities has increased over time both in states with medical marijuana laws and in those without such laws. In more than half of the states studied (7 out of 13), the increase was significant post-legalization. However, some literature suggests that the legalization of medical marijuana may prompt law enforcement to test for marijuana in crash victims more frequently.

Accidental Ingestion of Marijuana: The literature suggests that accidental exposure to marijuana could increase. Specifically, children could be at increased risk of accidental ingestion. States with medical marijuana laws experienced slight increases in accidental exposures among children, prompting Colorado to establish child-proof packaging for marijuana. Observed increases could be due to several factors; for instance, individuals may be more likely to seek treatment for accidental ingestion and health care providers may be more likely to test patients for cannabinoids. Literature findings for adults are mixed. Additionally, one study suggested that states with medical marijuana laws observed a decrease in deaths related to opioid painkillers.

Recommendations

To maximize the potential positive health effects and mitigate the potential negative health effects associated with the legalization of medical marijuana in Kansas, the HIA Team, with input from Kansas stakeholders, developed a set of recommendations to inform the decision-making process.

Key recommendations are listed below. The asterisk (*) indicates the recommendations that were identified as high priority by the stakeholders in terms of their feasibility, responsiveness to predicted impacts, and whether they addressed vulnerable populations.

Youth Prevention

Kansas Department of Health and Environment could consider:

- Encouraging parents and caregivers to hold regular discussions with their children about risks associated with marijuana use.
- Discouraging adults from using marijuana in the presence of children because of the influence of role modeling by adults on child and adolescent behavior.*

Provider Accountability

Kansas Department of Health and Environment could consider:

- Identifying evidence-based practices that keep health care providers accountable to the types of prescriptions/recommendations they make for medical marijuana such as Kansas Tracking and Reporting of Controlled Substances (K-TRACS).*

Monitoring and Surveillance

Kansas Department of Health and Environment could consider:

- Adding questions in the state-added module of Behavioral Risk Factor Surveillance System (BRFSS) related to marijuana use, including:
  - Medical marijuana use and marijuana use in general,
  - Source of marijuana,
  - Concurrent use of marijuana with other substances such as alcohol, and
  - Whether youth are using someone else's medical marijuana.
- Monitoring adult and youth marijuana addiction treatment rates.

Regulation

Kansas Department of Health and Environment could consider:

- Enacting regulations for child-proof packaging in order to prevent accidental ingestion of marijuana.*
- Limiting the number of types of edibles, and require those that are allowed be less attractive to kids and youth (e.g., they should not be made to look like candy).

The full list of findings and recommendations is available in *Appendix C*, page 54.

The following table summarizes potential health impacts associated with legalizing medical marijuana in Kansas for each of the areas studied (*Figure 1*, page 5). See *Figure 2*, page 6, for the legend that corresponds to *Figure 1*.

Figure 1. **Summary of Health Impacts of Legalizing Medical Marijuana in Kansas**

				Based on Literature and Data					Literature
Health Factor or Outcome	Literature Review	Data Analysis	Stakeholder Perspectives	Overall Projection	Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Access to Marijuana	Increase	N/A	Increase	Increase	Uncertain	Medium	Possible	At-risk youth, people with qualifying medical conditions	***
Consumption of Marijuana (illegal) (general population)	Mixed	None	N/A	None	None	N/A	Uncertain	N/A	**
Consumption of Marijuana (illegal) (youth)	Mixed	None	N/A	Mixed	Negative	Low	Likely	At-risk youth (those in substance abuse treatment, individuals already using drugs)	****
Consumption of Marijuana (legal)	N/A	Increase	Increase	Increase	Uncertain	Low	Likely	People with approved qualifying conditions	**
Violent Crime	Mixed	None	Mixed	None	None	N/A	Possible	N/A	**
Property Crime	Mixed	None	Mixed	None	None	N/A	Possible	N/A	**
Driving Under the Influence of Marijuana	Increase	Increase	Increase	Increase	Negative	Low	Likely	People who use marijuana and drive, passengers	***
Accidental Ingestion	Increase	Increase	Increase	Increase	Negative	Low	Possible	Children under 5 years old	****
Other Substance Use	Decrease	N/A	Mixed	Decrease	Uncertain	Low	Possible	Substance users and people who use prescription drugs	**

Source: KHI Medical Marijuana HIA Project, 2015. Legend: Figure 2, page 6.

Figure 2. **Legend: Health Impacts for Kansas**

CRITERIA	DESCRIPTION
Literature Review	Increase — Literature review found that this indicator might increase. Decrease — Literature review found that this indicator might decrease. Mixed — Literature lacked consensus about this indicator's potential direction. None — Literature review didn't find a change for this indicator. N/A — Literature was not available or a review was not performed on this indicator.
Data Analysis	Increase — Data analysis found that this indicator might increase. Decrease — Data analysis found that this indicator might decrease. Mixed — Data analysis lacked consensus about this indicator's potential direction. None — Data analysis didn't find a change for this indicator. N/A — Data were not available or analysis was not performed for this indicator.
Stakeholder Perspectives	Increase — Stakeholders anticipated that this indicator might increase. Decrease — Stakeholders anticipated that this indicator might decrease. Mixed — Stakeholders were divided in their opinions for this indicator. None — Stakeholders didn't anticipate a change for this indicator. N/A — Stakeholders didn't express an opinion regarding this indicator.
Overall Projection	Increase — The assessment found that this indicator might increase. Decrease — The assessment found that this indicator might decrease. Mixed — The assessment lacked consensus about this indicator's potential direction. None — The assessment didn't find a change for this indicator. N/A — The assessment wasn't performed for this indicator.
Expected Health Effect	Positive — Changes may improve health. Negative — Changes may impair health. Uncertain — Unknown how health might be affected. Mixed — Changes may be positive as well as negative. None — No identified effect on health.
Magnitude of Impact (number of people affected)	High — Affects most or all people in Kansas. Medium — Affects a moderate number of people, such as a segment of the population (e.g., youth). Low — Affects few or very few people, such as people with certain medical conditions. It is important to note, that although only some groups of people might be affected, the impact on a particular individual might be high. None — Affects no people. N/A — It was not possible to estimate the magnitude of impact.
Likelihood of Impact	Likely — It is likely that impacts might occur as a result of the proposed changes. Possible — It is possible that impacts might occur as a result of the proposed changes. Unlikely — It is unlikely that impacts might occur as a result of the proposed changes. Uncertain — It is uncertain whether impacts would occur as a result of the proposed changes.
Distribution	People most likely to be affected by changes in the indicator.
Quality of Evidence (based on literature review)	*** — Strong literature and/or data. ** — Sufficient literature and/or data. * — Lacks either quality literature and/or data.

Source: KHI Medical Marijuana HIA Project, 2015.

National Perspective

Nationwide, there has been increasing interest in legalizing marijuana for medicinal purposes. As of March 2015, 23 states and the District of Columbia had passed laws allowing the use of medical marijuana (i.e., marijuana use is allowed for a variety of conditions and can be smoked or made into edible products for use by medical marijuana cardholders). An additional 12 states passed more restrictive legislation in 2014 and 2015. These states restrict the types of conditions for which medical marijuana can be used (usually epilepsy or other seizure disorders), as well as the type of product that can be consumed (most allow cannabis oil only and no plant material), and place limits on the amount of THC* that can be present. Several also specify minimum levels of CBD.**

Kansas Legislation

Three bills related to medical marijuana were introduced during the 2015 Kansas legislative session. There were two companion bills: Senate Bill 9 and House Bill 2011, and another bill that was more restrictive in nature: House Bill 2282.

Senate Bill 9 and House Bill 2011 proposed to legalize marijuana for use by individuals with one of several specified medical conditions including cancer, glaucoma, hepatitis C and Crohn's disease, among others. Qualifying individuals would be required to receive documentation from a physician that marijuana would provide them with a medical benefit and they would have to register with the state for a medical marijuana card. Medical marijuana cardholders would not be allowed to smoke marijuana in public places or on public transportation, operate any motor vehicle while under the influence of marijuana, or possess marijuana on any school property. Individuals with a medical marijuana card would be allowed to either grow their own marijuana at home (up to 12 plants and six ounces of usable marijuana) or to purchase marijuana from a dispensary (six ounces per month).

Dispensaries would also be required to apply and register with the state. Both dispensaries and individuals registering for a medical marijuana card would be required to pay registration fees, and individuals purchasing medical marijuana at dispensaries would be required to pay the state's drug tax. The Kansas Department of Health and Environment (KDHE) would be given the authority to regulate medical marijuana cardholders, dispensaries and dispensary staff members. Marijuana would remain illegal for any consumption other than medical consumption by individuals with a medical marijuana card.

House Bill 2282 was different in that it proposed marijuana use legalization only for individuals with "a condition causing seizures, including those characteristic of epilepsy." This bill specifies that three percent is the maximum amount of THC* allowed in medical marijuana preparations and allows 'marijuana preparations' to include cannabis extract and/or plant material. As with the other two bills, individuals would be required to receive documentation from a physician that marijuana would provide a medical benefit and would register with the state to receive a medical marijuana card.

Main Compounds in Marijuana

*THC: delta-9-tetrahydrocannabinol, delta-9-THC. THC is the main psychoactive ingredient in marijuana and is the most responsible for intoxication.

**CBD: cannabidiol. CBD is not psychoactive and may even have antipsychotic properties. Research suggests that marijuana with a higher ratio of CBD to THC may have fewer negative side effects than high-THC, low-CBD strains.[1]

Medical Efficacy

Some evidence suggests that medical marijuana may have potential as therapy. However, the level of evidence varies for each condition from moderate to inconclusive or still emerging. In order to understand the efficacy of medical marijuana, some national groups, such as the American Pediatric Association,[2] have expressed support for further research related to the development of treatments derived from marijuana.

What We Learned From Literature

Figure 3 below represents a non-systematic review of literature for the conditions that are approved for use of medical marijuana in Kansas House Bill 2011/Senate Bill 9 and House Bill 2282.

The number of studies for each condition listed below is limited. Evidence is promising for some of the conditions, but is inconclusive or nonexistent for others. Without additonal research it is not possible to determine whether marijuana might or might not be useful in treating people with these conditions.

In addition to the conditions above, evidence suggests that marijuana may be useful in treating multiple sclerosis[28 29 30] and fibromyalgia,[31 32] but again, these findings are based on a small number of studies and more research is needed to determine its efficacy.

Figure 3. **HB 2011, SB 9 and HB 2282: Qualifying Conditions and Number of Studies Regarding Medical Efficacy Identified and Reviewed for Each**

CONDITION	NUMBER OF STUDIES	NUMBER OF STATES WHERE CONDITION IS APPROVED IN MEDICAL MARIJUANA LAW
Epilepsy and other disorders characterized by seizures	6[3 4 5 6 7]	20
Cancer, including chemotherapy-induced nausea and vomiting (CINV)	5[8 9 10 11 12]	23
Chronic and severe pain; Neuropathy	4[13 14 15 16]	17
Cachexia	3[17 18 19]	20
HIV/AIDS	2[20 21]	21
Crohn's disease	2[22 23]	13
Glaucoma	1[24]	19
Amyotrophic Lateral Sclerosis (ALS)	1[25]	10
Hepatitis C	1[26]	9
Alzheimer's disease	1[27]	6
Severe nausea	0	21
Nail patella	0	0

Source: KHI Medical Marijuana HIA Project, 2015 and Public Health Law Atlas, 2015.

Medical Risks Related to Marijuana Use

Recently, the Colorado Department of Public Health and Environment conducted a comprehensive literature review of the potential risks related to marijuana use.[33] Several topics were examined, including:

- Marijuana use during pregnancy and breastfeeding,
- Marijuana use among adolescents and young adults,
- Marijuana use and neurological, cognitive and mental health, and
- Marijuana use and respiratory effects.

Literature suggests that multiple negative cognitive, neurological and mental health impacts may be associated with smoking marijuana. However, these impacts may depend on multiple factors, such as the level and length of exposure to and potency of marijuana and individual use history.

For youth, substantial evidence suggests that marijuana use corresponds with other illicit drug use and addiction in later life, as well as psychotic symptoms and disorders such as schizophrenia. However, it is unclear whether marijuana use causes these symptoms and disorders to occur or if other factors contribute to both marijuana use and symptom/disorder development. Additionally, there is a moderate amount of evidence that marijuana may impair academic performance for up to 28 days following use. Furthermore, some evidence suggests that graduation rates may be lower among marijuana-using youth.

For adults, there is substantial evidence of impaired memory for at least seven days after use, as well as acute psychotic symptoms during intoxication.[34] Marijuana intoxication is generally defined as physiological and psychological symptoms following the smoking of marijuana, including euphoria, preoccupation with auditory and visual stimuli, and apathy. A moderate amount of evidence also suggests that regular marijuana users have an increased risk of depressive symptoms or a depression diagnosis when compared to non-users.[35]

Additionally, substantial evidence suggests that smoking marijuana could negatively affect respiratory health and is associated with an increase in chronic bronchitis, chronic cough, wheezing and pre-cancerous lesions in airways. Though there is mixed evidence as to whether marijuana use is associated with lung cancer, marijuana has been shown to contain many of the same carcinogens as tobacco smoke. Additionally, there is moderate evidence that indicates heavy marijuana use increases airflow obstruction in the lungs.[36]

There is moderate evidence that marijuana use during pregnancy and breastfeeding correlates with decreased IQ scores, attention problems, cognitive function, and impaired growth in offspring. Some of these effects may not appear until adolescence.[37]

Typical Medical Marijuana User Profile

Studies of legal medical marijuana patients suggest that the majority of medical marijuana users are young to middle-aged, white, employed males who have completed high school and have health insurance.[38 39 40 41 42 43 44 45 46 47] The majority of marijuana-approved patients also used medical marijuana for pain relief (38 to 87 percent)[48 49 50 51] and to replace another prescription drug (51 percent to 74 percent).[52 53 54 55] Data further suggest that a majority of medical marijuana users had used marijuana at some time in their past before receiving a prescription/recommendation for it (59 percent to 90 percent),[56 57] which may reflect that individuals who used the drug in the past feel more comfortable with it and more often seek it out when they have marijuana-approved symptoms when compared to individuals who have never used the drug.[58] In addition, a majority of medical marijuana patients appeared to use marijuana daily (67 percent to 90 percent).[59 60 61 62] Female user profiles appeared to be somewhat different from males, and more research on female medical marijuana users is warranted.[63 64 65]

Kansas Demographics

According to the U.S. Census Bureau, Kansas had nearly three million residents in 2013.[66] More than 77 percent of the population identified as white, non-Hispanic. Hispanics were the largest minority with about 11 percent of Kansans identifying as Hispanic or Latino, followed by approximately six percent identifying as African American. Slightly less than 90 percent of Kansas adults age 25 and older had at least a high school degree, and roughly 30 percent had at least a bachelor's degree. Kansas performed slightly better than the nation in these measures, as the national averages for the same year were 86 and 29 percent respectively. Fourteen percent of the Kansas population lived in poverty compared to approximately 15 percent nationwide. In 2013, the median annual household income in Kansas was $51,332, slightly lower than the national median of $53,046.[67]

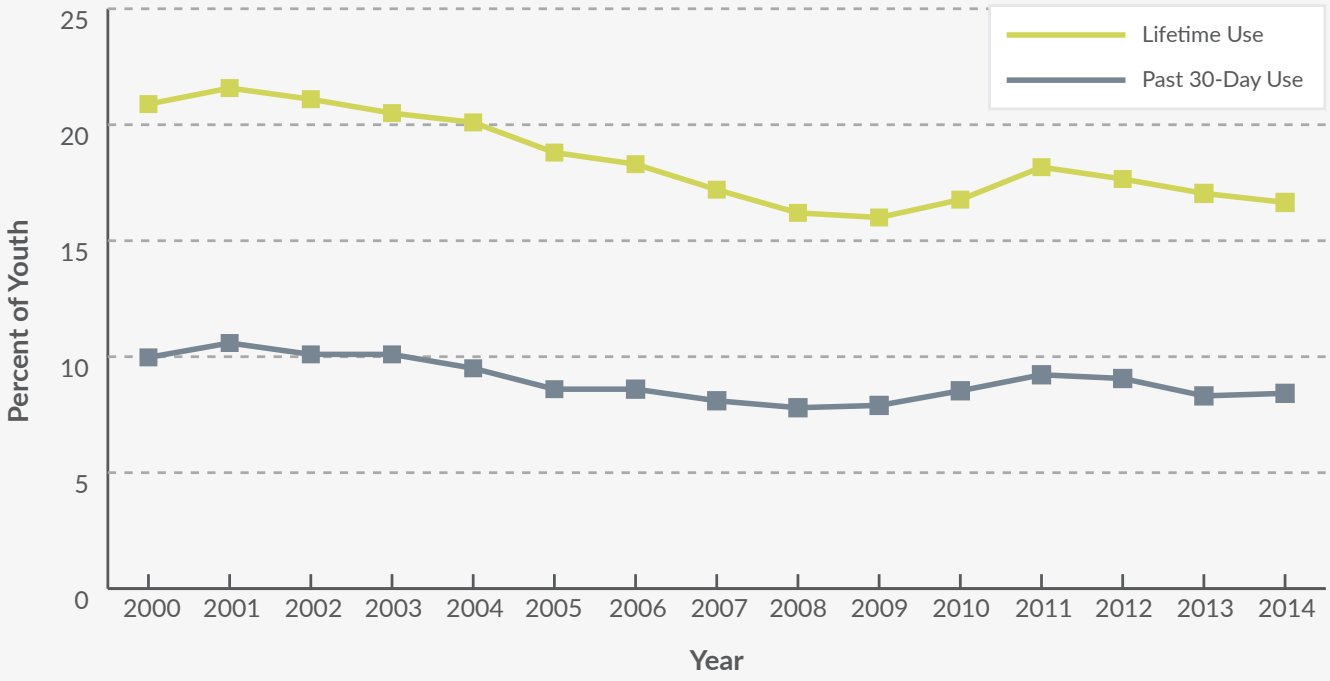
Of Kansas' 105 counties, over half are designated as rural or frontier and only 16 have urban or semi-urban status. As of 2013, three industries in Kansas with the highest number of employees were 1) Educational services, health care and social assistance, 2) Manufacturing, and 3) Retail trade.[68]

Currently, Kansas ranks near the middle of the country (27th) in terms of overall health, according to the 2014 America's Health Rankings, presented by the United Health Foundation. Additionally, the state ranks ninth in drug-related mortality, 18th in binge drinking and 31st in smoking.[69]

Marijuana Use in Kansas

According to recent estimates, approximately 17 percent of Kansas middle and high school-aged youth reported having ever used marijuana, while nine percent report having used marijuana in the past 30 days.[70] In the past 15 years, these rates have declined, with lows in 2009 and slightly higher rates since (*Figure 4*). Additionally, 40 percent of Kansas adults (individuals age 18 or older) reported having tried marijuana at least once in their lifetime.[71]

Figure 4. **Marijuana Use Among Kansas Youth, 2000–2014**



Source: KHI analysis of data from the Communities That Care Survey, 2000–2014.

The HIA Process

The National Research Council[72] defines the HIA process in six main steps:

1. **Screening:** Identify upcoming policy decisions and determine the HIA purpose and value.
2. **Scoping:** Identify potential health indicators and research methods.
3. **Assessment:** Analyze identified potential health impacts.
4. **Recommendations:** Determine options to mitigate identified potential negative health impacts and maximize identified potential positive health impacts.
5. **Reporting:** Share findings with stakeholders, including decision-makers.
6. **Monitoring and Evaluation:** Monitor/evaluate actual future health impacts resulting from policy changes, and assess HIA process, results, and lessons learned.

To date, the KHI Medical Marijuana HIA Project has included the first five steps. A monitoring plan has also been prepared, but implementation will depend on availability of future resources. Due to time and resource constraints, a formal evaluation of the HIA process and outcomes was not completed for this project.

Step 1 — Screening

Screening determines whether an HIA is feasible, timely, and would add value to the decision-making process.

In 2014, the Kansas Health Institute (KHI) received a legislative request to inform the discussion surrounding medical marijuana in Kansas. KHI conducted an environmental scan, media coverage analysis and conversations with stakeholders and decision-makers to determine whether the policy could benefit from an HIA. Additionally, KHI explored whether adequate time and resources were available to complete the study. The proposed policy was selected as an HIA project due to the opportunity to inform the decision-making process for the legislation, the number, variety, and size of potential health impacts, and its relevance to the community and stakeholders.

The KHI Medical Marijuana HIA Project aimed to broaden the scope of the policy discussion to include health considerations. In past years when legislation was introduced, the topic received attention from potential medical marijuana patients, advocates and opponents but did not receive a hearing. Arguments for legalizing medical marijuana included the potential for using it as a treatment for certain medical conditions. Arguments against the legislation included concerns that medical marijuana could illegally be diverted to youth or other individuals not authorized to use it. Because there may be health impacts both for those using medical marijuana legally and those who might gain illegal access to it, the policy was determined to be appropriate for an HIA. Because HIAs are meant to focus on population health topics rather than individual medicine, the HIA Team focused on assessing the potential positive and negative population-level effects of the proposed legislation.

Step 2 — Scoping

Scoping determines what issues are going to be studied, which populations will be included in the study, and the methods that will be used to conduct the HIA.

The potential areas of focus (health factors and outcomes) were identified in collaboration with key stakeholders including policymakers, public health officials, education officials, prevention organizations, mental health organizations and law enforcement.

At the beginning of the scoping process, the HIA Team developed and disseminated a scoping survey to assist in determining key areas for the HIA assessment and in identifying and recruiting stakeholders for key-informant interviews. The survey questions asked respondents to provide their perspectives on the potential general and health impacts of medical marijuana legalization.

The HIA Team used the survey results to prioritize key issues and inform the final scope of the study. Although the survey results might not have been representative of all sectors that may be impacted by legalizing medical marijuana in Kansas, they provided useful information and helped the HIA Team to identify the major issues surrounding the proposed legislation. A copy of the scoping survey questions is located in *Appendix F*, page 64, of the report.

Based on the results of the survey and preliminary research, the HIA Team identified several issues for further research, including the effects of medical marijuana legislation on state and local taxes, employment, marijuana consumption, crime, accidental ingestion and driving under the influence of marijuana.

Step 3 — Assessment

The assessment step includes analysis of potential health impacts.

This study used multiple methods—including a review of relevant literature, interviews with stakeholders and secondary data analysis—to identify and estimate potential health impacts of the proposed medical marijuana legislation. Secondary data analysis was based on data provided by federal, state and local agencies including crime reporting, self-reported marijuana consumption, and drug-involved driving, among others.

Literature Review

KHI completed a systematic literature review. In September 2014, a KHI researcher searched PubMed, PsychINFO, and Google Scholar, limiting results to journal articles, dissertation and masters theses, and research reports. Additional inclusion and exclusion criteria are discussed in *Appendix G*, page 71, and were used to review the titles and abstracts of 1,249 total hits. Abstract and title review left 69 papers, which were entered into NVivo qualitative data analysis software to read and ascertain their relevance to research topics. In addition, each article was deductively coded to identify the population studied, study location, period when data were collected, data sources, study design, limitations, results, and policy recommendations. Full review left 43 papers, 30 from Google Scholar, nine from PubMed, and four from PsychINFO. An additional 31 articles were identified through the references of included papers or as having cited an included paper.

The study findings were then explored and sorted into the following content areas: increased availability of marijuana, property and violent crime, driving under the influence, possession and selling, other substance use, accidental ingestion and overdose, and adult and adolescent consumption. Each content area was sorted into themes.

With the exception of those that used qualitative data or were reviews of previously published literature, articles included in the review were scored based on whether they were published in peer-reviewed journals, their funding source, and analytic methods using 12 criteria developed by the HIA Team *Appendix G*, page 71. Scores allocated documents into three categories based on their overall quality (low, medium, and high), such as rigor of methods and alignment of findings with the HIA research questions.

The HIA Team determined the weight of the evidence for each HIA topic using a system that awarded a star for each of the following criteria: 1) five or more articles of any quality, 2) 10 or more articles of any quality, 3) 50 percent or more articles with medium or better quality, 4) 75 percent or more articles with medium or better quality, and 5) 50 percent or more of articles of high quality. A total of five stars were possible if a topic met each of the listed criteria. Using a sixth criteria, a star could be removed if less than 75 percent of articles lacked the same result (findings were inconsistent). Following synthesis, eliminated articles were reconsidered, adding five additional articles to the review. Colleagues that were familiar with the project also referred two articles, making the total number of included articles 76. For detailed information about the literature search protocol, see *Appendix G*, page 71.

Data Analysis

In order to examine the identified health impacts of legalized medical marijuana, the HIA Team examined pre- and post-legalization data for states that passed medical marijuana legislation to explore potential changes in those states. Several factors were taken into consideration when determining states to include in the analysis. The development of criteria was informed by the literature review, the model for dispensing marijuana proposed in the Kansas legislation and whether the state was somewhat similar to Kansas. The selected states (between five and 14 depending on the type of analysis and data availability) had to meet two or more of the criteria listed below.

- Medical marijuana law was effective prior to 2010.
- Recreational marijuana was not legal during the studied timeframe (five years before and after legalization). The timeframe was unique to each state and dependent upon when each legalized medical marijuana.
- The state's medical marijuana law allowed both dispensaries and self-growing.
- The state's population size was below nine million people.

Trends and other relevant data were presented for the nation as a whole, where applicable.

Additionally, when Kansas county-level survey data were available, they were analyzed to determine the association between marijuana consumption and related factors (e.g., drug-related traffic accidents). Some analysis and related figures do not include all Kansas counties due to a lack of available data. For details, see *Appendix H*, page 75.

Key to estimating potential health impacts of each issue was the projection of changes in marijuana consumption for the general population and for youth. A statistically significant difference (at the 0.05 level) in consumption before and after medical marijuana legalization for a majority of the states analyzed was used as the threshold for projecting a change in consumption. The projected changes in marijuana consumption served as the basis for many of the subsequent health estimates.

Additionally, the HIA Team created maps to identify counties that might be particularly vulnerable to the negative impacts of increased marijuana consumption. The maps were created using ArcGIS 10.2 mapping software and are based on data from the Kansas Communities That Care Survey, the U.S. Census Bureau, the Substance Abuse and Mental Health Services Administration (SAMHSA), and the Federal Bureau of Investigation. These maps highlight the counties where prevention efforts could be targeted to help mitigate potential negative health impacts of medical marijuana legalization.

Key-Informant Interviews

In order to provide a deeper understanding of issues surrounding the legalization of medical marijuana in Kansas, the HIA Team conducted key- informant interviews with selected stakeholders in Kansas and in one of the states (Colorado) that has legalized medical marijuana. The interviews provided additional context and background surrounding the policy topic but literature review and data were used to develop the HIA findings.

The HIA Team identified potential interviewees by researching public comments, organizations that may have been knowledgeable or impacted by this issue and through results from the scoping survey. Selected individuals were contacted and interviews requested. Additionally, the HIA Team used respondent-driven sampling technique, whereby KHI requested interviewees suggest other knowledgeable individuals to interview. KHI also allowed the HIA research team's contact information to be posted to a medical marijuana legalization social media site with information about the study and requests for interviews.

A total of 12 interviews were conducted with 17 stakeholders in Kansas, seven opponents and five proponents of legalizing medical marijuana in Kansas. The HIA Team divided interviews

between opponents and proponents to ensure adequate representation for each side of this issue. In addition, interviews were divided among various sectors, including education (teachers, school administrators, academia and universities), law enforcement, health care providers and public health practitioners, youth organizations, individuals with medical conditions, and government and elected officials (e.g., legislators in relevant committees) to ensure a variety of perspectives were captured. One of the proponent interviews included six individuals, but responses were summarized into a single interview record.

Two additional interviews were conducted with experts and stakeholders in Colorado. These interview participants had knowledge of and experience with medical marijuana legalization impacts in their state and were selected based on their involvement in research related to and the management of the medical marijuana program.

Interviews were conducted via telephone and in person. Interviews were semi-structured, with a standard set of questions asked of each stakeholder (see *Appendix F*, page 64, for the key-informant questionnaire). In some cases, questions were modified slightly depending on applicability to the interviewee's organization and role, and unique follow-up questions were sometimes asked to provide clarity to responses or for additional information. Interviews were voluntary and confidential. Interviewees were allowed to skip questions or sections of the interview. The interviews took on average one hour to complete, but the length was dependent upon the extent of the answers given by each interviewee.

Once complete, interviews were analyzed using NVivo qualitative analysis software. To analyze the information, the HIA Team used inductive coding to identify common themes in interview responses. Interviewees provided perspectives on areas studied in the HIA including access to and consumption of marijuana, driving under the influence of marijuana, accidental ingestion, illegal selling and possession of drugs, certain types of crime and use of substances other than marijuana. Interviewees also provided comments on how legalizing medical marijuana might impact state and local revenue and provided suggestions for policymakers to consider as they debate this issue. Interviewees provided their perspectives on the general issue of the medical marijuana legalization and not on the specific bills.

Step 4 — Recommendations

Recommendations are a way to suggest action that can enhance positive health effects and mitigate potential negative health effects related to the proposed policy.

The recommendations were selected and prioritized based on the following criteria:

- **Responsive to predicted impacts** — *To what extent does the recommendation align with the findings?*
- **Specific and actionable** — *Does the recommendation include specific steps, details and actionable measures?*
- **Feasible** — *How realistic is it to implement this recommendation?*
- **Evidence-based and effective** — *How much evidence is there to support this recommendation?*
- **Vulnerable populations** — *Does it address the needs of vulnerable populations?*

The recommendations were developed by the HIA Team to address findings and were based on evidence-based recommendations found in literature and national public health organizations such as the Centers for Disease Control and Prevention.

The final list includes 26 recommendations, five of which were identified by stakeholders as high priority (see *Appendix C*, page 54).

Step 5 — Reporting

Reporting includes the distribution of findings to decision-makers and others involved with the HIA.

The HIA results were summarized in this report, which is designed primarily for legislators and stakeholders in various sectors including health (e.g., Kansas Department of Health and Environment, local health departments, hospitals, clinical care providers), education (e.g., schools and universities), and substance abuse (e.g., youth prevention organizations, substance abuse treatment centers).

The report findings and recommendations will be shared in various ways (presentations, in-person discussions, on the KHI website, Kansas media outlets and printed materials) with members of the relevant legislative committees, attendees of the legislative hearings and participants of key-informant interviews.

Step 6 — Monitoring

The HIA Team developed a monitoring plan to measure the outcomes of the final decision and track its potential effects on health and/or the determinants of health (e.g., crime, etc.). The plan includes measures that could be tracked if the proposed legislation passes. Additionally, the plan suggests agencies that could monitor changes and suggest appropriate actions for state and local policymakers to take to mitigate potential negative health effects (see *Appendix I*, page 77).

Limitations

Literature

Limitations were divided into two categories: those that related to the literature search and those of identified studies. Those related to the search included search engine algorithms, which may have missed relevant articles. Researchers attempted to address this by searching multiple engines and using forward and backward searching.[73]

Additionally, after the initial search process, Cochrane Library, Psychiatry Online, and the Psychiatry and Behavioral Sciences Collection were explored with no additional articles found. In terms of search engines used, the algorithm used by Google Scholar is unknown,[74] making it difficult to understand why particular results were returned. Google Scholar is also known to have poor replicability so that a search query will return different results at different times.[75] Google Scholar also returns a large number of unrelated articles, its search tool lacks sophistication, and it does not return more than 1,000 hits. Even with these limitations, Google Scholar was selected because it is known to provide more results than other engines, often from higher ranked journals.[76] Searching Google Scholar is also considered acceptable for a systematic review as long as it is not the only database used.[77] [78] Another limitation to note is the potential for publication bias. Publication bias occurs because studies that result in limited or negative findings are less likely to be published in the peer-reviewed journals than studies with positive findings.[79] Gray literature (not peer-reviewed) was included to help offset this bias. Literature was also only analyzed by one researcher.[80]

Limitations also include those of identified studies. First, only a small number of articles were found for some topics, indicating little knowledge about these topics. In addition, replication studies are needed to confirm most studies' results. Data were often self-reported, cross-sectional, not generalizable to other populations, not able to establish causality, and not from representative samples.

Additionally, authors frequently acknowledged that it was likely there were unknown confounding variables not included in datasets. In terms of studies that examined large datasets for specific states with weighted variables, it is possible that results were driven by states with large populations. Finally, not all data from large datasets were available for every year analyzed.

Data

This study used population-level data to explore patterns and correlations between issues. Population-level observational studies (sometimes referred to as ecological studies) are useful for exploring patterns or generating hypotheses, but are limited in their ability to fully explore associations or prove causal relationships. Additionally, many of the measures (e.g., marijuana use, property and violent crime, and socio-economic measures) included in this analysis are likely to be influenced by many factors in addition to the presence or absence of medical marijuana legislation in Kansas.

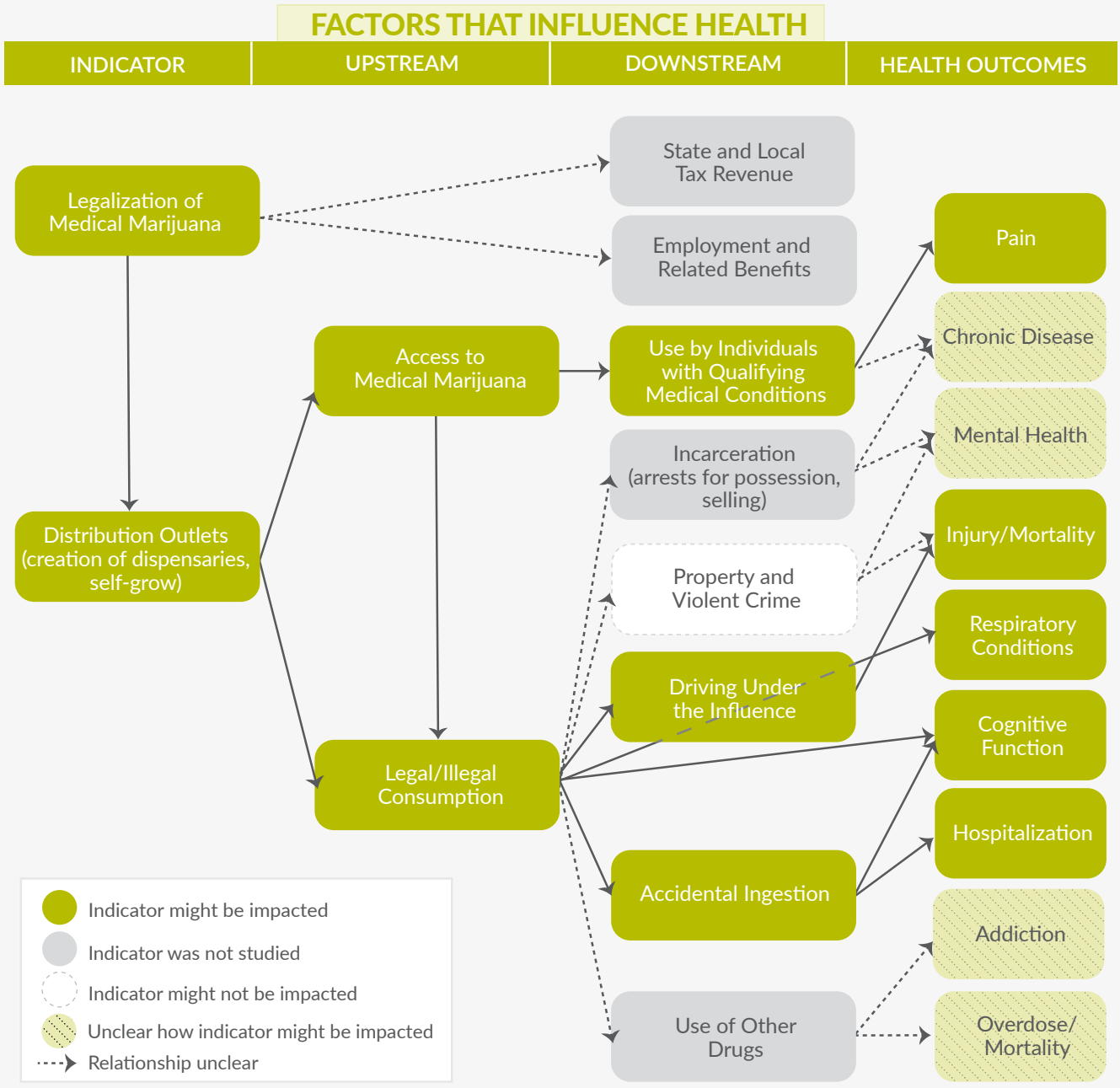
Comparison of these measures across states and examination of patterns of correlation between various indicators are useful in identification of possible relationships. However, it does not adequately control for other factors and cannot conclusively identify whether differences observed among states are caused by differences in medical marijuana legislation.

Stakeholders

Community engagement is a core component of an HIA. While this HIA offered key stakeholders (proponents, opponents and neutrals of the proposed legislation) an opportunity to participate in the assessment process, representatives of some key organizations declined, and their knowledge and perspectives are, therefore, absent in the analysis. Insights and experiences of individuals who might be directly affected by the medical marijuana legislation (i.e., those with qualifying medical conditions) were gathered through a small convenience sample using semi-structured interviews, but it is likely that some individuals in communities that may be affected have not been adequately represented in this process.

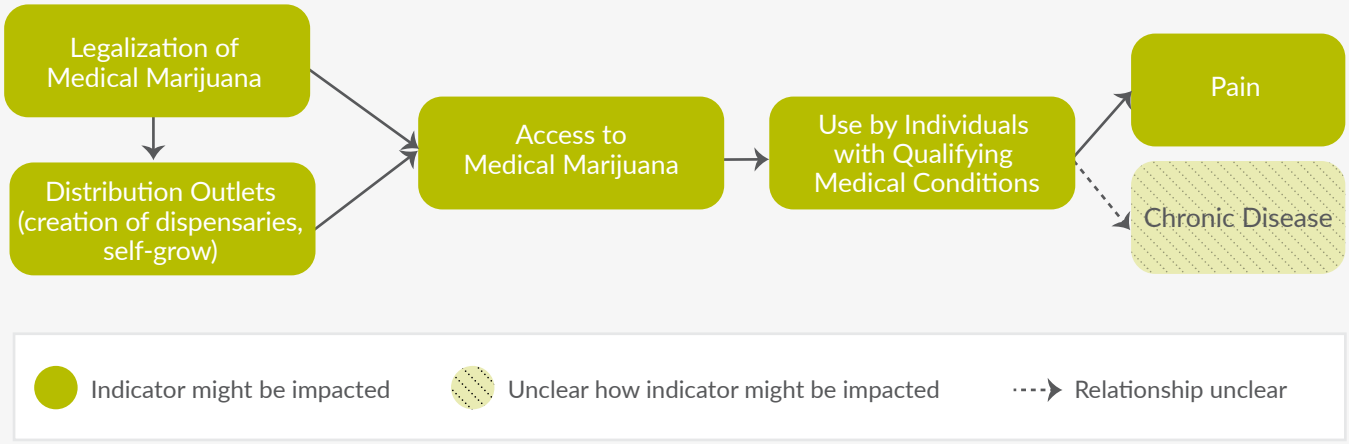
The HIA's pathway diagram provides the visual links between the proposed legislation and the potential resulting health effects. However, it is important to note that the legalization of medical marijuana could directly and indirectly impact several other areas beyond the ones described in the pathway diagram. Additionally, the diagram illustrates indicators, upstream and downstream impacts and health outcomes. An "indicator" is a direct change that may happen due to the legislation. These indicators may then lead to impacts that can be considered either more "upstream" or "downstream", depending on how directly they are linked to the ultimate health outcome. Upstream factors are likely to be further removed from health outcomes than downstream factors.

Figure 5. **Pathway Diagram: How Medical Marijuana Legalization May Affect Health**



Source: KHI Medical Marijuana HIA Project, 2015.

Figure 6. **How Changes in the Amount of Marijuana in the Community May Affect Access to Marijuana and Associated Health Impacts**



Source: KHI Medical Marijuana HIA Project, 2015.

FINDINGS

- Perception of easy access to marijuana is associated with consumption of marijuana among youth.
- Perception of easy access to marijuana is associated with poverty (percent of people below the federal poverty level), median household income and unemployment.
- Individuals (e.g., at-risk youth) without legal access to marijuana may obtain marijuana from people with legal access.
- In the states with medical marijuana laws, the average medical marijuana patient is a middle-aged white male (age 35 and older).
- Most medical marijuana prescriptions or recommendations are for chronic pain.

RECOMMENDATIONS

Kansas Department of Health and Environment could consider:

- Requiring dispensaries to limit advertising of services and products to the public.
- Conducting a media campaign to highlight the myths and realities of medical marijuana in Kansas.

Kansas Department of Health and Environment, in collaboration with Kansas law enforcement agencies, could consider:

- Requiring educational materials to be provided at dispensaries regarding the importance of not sharing medical marijuana.
- Ensuring that law enforcement prosecutes those that willingly share medical marijuana with unauthorized individuals.

What We Learned From Literature

Changes in access to or availability of marijuana can be measured in several ways. It is sometimes measured by price, with the assumption that lower prices increase availability. Price data for the illegal market come from sources such as priceofweed.com. For example, a cross-sectional study that compared marijuana prices in medical marijuana states to prices in states without medical marijuana found that the price of high quality (e.g., higher potency, more buds and fewer stems) marijuana was lower in medical marijuana states.[81] However, differences in price should be considered in context of other factors. Additionally, the potency of marijuana seized from the black market was higher in medical marijuana states than states without similar legislation.[82 83]

Another potential effect on changes in availability might occur through diversion, or the transmission of medical marijuana from those who possess it legally to non-authorized users. While specific information regarding rates of diversion were not found, data suggest that diversion is occurring to some degree among adults and adolescents.[84 85 86] Perceived availability of marijuana may be associated with increased access to marijuana. The perception of availability could be affected by dispensaries' marketing practices among other factors. One study examined medical marijuana dispensaries in California and found that a notable proportion (38 percent) marketed their products as if they were for recreational use.[87] This may suggest that dispensaries were trying to attract a larger customer base of non-authorized users. While a survey among members of the general public found attitudes about access to marijuana were not significantly different in California before and after legalization of medical marijuana and to the rest of the country,[88] child and adolescent psychologists thought access among adolescents had increased.[89] Additionally, the model for medical marijuana (i.e. self-grow or dispensaries) may have differential impacts on access to marijuana. See *Appendix E*, page 62 for more detail.

What We Learned From Data

In order to determine who would have legal access to medical marijuana in Kansas, the number of people with qualifying medical conditions were estimated under each proposed bill. About 65,000 people in Kansas were estimated to have one or more of the conditions and symptoms outlined in House Bill 2011/Senate Bill 9 and would then have legal access to medical marijuana if the bills were passed (see *Figure 7*).[90] Approximately 3,600 people have epilepsy or other seizure disorders, and would qualify for a medical marijuana card under House Bill 2282.

Figure 7. **Prevalence of Qualifying Conditions in Kansas, 2011–2012**

CONDITION/ SYMPTOM	NUMBER ELIGIBLE UNDER HOUSE BILL 2011/SENATE BILL 9	NUMBER ELIGIBLE UNDER HOUSE BILL 2282
CONDITIONS		
Epilepsy and seizure disorders	3,623	3,623
Cancer	14,268	–
HIV/AIDS	360	–
Crohn's disease	1,790	–
Glaucoma	23,403	–
Amyotrophic Lateral Sclerosis (ALS)	118	–
Hepatitis C	404	–
Alzheimer's disease	2,670	–
Nail patella	26	–
SYMPTOMS		
Severe nausea	15,297	–
Severe pain	3,239	–
Cachexia/wasting syndrome	45	–
TOTAL (% of KS population)	65,243 (2.24%)	3,623 (0.12%)

Note: Dash (–) indicates not applicable.

Source: KHI analysis of data from the Kansas Health Insurance Information System, 2012, and Kansas Department of Health and Environment, Kansas Information for Communities Database, 2011.

What We Learned From Stakeholders

The majority of interviewees, both proponents and opponents, believed illegal access to marijuana would increase if Kansas legalized medical marijuana, especially among youth. Some opponents stated that if medical marijuana were legal, the perception of the substance would be more favorable, and access would increase. Proponents cited more access as a positive development, stating that those with medical conditions would be able to legally obtain marijuana, and therefore experience positive impacts.

Interviewees were asked to provide some suggestions they would want policymakers to consider as the debate on legalizing medical marijuana continues. Some of these suggestions included:

- Examining the potential for fraud and abuse within the medical marijuana registration system
- Including penalties for distributing or sharing medical marijuana with a minor not authorized to use it.

> *"I would hope there would be some restrictions on accessing medical marijuana, but I don't know how well those would work."*
>
> *- Opponent*

Conclusion

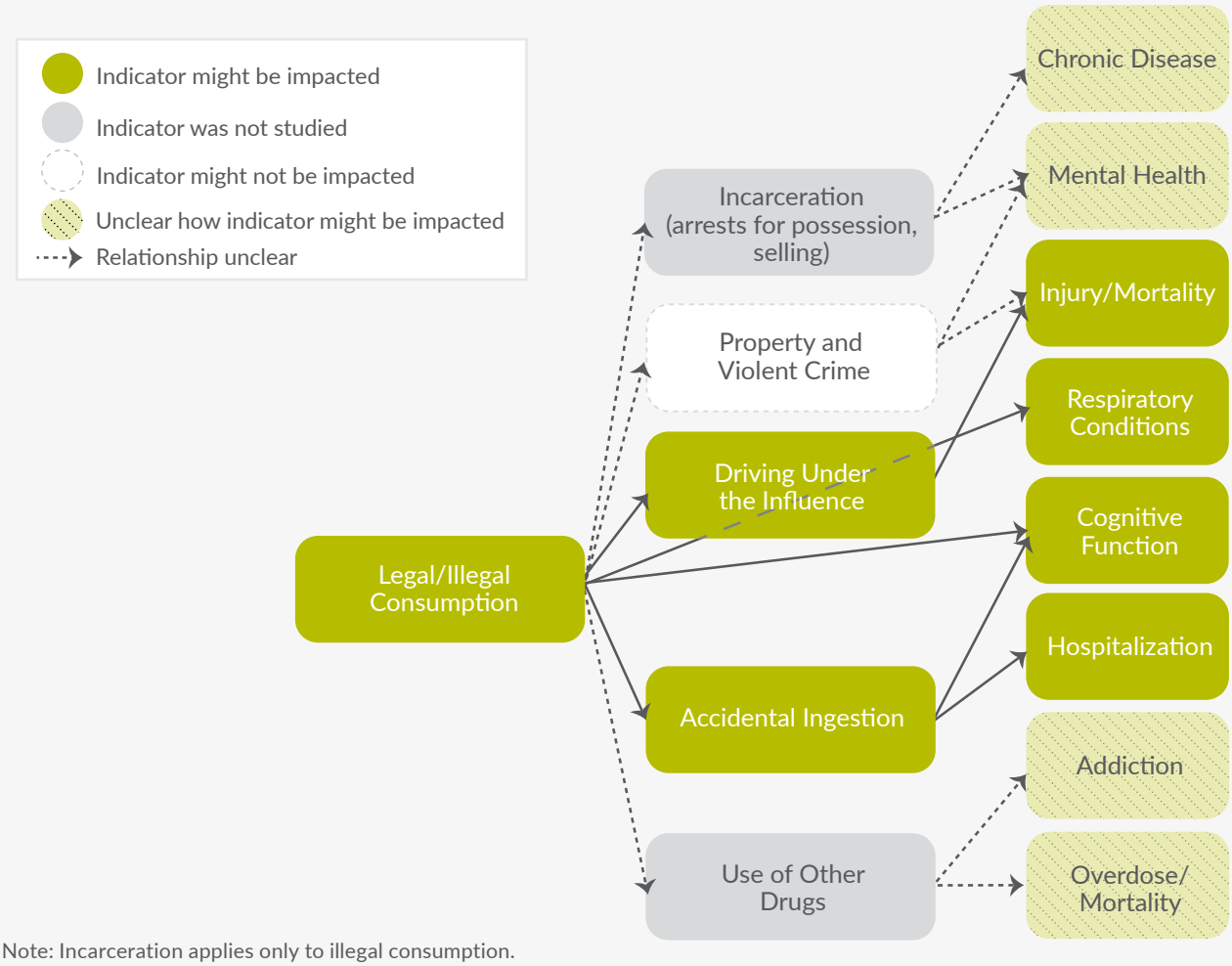
According to the literature review, changes in the price of marijuana can increase or decrease access. Some evidence suggests that prices for marijuana are lower in states that have legalized medical marijuana, which could lead to increased access. Additionally, literature points to the possibility that medical marijuana may be sold or given to youth and adults who are not authorized to use it, however, the extent to which this occurs may depend on regulation and law enforcement practices. Data and literature both indicate that access will likely increase for individuals with qualifying medical conditions. Based on data analysis, between 0.12 percent and 2.24 percent of the Kansas population would qualify for medical marijuana, depending on which conditions are approved under new law. In general, interviewees believed that legalization of medical marijuana would increase access to marijuana. Interviewees offered suggestions to decrease the negative consequences of increased access, including enacting penalties for distributing or sharing medical marijuana with a minor not authorized to use it. Based on literature review and data analysis, the legalization of medical marijuana may result in increased access to marijuana.

Figure 8. **Impact of Legalizing Medical Marijuana on Access to Marijuana and Associated Health Impacts**

				Based on Literature and Data					Literature
Health Factor or Outcome	Literature Review	Data Analysis	Stakeholder Perspectives	Overall Projection	Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Access to Marijuana	Increase	N/A	Increase	Increase	Uncertain	Medium	Possible	At-risk youth, people with qualifying medical conditions	***

Note: See Legend, *Appendix B*, page 53.
Source: KHI Medical Marijuana HIA Project, 2015.

Figure 9. **How Legalizing Medical Marijuana May Affect its Consumption and Associated Health Impacts**



Note: Incarceration applies only to illegal consumption.

Source: KHI Medical Marijuana HIA Project, 2015.

FINDINGS

- The legalization of medical marijuana may result in little to no impact on consumption of marijuana among the general population in Kansas.
- Some increase in marijuana consumption might occur for at-risk youth, but the level of change in youth consumption would depend on regulation and law enforcement practices.

RECOMMENDATIONS

Kansas Department of Health and Environment could consider:

Monitoring and surveillance

- Adding questions in the state-added module of the Behavioral Risk Factor Surveillance System related to marijuana use, including:
  - Medical marijuana use and marijuana use in general,

FINDINGS

- Individuals with qualifying medical conditions could become users of medical marijuana. However, the level of change in consumption would depend on regulation.
- Some medical marijuana patients who currently use substances such as alcohol and/or prescription painkillers may substitute them with marijuana. However, others may use marijuana in combination with other substances.

RECOMMENDATIONS

  - Source of marijuana,
  - Concurrent use of marijuana with other substances such as alcohol, and
  - Whether youth are using someone else's medical marijuana.
- Monitoring rates of participation in treatment programs.

Youth prevention

- Encouraging parents and caregivers to hold regular discussions with their children regarding risks associated with marijuana use.
- Discouraging adults from using marijuana in the presence of children because of the influence of role modeling by adults on child and adolescent behavior.

Provider accountability

- Identifying evidence-based practices that keep health care providers accountable to the types of prescription recommendations that they make (such as Kansas Tracking and Reporting of Controlled Substances (K-TRACS).

Kansas Legislature could consider:

- Revisiting the legislation regarding opt-in vs. opt-out for the Communities that Care (CTC) survey.

Kansas schools and universities, in collaboration with the Kansas Department of Health and Environment and local health departments, could consider:

- Identifying evidence-based educational programs to implement at schools and universities related to risks associated with marijuana use.

Kansas Department of Health and Environment and Kansas research institutions could consider:

- Researching the efficacy of medical marijuana for current and potential qualifying medical conditions.

Consumption of Marijuana and Health

Medical marijuana has been used to alleviate neuropathic pain,[91 92 93 94] nausea and vomiting associated with chemotherapy,[95 96 97 98 99] muscle spasms due to multiple sclerosis and weight loss in HIA/AIDS patients. It also has been used to treat conditions like epilepsy[100 101] and other seizure disorders,[102 103 104 105] cachexia,[106 107 108] Crohn's disease[109 110] and glaucoma,[111] among others. Some evidence suggests that medical marijuana may potentially be used as therapy for some conditions. However, the level of evidence varies for each condition, from moderate to inconclusive or still emerging.

Consumption of marijuana has also been associated with some potential negative health impacts.[112] The extent of the impacts depends upon the form and amount of marijuana ingested. For example, smoking marijuana could negatively affect respiratory health. In addition, negative consequences have been associated with marijuana use during pregnancy, while breastfeeding, among adolescents, and among young adults. Adolescent use of marijuana has been linked with poor academic performance and lower graduation rates.

What We Learned From Literature

Youth

Studies were not definitive on whether illegal youth consumption of marijuana would increase if medical marijuana became legal. While states with dispensaries appeared to have increased marijuana treatment admissions following medical marijuana legalization, patterns for other regulatory models were not as clear.[113 114] Additionally, when single-year data were analyzed, medical marijuana states appeared to have higher adolescent use rates than non-medical marijuana states,[115 116] but prevalence could relate to other underlying factors, such as cultures more accepting of marijuana use in these states. Finally, studies with small samples conducted in Colorado were strongly suggestive that medical marijuana was diverted to adolescents in that state,[117 118 119] particularly at-risk youth or adolescents in substance abuse treatment.[120 121] However, it is not clear whether this represents an increase in new users or an additional way for those who would already use marijuana to obtain it. Multiple studies found no significant increase in marijuana use among adolescents following legalization,[122 123 124 125 126 127] and two of those had findings that suggested a decline in adolescent use.[128 129] Another study found that the number of medical marijuana cardholders did not correlate with greater prevalence of adolescent marijuana use, but voter attitudes toward legalization did.[130]

Adults

Study findings were also inconsistent on whether legalizing medical marijuana would impact adult marijuana consumption. Studies that suggested a potential increase in adult consumption included two that examined data from the National Survey on Drug Use and Health. One focused on adults, and one on individuals age 12 and over (not differentiating adults from adolescents).[131 132] An additional study found that marijuana use and an associated need for treatment appeared to increase in states with medical marijuana dispensaries.[133 134] In 50 California cities, the number of dispensaries per roadway mile also positively correlated with marijuana use.[135] Marijuana use was found to be higher in some medical marijuana states when compared to other non-medical marijuana states.[136] However, it was unclear if this was because of medical marijuana laws or other underlying factors. Finally, two studies, one that examined treatment episode admissions and one that examined marijuana possession arrests, found increased admissions and arrests in states after medical marijuana was legalized.[137 138]

Studies that did not find evidence of an increase in adult consumption included a telephone survey comparing young adult (age 16 to 25) marijuana use in California before and after legalization and use in post-legalization California to ten other states without legalized medical marijuana.[139]

A significant increase in use was not identified. A study that compared urinalysis results from individuals either arrested (reason not disclosed) or seeking emergency room treatment (reason not disclosed) in cities in California, Colorado, Washington, and Oregon (before and after medical marijuana legalization) did not find an increase in use following legalization.[140] Finally, a study that examined treatment admissions data for young adults (age 18 to 20) did not find significantly increased admissions following medical marijuana legalization.

Discrepancies in findings among studies suggest unexamined factors may affect marijuana use rates. Recent literature suggests that the medical marijuana model implemented in a state (i.e. self-grow or dispensaries) may have differential impacts on consumption of marijuana. See *Appendix E*, page 62, for more details on medical marijuana models.

What We Learned From Data

No increase in youth consumption (as measured by lifetime or past-month marijuana use) or age of initiation was found for any of the states that have legalized marijuana, with the exception of Colorado, where a significant increase in youth past-month use was found. It should be noted that while medical marijuana has been legalized in the comparison states analyzed, the measures of consumption do not differentiate between legal and illegal consumption for youth or adults. Kansas county-level regression results show that youth's perception of easy access to marijuana is positively correlated with youth consumption. This may indicate the need to control perception of easy access through regulations on advertising the availability of marijuana and strong enforcement practices.

Two of five states (Colorado and Michigan) saw a statistically significant increase in adult consumption after medical marijuana was legalized (*Figure 12*, page 25).

Figure 10. **Marijuana Use Among Youth in States Before and After Medical Marijuana Legalization (MML), 1993–2013**

	YOUTH PAST-MONTH USE (PERCENT)		YOUTH LIFETIME USE (PERCENT)	
State	Pre-MML	Post-MML	Pre-MML	Post-MML
Arizona	22.8	23.2	43.7	43.05
Colorado	8.3	10.4*	–	–
Hawaii	22.4	18.3	41.75	34.90
Maine	29.4	23.0*	–	–
Michigan	23.2	19.2	42.56	34.66*
Montana	22.7	21.7	40.41	39.96
New Jersey	22.4	20.8	38.45	37.03
Nevada	24.1	20.1	44.82	42.16
Rhode Island	28.6	24.9	45.5	39.95*
Vermont	29.8	24.8	–	–

Note: *indicates statistically significant at p<0.05; MML= medical marijuana legalization; Years of data are based on the year each state legalized medical marijuana (e.g. Colorado legalized medical marijuana in 2000. Pre: 1995–1999 and Post: 2001–2005). For each state, five-year averages were calculated.

Source: KHI analysis of data from the Centers for Disease Control and Prevention (CDC) Youth Behavior Risk Survey, odd-year reports, 1993–2013.

Youth Marijuana Use

Ten states had data available for youth past-month use (*Figure 10*, page 24). Only Colorado saw a significant increase in youth past-month use after legalization, while one state, Maine, saw a significant decrease. Additionally, seven states had data available for youth lifetime use, and none saw increases in the mean use pre-and post-legalization. Maine and Rhode Island saw a significant decrease in youth lifetime use after legalization.

Age of Initiation

Data were available for eight states for the percent of youth who began smoking marijuana before the age of 13 (*Figure 11*). There were no states that experienced significant increases in early initiation (percent of youth who began smoking before the age of 13). Three states—Michigan, Rhode Island and Vermont—saw significant decreases after legalizing medical marijuana.

Adult Marijuana Use

Data were available for five states for adult marijuana use. Colorado and Michigan saw significant increases in adult marijuana use after the legalization of medical marijuana (*Figure 12*).

Figure 11. **Age of Initiation: Percent of Youth Who Began Smoking Before the Age of 13 in Medical Marijuana States, 1993–2013**

STATE	PRE-MML	POST-MML
Hawaii	13.5	11.2
Michigan*	10.9	6.9
Montana	9.9	9.3
New Jersey	6.9	4.5
New Mexico	18.1	18.0
Nevada	11.4	11.7
Rhode Island*	11.1	7.9
Vermont*	11.2	8.4

Note: *indicates statistically significant at p<0.05; MML= medical marijuana legalization; Years of data are based on the year each state legalized medical marijuana (e.g. Colorado legalized medical marijuana in 2000. Pre: 1995–1999 and Post: 2001–2005). For each state, five-year averages were calculated.

Source: KHI analysis of data from the Centers for Disease Control and Prevention (CDC) Youth Behavior Risk Survey, odd-year reports, 1993–2013.

Kansas

In order to determine potential changes to consumption in Kansas if medical marijuana was legalized, standardized regressions for three dependent variables (youth lifetime use, youth past-month use and age of initiation) were performed. Perception of ease of access to marijuana was positively correlated with youth lifetime and past-month use (*Figure 13*, page 26). None of the dependent variables were found to be significantly correlated with age of initiation. A further examination was conducted using easy access to marijuana as the dependent variable to ascertain its determinants. Median household income, percent unemployment, and percent of the population in poverty were all positively correlated with youth perception of easy access to marijuana (*Figure 14*, page 26), indicating that in communities with lower socio-economic indicators, youth perceive marijuana to be more readily available. A separate regression revealed that counties in close proximity to Colorado and those along the I-70 corridor were not significantly associated with any the dependent variables. All analyses were performed using 78 of 105 Kansas counties that had appropriate data available.

Figure 12. **Percent of Adults Who Have Ever Used Marijuana in Medical Marijuana States, 1993–2013****

STATE	PRE-MML	POST-MML
Colorado**	6.0	8.2
Michigan*	45.4	47.8
New Mexico	44.7	42.9
Rhode Island*	47.8	49.8
Vermont	51.3	52.4

Note: *indicates statistically significant at p<0.05; **indicates that rates for Colorado are for past-month consumption. MML= medical marijuana legalization; Years of data are based on the year each state legalized medical marijuana (e.g. Colorado legalized medical marijuana in 2000. Pre: 1995–1999 and Post: 2001–2005). For each state, five-year averages were calculated.

Source: KHI analysis of data from the National Survey on Drug Use and Health, 2000–2011.

Figure 13. **Association Between Marijuana Use and Various Socio-Demographic Factors, 2008–2013**

SOCIO-DEMOGRAPHIC FACTOR	YOUTH LIFETIME USE	YOUTH PAST-MONTH USE	AGE OF INITIATION
Percent of population, white	-0.09	0.19	0.89
Percent of population, African American	-0.04	0.09	0.06
Percent of population, Hispanic	-0.05	0.13	0.69
Percent of population, male	0.06	-0.04	-0.04
Percent of population with a high school degree or higher	0.10	0.11	0.17
Median household income	-0.09	0.05	0.25
Perception of easy access to marijuana	0.98*	0.91*	-0.09
Percent unemployment	-0.01	-0.02	-0.20
Age of initiation	0.00	-0.06	0.09
Percent of population in poverty	-0.07	0.04	-0.12
Marijuana offenses	0.04	0.07	0.89

Note: Numbers presented in this table are standardized regression estimates. *indicates statistically significant at p<0.05.

Source: KHI analysis of data from the Communities That Care Survey, 2008–2013; U.S. Census Bureau American Community Survey, 2008–2013. For each indicator, five-year averages were used.

What We Learned From Stakeholders

The majority of interviewees believed marijuana consumption would increase as a result of legalizing medical marijuana. However, proponents and opponents were divided on how this would impact Kansans. Proponents believed that increased consumption from those with medical conditions would be a positive result, while opponents were concerned with negative consequences of increased consumption, especially for youth.

Interviewees were asked to provide some suggestions they would want policymakers to consider as the debate on legalizing medical marijuana continues. Some of these suggestions included:

- Providing funding for prevention programs and treatment services for addictions associated with marijuana use.
- Implementing education programs regarding the effects of marijuana use.

Figure 14. **Association Between Perception of Easy Access to Marijuana and Socio-Demographic Factors, 2008–2013**

SOCIO-DEMOGRAPHIC FACTOR	PERCEPTION OF EASY ACCESS TO MARIJUANA
Percent of population, white	-0.27
Percent of population, African American	-0.02
Percent of population, Hispanic	0.14
Percent of population, male	0.08
Percent of population with a high school degree or higher	0.06
Median household income*	0.30
Percent unemployment*	0.50
Age of initiation	-0.05
Percent of population in poverty*	0.39

Note: Numbers presented in this table are standardized regression estimates.* indicates statistically significant at p<0.05

Source: KHI analysis of data from the Communities That Care Survey, 2008–2013; U.S. Census Bureau American Community Survey, 2008–2013. For each indicator, five-year averages were used.

> *"Students have expressed that they are curious about marijuana, so if medical marijuana were to be legalized, I think consumption would increase."*
>
> *- Opponent*

> *"I think it [consumption] would increase because people will have greater medical options."*
>
> *- Proponent*

Conclusion

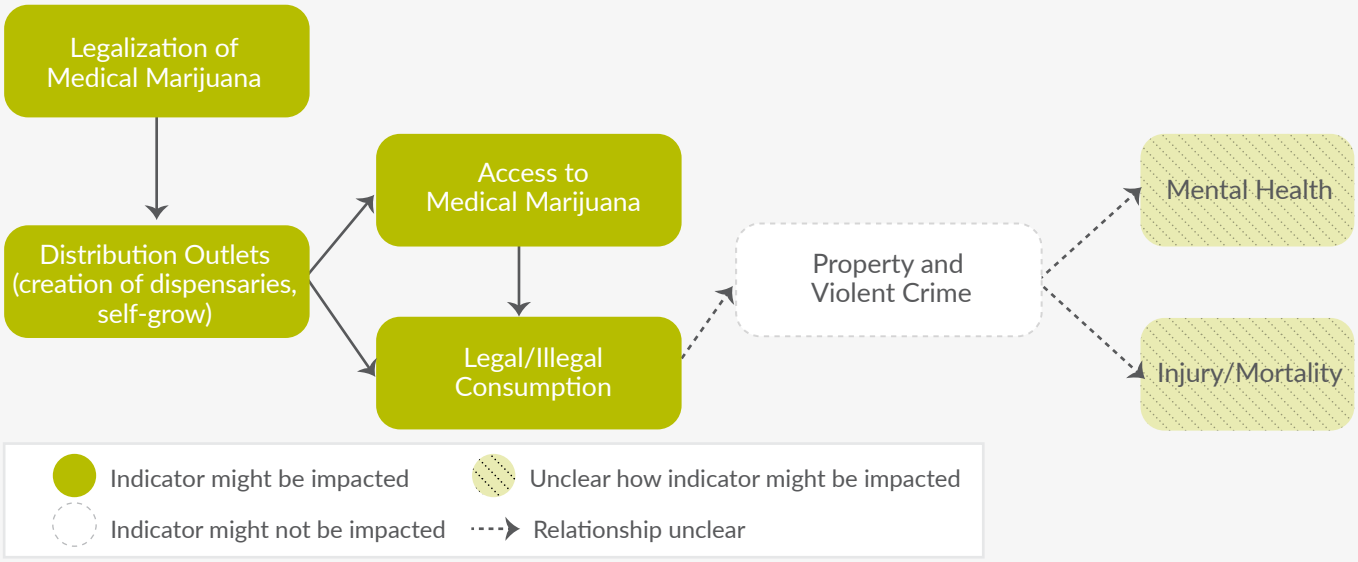
The literature review found mixed results as to whether or not the legalization of medical marijuana would have an impact on adult and adolescent use of marijuana. Studies found at-risk youth reported using medical marijuana without authorization in Colorado. Findings also suggest that different regulatory models, such as allowing medical marijuana dispensaries, may affect consumption. However, evidence was inconclusive and additional studies that focus on the effects of dispensaries and self-grow models are needed. The data analysis found no increase in youth consumption or percent of youth who began smoking marijuana before the age of 13 in any of the states that have legalized marijuana, with the exception of Colorado. However, Kansas-specific data found that youth's perception of easy access to marijuana was correlated with youth consumption. The data analysis results were also mixed for adults. In general, the majority of interviewees agreed that marijuana consumption would increase as a result of legalizing medical marijuana. However, proponents and opponents were divided on how this would impact Kansans. Proponents believed that increased consumption from those with medical conditions would be a positive result, while opponents were concerned with negative consequences of increased consumption, especially for youth. Based on literature review and data analysis, the legalization of medical marijuana may result in little to no impact on consumption of marijuana among the general population in Kansas. However, some increase in marijuana consumption might occur for at-risk youth, but the level of change in youth consumption would depend on regulation and law enforcement practices (*Figure 15*).

Figure 15. **Impact of Legalizing Medical Marijuana on Consumption of Marijuana and Associated Health Impacts**

				Based on Literature and Data					Literature
Health Factor or Outcome	Literature Review	Data Analysis	Stakeholder Perspectives	Overall Projection	Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Consumption of Marijuana (illegal) (general population)	Mixed	None	N/A	None	None	N/A	Uncertain	N/A	**
Consumption of Marijuana (illegal) (youth)	Mixed	None	N/A	Mixed	Negative	Low	Likely	At-risk youth (those in substance abuse treatment, individuals already using drugs)	****
Consumption of Marijuana (legal)	N/A	Increase	Increase	Increase	Uncertain	Low	Likely	People with approved qualifying conditions	**

Source: KHI Medical Marijuana HIA Project, 2015.

Figure 16. **How Changes in Access to Marijuana May Impact Property and Violent Crimes and Associated Health Impacts**



Source: KHI Medical Marijuana HIA Project, 2015.

FINDINGS

- The legalization of medical marijuana may have no impact on violent and property crime rates.
- Areas that are located in close proximity to dispensaries might experience some increase in crime. However, dispensaries may be more likely to open in areas that already have high rates of crime.

RECOMMENDATIONS

Kansas Bureau of Investigation and other state and local law enforcement agencies could consider:

- Reporting marijuana use separately from other drug use in surveillance and data systems.
- Monitoring changes in crime rates in areas where dispensaries are located. If significant changes are detected, identify appropriate measures for addressing issues.

Kansas Department of Health and Environment could consider:

- Requiring dispensaries to implement safety measures to deter crime, such as video surveillance, locked supply storage, etc.
- Implementing zoning requirements for dispensaries stipulating minimum distances to certain entities including schools, universities, child care and correctional facilities.

Crime and Health

Crime can have direct effects on health, including physical impacts such as injuries[141] or psychological impacts.[142] The physical injuries suffered by victims may include cuts, bruises, or broken bones. There is a range of mental health issues associated with being a victim of violence, which can include depression, post-traumatic stress disorder, substance abuse, and reduced social functioning.[143] In general, victims of crime experience lower levels of well-being and higher levels of fear.[144] Victims of violent crime feel particularly vulnerable compared to those who have experienced property crime or individuals who experienced no crime. As a result, victims of violent crime are more likely to have a longer recovery period than victims of property crime. Research also suggests that some groups might experience higher rates of property and violent crime victimization compared to others (e.g., low-income neighborhoods).

What We Learned From Literature

Literature review findings were mixed regarding whether legalizing medical marijuana would impact property and violent crime rates. While some studies found that medical marijuana legalization correlated with increases in violent and property crime rates, others found that legalization was correlated with decreases in rates of both types of crime. However, increases and decreases in crime rates may have been impacted by a variety of factors other than medical marijuana legalization.[145] [146] [147] [148] Additionally, other studies found no statistical relationship between medical marijuana legalization and crime rates.[149] [150]

Studies examining local data from San Francisco, California and Denver, Colorado, showed that dispensary locations correlated with increased crime.[151] [152] However, correlations may reflect that dispensaries are more likely to open in high-crime areas and areas with high levels of poverty.[153] [154] Additionally, police may pay increased attention to areas following the opening of a dispensary.

Anecdotal evidence suggests that violent and property crimes directly related to medical marijuana dispensaries occur and are under-reported.[155] However, it is not clear if these are significantly different from crimes that occur at similar, existing locations, such as liquor stores.

Marketing and signage may affect public perceptions of medical marijuana dispensaries.[156] Additionally, security measures, such as cameras, appear to decrease the likelihood of crime.[157] Individuals with legal marijuana prescriptions reported increased safety when using dispensaries.[158]

The model for medical marijuana (i.e. self-grow or dispensaries) may have differential impacts on marijuana-related crime. See *Appendix E*, page 62, for more detail.

What We Learned From Data

In almost all cases, rates of violent and property crimes remained unchanged or decreased after medical marijuana was legalized. Vermont was the only state out of the 14 studied that had an increase in violent crime rates after legalization. However, these statistics reflect statewide rates and may not capture the impacts of marijuana-related businesses on a specific locality.

In Kansas, regression results indicate that the perception of easy access to marijuana and age of initiation are correlated with crime rates. However, poverty status is also correlated with property crime rates, indicating that neighborhood variables may also affect crime rates.

Property Crime, Violent Crime and Robbery

Data analysis suggests that medical marijuana legalization was not generally correlated with increased rates of violent crime, and in some cases, it was correlated with a decreased rates of violent crime. Property crime, violent crime, and robbery rates, measured as the number of crimes per 100,000 people, were available for fourteen states.

A t-test was conducted for each state for the mean of the rates for years before and after medical marijuana legalization in that state. In 13 of the 14 states, the rates of property crimes were significantly lower post-medical marijuana legalization. No significant difference was found for Colorado. In seven of the 14 states, the violent crime rate was significantly lower post-legalization. In Vermont, the violent crime rate was significantly higher post-legalization. In the remaining six, no significant difference was found. In nine of the 14 states, the robbery rates were significantly lower post-legalization. In the remaining five, no significant difference was found.

Kansas

Regressions for two dependent variables (property crime rates, violent crime rates) were conducted using data from the 78 counties for which data were available. Using a regression, it was found that the counties close to Colorado or along the I-70 corridor did not have a significant association with rates of either type of crime. The perception of ease of access to marijuana and percent of population in poverty were significantly and positively correlated with property crime rates. Age of initiation was negatively correlated with both property crime and violent crime rates.

Figure 17. **Annual Crime Rates Before and After Medical Marijuana Legalization (MML) by State, 1994–2013**

STATE	PROPERTY CRIME RATES		VIOLENT CRIME RATES		ROBBERY RATES	
	PRE-MML	POST-MML	PRE-MML	POST-MML	PRE-MML	POST-MML
Alaska	4908	3330*-	627	621	104	83*-
Arizona	4365	3547*-	497	422	145	112*-
California	5789	3168*-	933	557*-	358	183*-
Colorado	4358	3822	385	366	87	82
Hawaii	5851	4248*-	264	263	102	84*-
Maine	3282	2486*-	135	115*-	24	25
Michigan	3113	2668*-	536	473*-	130	113
Montana	3652	2715*-	264	308	27	21*-
New Mexico	4131	3619*-	679	601*-	107	91*-
Nevada	4960	4061*-	754	614	284	222*-
Oregon	5798	3945*-	513	290*-	157	73*-
Rhode Island	3078	2644*-	280	249*-	81	74
Vermont	2690	2396*-	113	137*+	14	15
Washington	5888	4332*-	471	339*-	134	94*-

Note: *indicates statistically significant at p<0.05; + indicates that the post-value is greater than pre-value; -indicates the post-value is less than the pre-value. MML = Medical Marijuana Legalization. Years of state data are based on the year each legalized medical marijuana (e.g. Colorado legalized medical marijuana in 2000. Pre = 1995–1999; Post= 2001–2005). For each state, five-year averages were calculated. Rates are per 100,000.

Source: KHI analysis of data from the Federal Bureau of Investigation Uniform Crime Reporting, 1995–2013.

Figure 18. **Association Between Property and Violent Crime Rates and Socio-Demographic Factors in Kansas, 2008–2013**

SOCIO-DEMOGRAPHIC FACTOR	PROPERTY CRIME	VIOLENT CRIME
Percent of population, white	0.23	-0.23
Percent of population, African American	0.29	0.36
Percent of population, Hispanic	0.21	-0.01
Percent of population, male	-0.12	-0.11
Percent of population with a high school degree or higher	0.15	0.14
Median household income	0.11	-0.07
Percent unemployment	-0.02	0.09
Perception of easy access to marijuana	0.36*	0.09
Age of initiation	-0.29*	-0.28*
Percent of population in poverty	0.30*	0.03

Note: Numbers presented in this table are standardized regression estimates. * indicates statistically significant at p<0.05

Source: KHI analysis of data from the Kansas Bureau of Investigation, 2008–2013; U.S. Census Bureau American Community Survey, 2008–2013. For each indicator, five-year averages were used.

What We Learned From Stakeholders

Property Crime

Interviewees were mixed on whether legalizing medical marijuana would impact property crime. Most opponents stated that property crime would increase, as drugs are generally associated with higher property crime. Proponents stated that property crime would decrease, as people switch from other substances to using marijuana for medical purposes, which they believe, has less of an impact on this type of crime.

Violent Crime

Proponents and opponents were mixed on whether legalizing medical marijuana would impact violent crime. Some proponents stated violent crime would decrease because marijuana users are not prone to violence. Opponents disagreed, stating that medical marijuana may be used by those who do not have legal access to medical marijuana, especially by youth, and that increased use could impact crime. They also stated that violent crime such as domestic and dating violence, may increase. A few interviewees also thought that violent crime would not be impacted by legalizing medical marijuana.

> *"Property crime has gone down because people that are addicted to pharmaceuticals are getting off of them and don't have to feed their addiction anymore."*
>
> *- Proponent*

> *"I think there is potential for property crimes to increase, but it depends on where dispensaries are located."*
>
> *- Opponent*

Conclusion

The literature review found mixed results as to whether or not the legalization of medical marijuana would have an impact on property and violent crime rates. The literature review did not indicate that medical marijuana itself was associated with criminal activities. However, the review also showed that in some cases, dispensary location was correlated with increased crime rates. This could be, in part, due to dispensaries being more likely to open in areas with higher crime. In almost all cases, rates of violent and property crime remained unchanged or decreased after medical marijuana was legalized. Only one state of the 14 studied, Vermont, saw an increase in violent crime rates after legalization. It is important to note that decreases in property and violent crime rates might be attributed to other factors (e.g., economic conditions). Interviewees were mixed on whether legalizing medical marijuana would impact rates of property and violent crime. Proponents suggested that crime would decrease because marijuana users are not prone to violence as marijuana has a calming effect. However, opponents provided a different perspective and suggested that violent crime such as domestic and dating violence may increase. Based on data and reviewed literature, the legalization of medical marijuana may have no impact on violent and property crime rates. However, areas that are located in close proximity to dispensaries might experience increases in crime rates. This could be in part due to dispensaries being more likely to open in areas with higher crime rates (*Figure 19*).

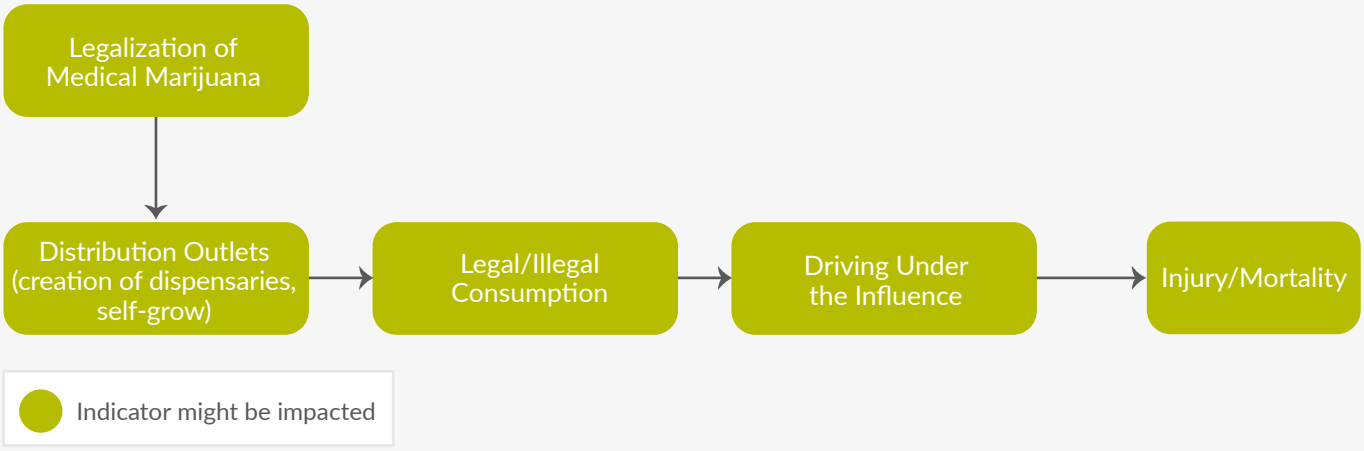
Figure 19. **Impact of Legalizing Medical Marijuana on Property and Violent Crimes and Associated Health Impacts**

				Based on Literature and Data					Literature
Health Factor or Outcome	Literature Review	Data Analysis	Stakeholder Perspectives	Overall Projection	Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Violent Crime	Mixed	None	Mixed	None	None	N/A	Possible	N/A	**
Property Crime	Mixed	None	Mixed	None	None	N/A	Possible	N/A	**

Note: See Legend, *Appendix B*, page 53.

Source: KHI Medical Marijuana HIA Project, 2015.

Figure 20. **How Changes in Consumption of Marijuana May Impact Driving Under the Influence and Associated Health Impacts**



Source: KHI Medical Marijuana HIA Project, 2015.

FINDINGS

- The legalization of medical marijuana may result in an increase in driving under the influence of marijuana and related traffic accidents.

RECOMMENDATIONS

Kansas Department of Transportation and local law enforcement could consider:

- Increasing testing and reporting for marijuana in drivers, especially fatally injured drivers and at-fault drivers.

Kansas Department of Health and Environment, local health departments and the Kansas Department of Transportation could consider:

- Educating the public on marijuana-related impairment (driving, biking), including riding with impaired drivers.

Kansas Department of Health and Environment could consider:

- Developing and providing educational materials for health-related service providers, such as dispensaries and doctors' offices, in order to inform medical marijuana cardholders about the dangers of using marijuana with other drugs and substances (i.e. alcohol).
- Including questions on the state-added module of the Behavioral Risk Factor Surveillance System (BRFSS) to monitor self-reported impaired driving behaviors and perceptions of risk associated with impaired driving.
- Requiring medical marijuana products to have labels with detailed usage and warning information.

Driving Under the Influence and Health

Unintentional injury is the leading cause of death in people age 1-44, with motor vehicle accidents accounting for 25 to 50 percent of vehicle accident deaths. Although alcohol-impaired driving crashes account for nearly one-third (31 percent) of all traffic-related fatalities, about one-fifth (18 percent) of motor vehicle driver deaths involve drugs other than alcohol. Additionally, these other drugs are often used in combination with alcohol.[159] Substances like alcohol, opioids, marijuana and other drugs can impact judgement, depth perception as well as vital motor skills required to drive safely. Furthermore, crashes can result in secondary health impacts beyond injury and death. For example, victims might experience lengthy recovery periods, which could add personal stress for them and their caregivers.[160]

What We Learned From Literature

Overall, studies consistently show that marijuana use can impair driving by reducing attention, concentration, hand-eye coordination, reaction time, and tracking.[161] [162] [163] [164] [165] In addition, the negative effects of driving under the influence of marijuana are exacerbated when marijuana is used in combination with alcohol.[166] Overall, findings suggest that driving under the influence of marijuana is an issue, even in states without medical marijuana laws.[167] [168] [169] Legalization of medical marijuana may increase this problem, as legalization may increase the number of drivers on the road with access to the drug.[170] [171] However, current study findings are inconclusive, and states that pass medical marijuana laws also appear to have increased marijuana driver testing.[172] Increased testing may make it appear as though there was an increase in use in states following medical marijuana legalization, when, in reality, there was no increase.

Two studies suggested that legalization of medical marijuana may decrease incidents of driving under the influence of alcohol.[173] [174] However, these studies could not be replicated.[175] [176] [177] Furthermore, one study found that, among a sample of arrestees for unspecified crimes in Arizona, authorized medical marijuana users were more likely to self-report driving under the influence of a substance than others in the study.[178]

The model for medical marijuana (i.e. self-grow or dispensaries) may have differential impacts on driving under the influence of marijuana. Studies found that medical marijuana dispensaries were associated with higher rates of driving under the influence of alcohol and drugs.[179] [180] [181] Alternatively, allowing people to self-grow medical marijuana was associated with lower rates of driving under the influence.[182] (See *Appendix E*, page 62, for more detail on medical marijuana models.) This suggests that additional factors, such as medical marijuana policies, may influence outcomes. Additionally, no studies addressed the potential for education campaigns or intervention activities to reduce DUI harms that may be associated with legalization of medical marijuana. Data suggest that some individuals do not perceive marijuana as a drug that affects driving ability.[183] [184] [185] It is possible that a combined effort of medical marijuana legalization with education and systemic-level intervention could improve public awareness of the dangers of driving while under the influence of marijuana.

What We Learned From Data

The rate of marijuana-related fatalities has increased over time both in states that have and have not legalized medical marijuana. In more than half of the studied states, there was a significant increase post-legalization.

Nearly 1/3 of all motor vehicle driver deaths are caused by alcohol-impaired driving. About 1/5 involve drugs other than alcohol.

Figure 21. **Marijuana-Related Traffic Fatalities in the United States, 1994–2013**

Source: KHI analysis of data from the Fatality Analysis Reporting System (FARS), 1994– 2014.

However, it is unclear whether testing for marijuana has become more common over time, and whether legalization of marijuana prompts law enforcement to look for marijuana in crash victims more frequently. In Kansas, it appears that drug-related accidents are much less frequent than alcohol-related accidents.

Marijuana-Related Traffic Fatalities

The national trend for marijuana-related traffic fatalities per 100,000 people is shown in *Figure 21*. Since 1994, the rate of fatalities where marijuana was the primary drug detected has increased. In seven of the 13 states analyzed, the increase after marijuana legalization was statistically significant (*Figure 22*).

Kansas Trends

Trends for alcohol and drug-related (marijuana and other drugs) traffic accidents in Kansas are shown in *Figure 23*, page 36. Alcohol-related accidents are approximately 10 times more frequent than drug-related accidents. Additionally, both alcohol and drug-related accidents exhibit a downward trend between the years of 2000 and 2012.

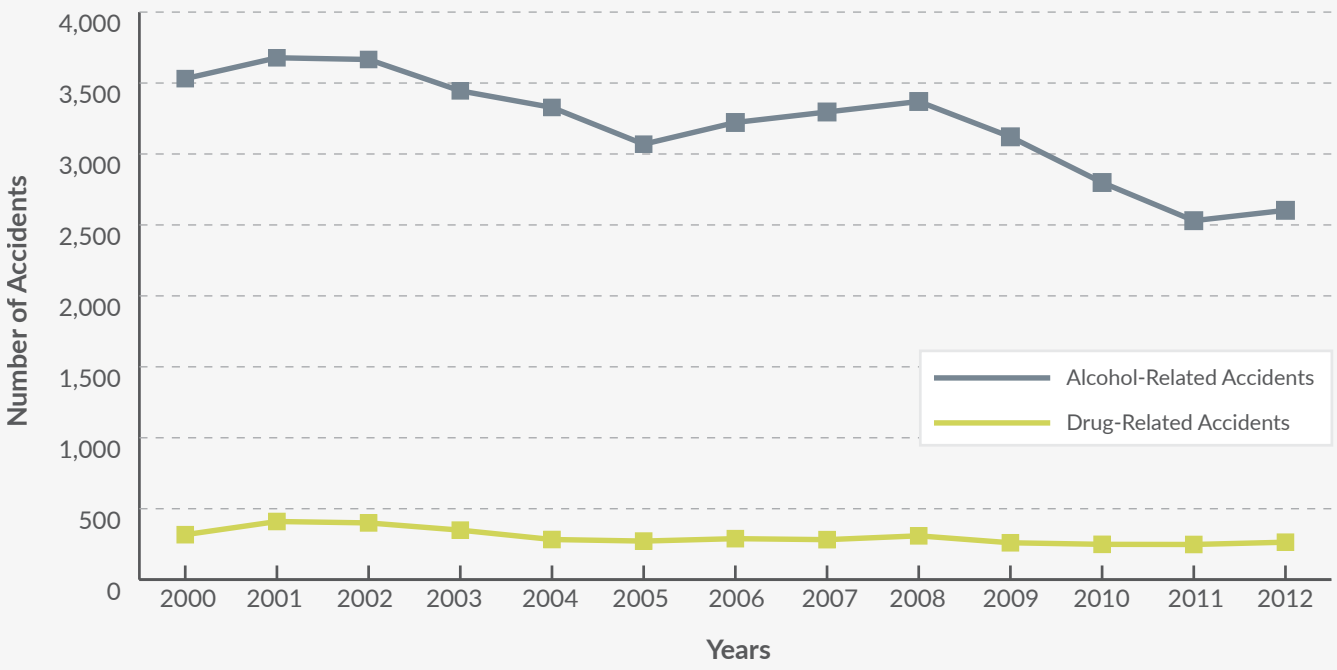
Figure 22. **Marijuana-Related Traffic Accident Fatalities Rates Before and After Medical Marijuana Legalization (MML) by State (Deaths per 100,000 People), 2000–2012**

STATE	PRE-MML	POST-MML
Alaska	0.87	0.99
Arizona	1.58	2.10
California	0.11	0.18
Colorado	0.80	0.91
Hawaii*	0.36	1.46
Michigan*	0.32	0.73
Montana*	1.51	3.78
Nevada*	0.27	1.18
New Mexico	0.23	0.84
Oregon	0.38	0.39
Rhode Island*	0.06	0.78
Vermont*	0.80	1.76
Washington*	0.09	1.06

Note: *indicates statistically significant at p<0.05. Years of state data are based on the year each legalized medical marijuana (e.g. Colorado legalized in 2000. Pre = 1995–1999; Post= 2001–2005). MML= Medical Marijuana Legalization. For each state, five-year averages were calculated.

Source: KHI analysis of data from the Fatality Analysis Reporting System (FARS), 1994–2013.

Figure 23. **Alcohol and Drug-Related Traffic Accidents in Kansas, 2000–2012**



Source: KHI analysis of data from the Kansas Department of Transportation, 2000–2012.

What We Learned From Stakeholders

Most interviewees stated that driving under the influence of marijuana would increase, although opponents were more concerned than proponents with the negative effects of driving under the influence. For example, some opponents stated that people may be less aware of how long marijuana stays in their system and get behind the wheel. Other opponents were unsure if driving under the influence of marijuana would be impacted, as driving under the influence of alcohol has gone down in recent years. Some proponents stated that driving under the influence of marijuana does not have the same effects as alcohol.

> *"I think there will be a slight increase at first, but then driving under the influence of marijuana will drop. A person who has high tolerance is not as affected by marijuana as someone who has just started using it."*
>
> *- Proponent*

> *"I think instances of people driving under the influence of marijuana would go up because I don't know how to prevent people with a prescription for medical marijuana from driving."*
>
> *- Opponent*

Conclusion

Studies consistently show that marijuana use could impair driving. Literature that examined whether legalization of medical marijuana would increase or decrease driving under the influence and/or traffic accidents showed mixed results. However, studies leaned toward an increase, particularly in states with dispensaries. According to the data analysis, nationally, the rate of marijuana-related traffic fatalities has increased over time. In seven out of 13 states studied, the increase was significant post-legalization. However, some literature suggests that the legalization of medical marijuana may prompt law enforcement to test for marijuana in crash victims more frequently. Stakeholders echoed literature review and data analysis findings and suggested that the legalization of medical marijuana could result in more people driving under the influence. Based on data and reviewed literature, the legalization of medical marijuana may result in an increase in driving under the influence of marijuana and related traffic accidents (*Figure 24*).

Figure 24. **Impact of Legalizing Medical Marijuana on Driving Under the Influence of Marijuana and Associated Health Impacts**

				Based on Literature and Data					Literature
Health Factor or Outcome	Literature Review	Data Analysis	Stakeholder Perspectives	Overall Projection	Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Driving Under the Influence of Marijuana	Increase	Increase	Increase	Increase	Negative	Low	Likely	People who use marijuana and drive, passengers	***

Note: See Legend, *Appendix B*, page 53.

Source: KHI Medical Marijuana HIA Project, 2015.

7 out of 13

The national rate of marijuana-related traffic fatalities has increased over time. In seven out of 13 states studied, the increase was significant post-legalization.

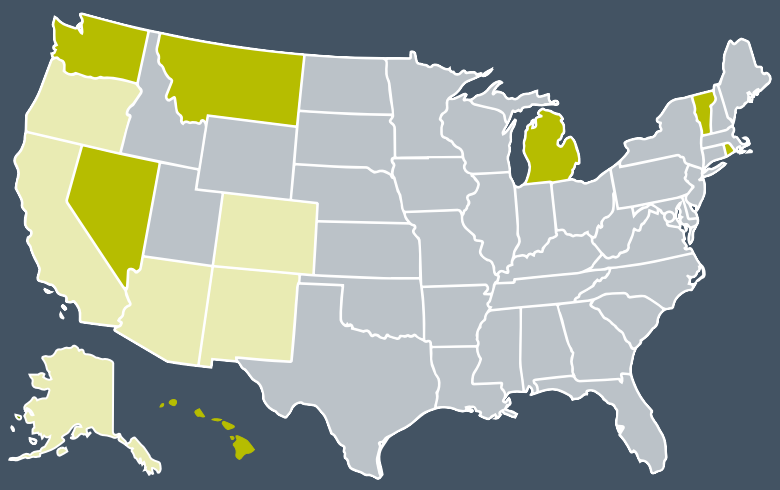
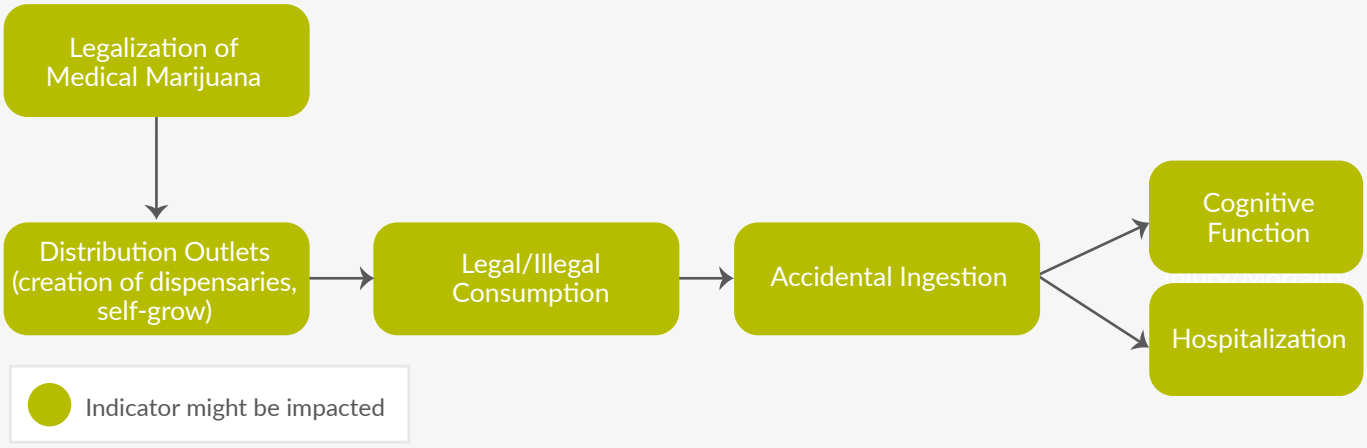


Figure 25. **How Changes in Access to Marijuana May Affect Accidental Ingestion and Associated Health Impacts**



Source: KHI Medical Marijuana HIA Project, 2015.

FINDINGS

- The accidental ingestion of marijuana could increase, specifically for children. However, increases could be due to several factors; for instance, individuals may be more likely to seek treatment for accidental ingestion, and health care providers may be more likely to test patients for marijuana.
- An increase in accidental ingestions of marijuana might be relatively minimal compared to accidental ingestion of opioids.

RECOMMENDATIONS

The Kansas Hospital Association could consider:

- Monitoring emergency department visits for accidental ingestion of marijuana, especially among children under age five.

KDHE could consider:

- Developing and providing educational materials to health-related service providers, such as dispensaries and doctors' offices, in order to inform marijuana cardholders or caregivers (parents/grandparents/guardians) about safe use and safe storage.
- Enacting regulations for child-proof packaging in order to prevent accidental ingestion of marijuana.
- Limiting the number of types of edibles, and requiring those that are allowed to be less attractive to children and youth (e.g., they should not be made to look like candy).

Accidental Ingestion and Health

Reported unintentional marijuana exposure has been increasing among children in medical marijuana states.[186] While few unintentional marijuana exposures among children have had permanent negative effects, the acute symptoms of marijuana exposure include dizziness, lethargy, breathing difficulties and inability to walk.[187] Additionally, literature shows that there are negative neurological and cognitive effects among offspring when marijuana is used during pregnancy, and some these effects may not appear until later in life.[188] It is unknown whether single incidences of accidental ingestion among children might have similar long-term health consequences.

What We Learned From Literature

Together, the reviewed literature suggests that medical marijuana dispensaries may be a factor influencing increased emergency room visits for humans and dogs.[189] [190] [191] [192] [193] [194] Only one study did not find an increase in emergency room visits, and those data were collected before 2009.[195] Two studies suggest that marijuana-infused edibles may be more potent than smoked marijuana, and edibles are often items that are appealing to children and dogs, such as cookies, cakes and candies.[196] [197] An increase in edibles may relate to products offered in dispensaries.[198] If dispensaries increase the number of available edibles, particularly sweet treats, this could help explain increased emergency room visits. It is worth noting that states with medical marijuana laws had lower (25 percent) opioid overdose mortality than states without similar laws.[199] Lower opioid overdose mortality may relate to individuals in medical marijuana states using marijuana instead of opioids for pain relief.

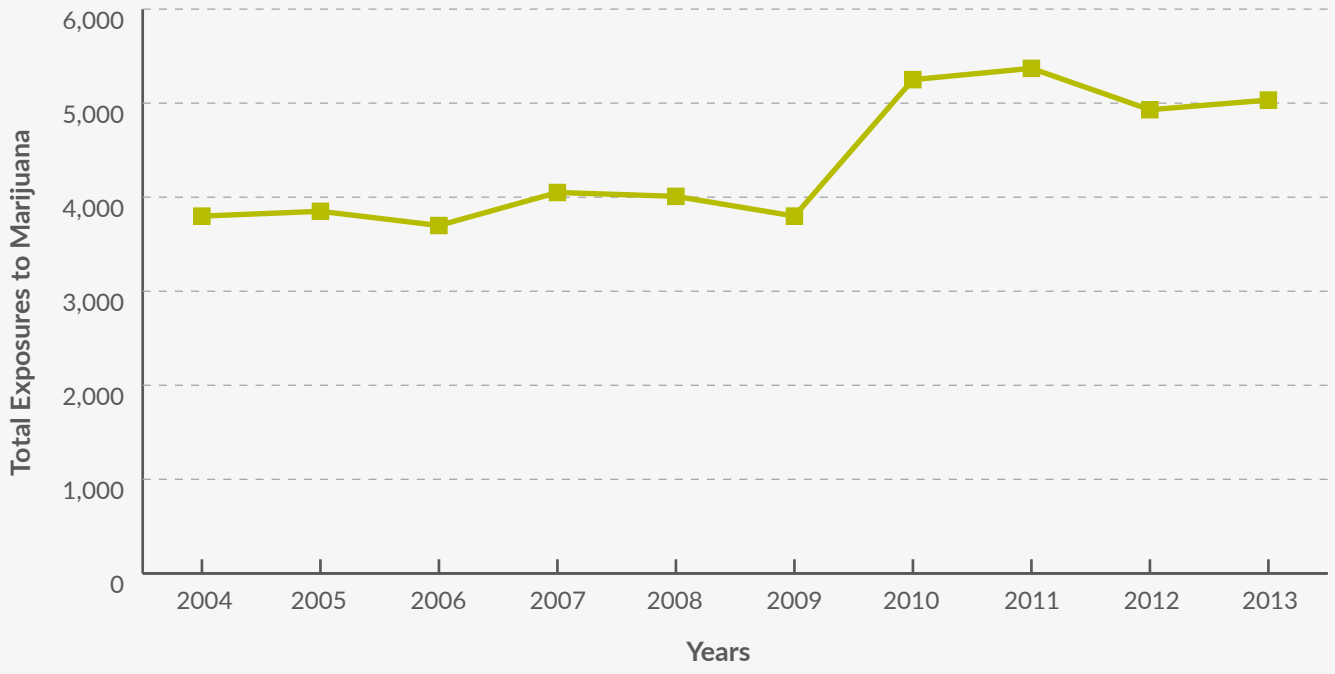
The type of model for medical marijuana (i.e. self-grow or dispensaries) may have differential impacts on accidental ingestion of marijuana. See *Appendix E*, page 62, for more detail.

What We Learned From Data

Data from the American Association of Poison Control Centers (AAPCC) show that the number of marijuana exposures (ingestion) in the United States has increased over the past decade. Since 2004, the number of total exposures has risen, with a sharp rise between 2009 and 2010 and a peak in 2011. Total exposures includes the total number of instances where marijuana was identified—either alone or in combination with other substances (*Figure 26*, page 40).

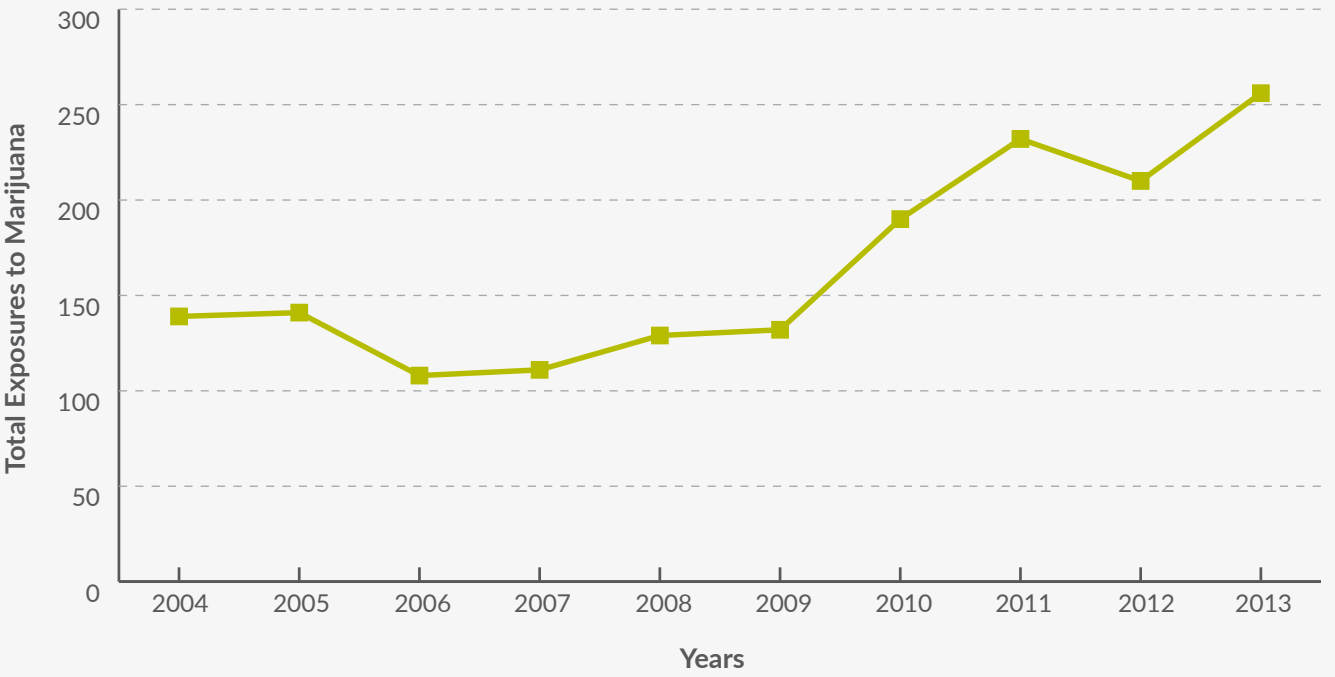
Additionally, the number of exposures among children under six years of age rose between 2006 and 2013 (*Figure 27*, page 40).

Figure 26. **Total Marijuana Exposures in the United States, 2004–2013**



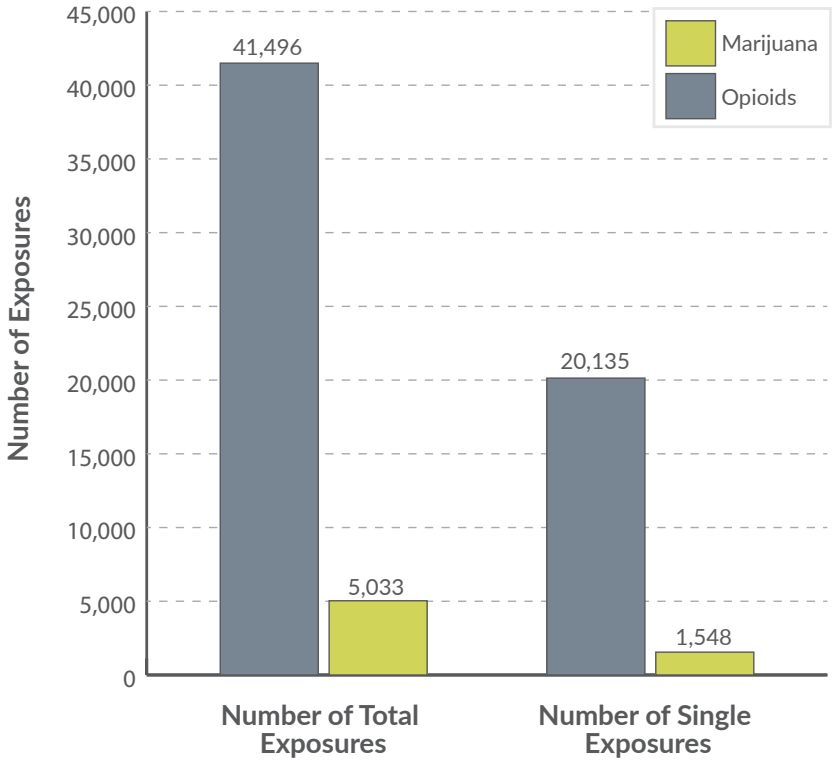
Source: KHI analysis of data from the American Association of Poison Control Centers, 2004–2013.

Figure 27. **Total Marijuana Exposures Among Children Under Age Six in the United States, 2004–2013**



Source: KHI analysis of data from the American Association of Poison Control Centers, 2004–2013.

Figure 28. **Total Number of Exposures to Marijuana and Opioids in the United States, 2013**

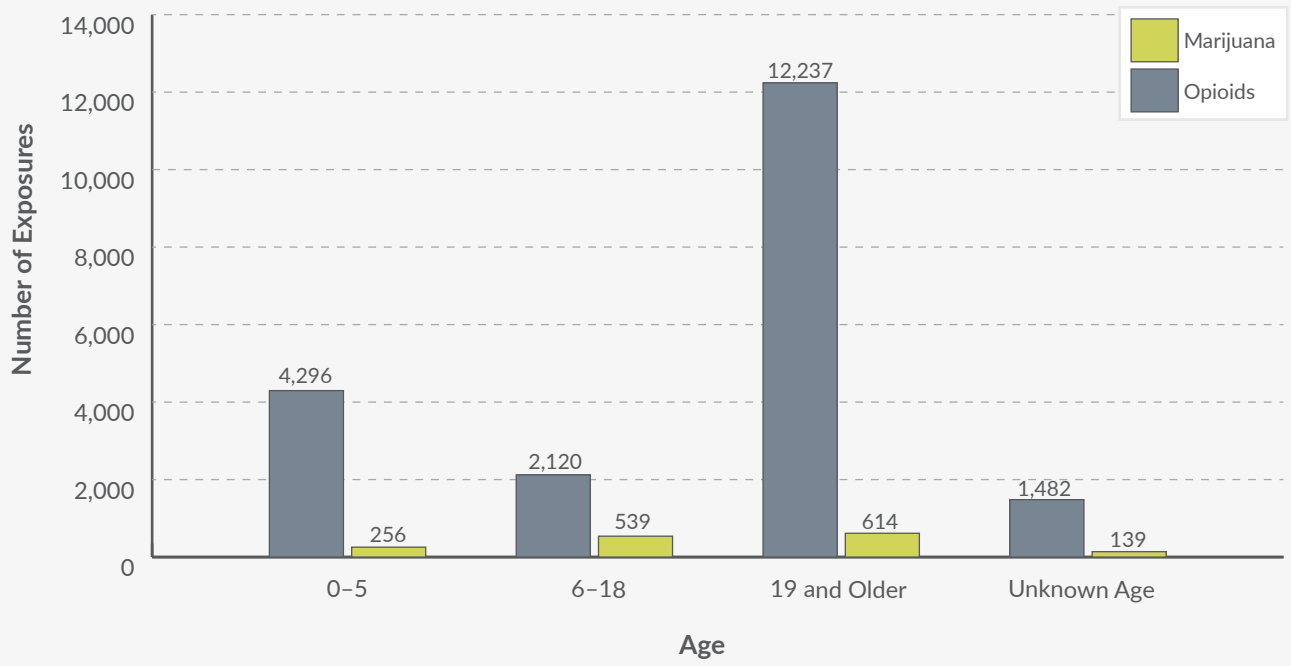


Source: KHI analysis of data from the American Association of Poison Control Centers, 2013.

While the number of marijuana exposures has increased over the last several years, it is worth noting that the number of exposures is still relatively small compared to some other substances. In this case, opioids were chosen as a comparison as they are frequently used for chronic pain—the most common use for medical marijuana. *Figure 28* shows that in 2013, total exposures for opioids were eight times greater (41,496 vs. 5,033) than total marijuana exposures (total exposures are the number of exposures alone or in combination with other substances).

Additionally, the number of single exposures for opioids was 13 times greater (20,135 vs. 1,548) than single marijuana exposures. The data show a similar pattern when broken out by age, as shown in *Figure 29*.

Figure 29. **Single Exposures to Marijuana and Opioids in the United States by Age, 2013**



Source: KHI analysis of data from the American Association of Poison Control Centers, 2013.

What We Learned From Stakeholders

Most interviewees stated that there would be potential for more accidental ingestions, especially among young children. Some opponents have cited other states' experiences with increased emergency department visits due to accidental ingestion post-legalization of medical marijuana. Opponents stated that this is especially a problem with edibles, as children are not aware that marijuana is in these products. Opponents acknowledge that accidental ingestion may be an issue, but state that it can be mitigated with proper packaging, regulation, education and storage. Additionally, proponents believed that medical marijuana, if ingested, is not as harmful as other drugs.

> *"Parents need to educate their children that medical marijuana is medicine, just like they would with every other medicine in the cabinet."*
>
> *- Proponent*

> *"The risk for it is certainly increasing and I am especially concerned for young children."*
>
> *- Opponent*

Interviewees were asked to provide some suggestions they would want policymakers to consider as the debate on legalizing medical marijuana continues. One of the suggestions on this issue was not allowing edibles as a form of acceptable medical marijuana.

Conclusion

The literature suggests that accidental exposure could increase, specifically among children. States with medical marijuana laws experienced slight increases in accidental exposures among children, prompting Colorado to establish child-proof packaging for marijuana. Observed increases could be due to several factors, such as individuals being more likely to seek treatment for accidental ingestion and health care providers are more likely to test patients for marijuana. Literature findings for adults are mixed. Additionally, one study suggested that states with medical marijuana laws observed a decrease in deaths related to opioid painkillers (*Figure 30*).

Figure 30. **Impact of Legalizing Medical Marijuana on Accidental Ingestion and Associated Health Impacts**

				Based on Literature and Data					Literature
Health Factor or Outcome	Literature Review	Data Analysis	Stakeholder Perspectives	Overall Projection	Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Accidental Ingestion	Increase	Increase	Increase	Increase	Negative	Low	Possible	Children under age 5	****

Note: See Legend, *Appendix B*, page 53.
Source: KHI Medical Marijuana HIA Project, 2015.

Vulnerable populations are populations that have experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; or geographical location. Identifying vulnerable populations and how their health may be impacted by legalizing medical marijuana is important for determining appropriate policy options to address negative health impacts or enhance positive impacts.

What We Learned From Stakeholders

The majority of interviewees stated that youth would be most impacted if Kansas were to legalize medical marijuana. Proponents stated that children with epilepsy could benefit if they had legal access to medical marijuana. Opponents stated that youth access and associated harms would negatively impact children in the state. Other vulnerable populations identified included those with qualifying medical conditions. Proponents stated that these individuals, especially the elderly with Alzheimer's or Parkinson's diseases and veterans with PTSD (Post Traumatic Stress Disorder), would be able to have some relief from their symptoms if they had access to medical marijuana.

Vulnerable Counties

Using distribution analysis and mapping techniques, a vulnerability score was developed to illustrate the Kansas counties that might be at highest risk for disproportionate health effects related to the passage of medical marijuana legislation. Based on the available data, scoped issues, and results of the regressions conducted for marijuana consumption and crime, measures were identified to include in a vulnerability score which would assist in identifying the counties that were most vulnerable to disproportionate impacts.

Fifteen measures (listed in *Figure 31*, page 44) were identified through the literature review and regression model and were used to identify which counties might be vulnerable to increases in marijuana consumption. All of these measures were averaged for the five-year period of 2008–2012. For 13 of the 15 identified measures, higher values represent greater vulnerability for the geographic unit. To provide a standardized approach to quantifying and comparing vulnerability scores, the means, standards deviations and z-scores were computed for all geographical units on each measure. On the two measures where a higher value indicated lower vulnerability (median income and age of initiation), the opposite value of the z-score was assigned and used in the calculation of the aggregate vulnerability score.

FINDINGS	RECOMMENDATIONS*
• Thirteen Kansas counties may be at risk for disproportionate impacts if medical marijuana were to be legalized in Kansas.	Kansas Department of Health and Environment could consider: • Prioritizing 13 "vulnerable" counties for any efforts focused on reducing risks associated with marijuana use.

Higher z-scores indicate larger differences between the values of a measure for a specific geographic unit compared to the average of all geographic units being compared on that measure. This approach was useful for the quick identification of outliers. A z-score of 1.5 or greater was used as a cutoff to identify counties that may be at increased vulnerability for each measure. Aggregate vulnerability scores were computed by counting the number of measures with z-scores of 1.5 or greater for each county. The maximum vulnerability score was 15.

Of Kansas counties, 104 out of 105 counties had scores between 0-5; the exception was Wyandotte County, whose vulnerability score was 9. The scores were divided into three 'low' scores (0–2), three 'high' scores (3–5), and three 'very high' scores (6–9).

Figure 31. **Domains and Measures in the Vulnerability Index, 2008–2012**

DOMAIN	MEASURE AND DESCRIPTION	SOURCE
Perceived Availability of Marijuana	Percent of youth who answered "very easy" to the question: *If you wanted to get some marijuana, how easy would it be for you to get some?*	Kansas Communities that Care (CTC) Survey
Youth Lifetime Marijuana Use	Percent of youth who answered "At least once" to the question: *On how many occasions (if any) have you used marijuana in your lifetime?*	Kansas CTC Survey
Youth Past 30-day Marijuana Use	Percent of youth who answered "at least once" to the question: *On how many occasions (if any) have you used marijuana in the past 30 days?*	Kansas CTC Survey
Age of Initiation of Marijuana Use	Average age of marijuana initiation (youth)	Kansas CTC Survey
Marijuana-related Offenses	Rate of marijuana-related offenses per 10,000 people	Kansas Bureau of Investigation (KBI)
Violent Crime	Rate of violent crimes per 100,000 people	KBI
Property Crime	Rate of property crimes per 100,000 people	KBI
Poverty	Percent of population with income in the past 12 months below federal poverty level	U.S. Census Bureau, 2012 ACS 5-year
Educational Attainment	Percent of adults age 25 years and over with less than a high school diploma	U.S. Census Bureau, 2012 ACS 5-year
Median Income	Median household income	U.S. Census Bureau, 2012 ACS 5-year
Unemployment	Percent of population age 16 and over in labor force that is unemployed	U.S. Census Bureau, 2012 ACS 5-year
Youth Lifetime Alcohol Use	Percent of youth who answered "at least once" to the question: *On how many occasions (if any) have you had beer, wine or hard liquor to drink in your lifetime?*	Kansas CTC Survey
Youth Binge Drinking	Percent of youth who answered "at least once" to the question: *Think back over the last two weeks. How many times have you had five or more alcoholic drinks in a row?*	Kansas CTC Survey
Racial Disparity: Poverty†	The difference between Hispanic and non-Hispanic whites on the percentage of population with income in the past 12 months below federal poverty level	U.S. Census Bureau, 2012 ACS 5-year
Racial Disparity: Poverty‡	The difference between African Americans and non-Hispanic whites on the percentage of population with income in the past 12 months below federal poverty level	U.S. Census Bureau, 2012 ACS 5-year

Note: † In census tracts where the Hispanic population in the denominator is smaller than 20 persons, the value is suppressed for this measure. ‡ In census tracts where the African American population in the denominator is smaller than 20 persons, the value is suppressed for this measure.

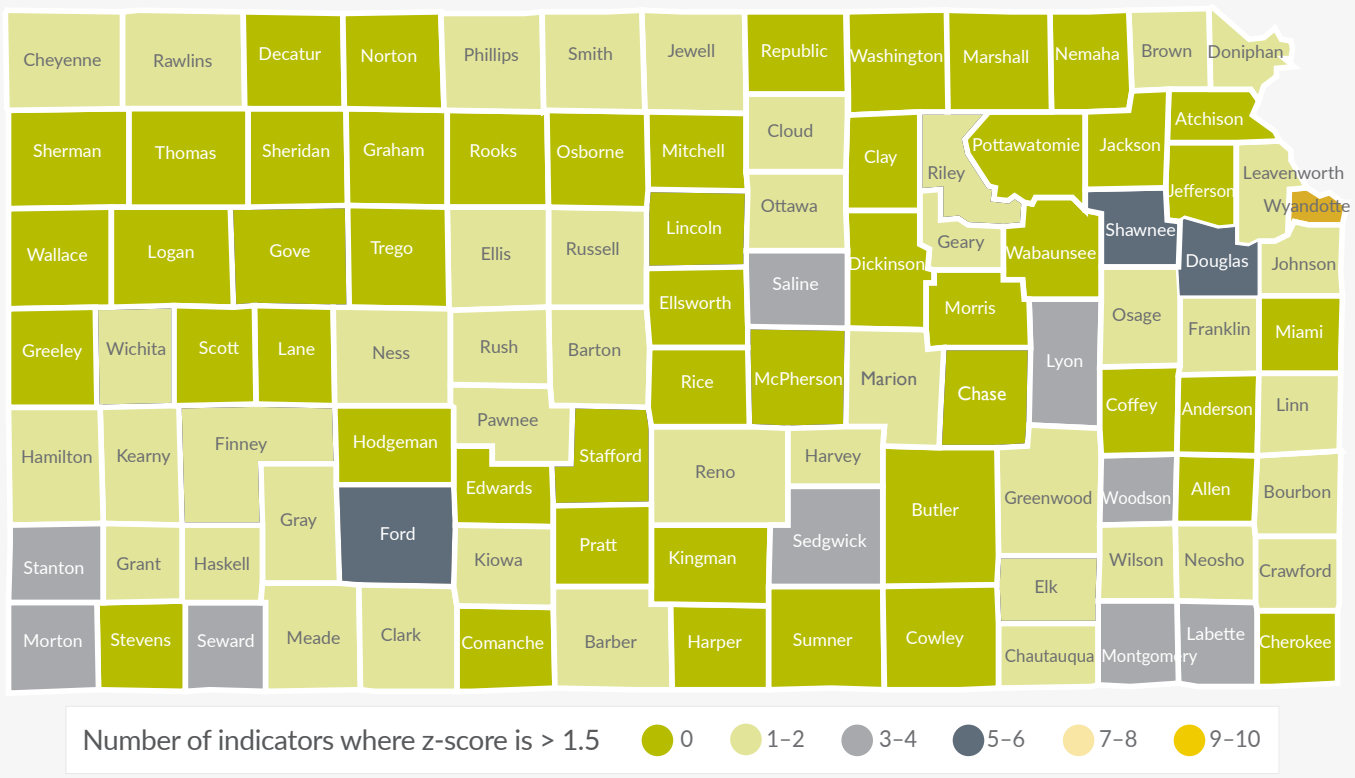
Figure 32. **Kansas Counties with "High" or "Very High" Vulnerability Scores, 2008–2012**

COUNTY	VULNERABILITY SCORE
Lyon	3
Montgomery	3
Morton	3
Sedgwick	3
Seward	3
Stanton	3
Labette	4
Saline	4
Woodson	4
Douglas	5
Ford	5
Shawnee	5
Wyandotte	9

Source: KHI Medical Marijuana HIA Project, 2015.

The 13 counties that were identified as having 'high' or 'very high' vulnerability scores are listed in *Figure 32* and illustrated in *Figure 33*. Based on the analysis, 13 counties were determined to have underlying behavioral and socioeconomic characteristics that would identify them as being vulnerable to poor population health outcomes if medical marijuana were to be legalized. These counties may experience disproportionate impacts related to marijuana use. Based on these findings, policymakers could consider focusing prevention efforts on these counties if medical marijuana is legalized in Kansas.

Figure 33. **Geographical Distribution of Vulnerable Kansas Counties, 2008–2012**



Source: KHI Medical Marijuana HIA Project, 2015.

In addition to the issues that were identified at the beginning of this health impact assessment project, some issues were identified through literature and stakeholder interviews that are pertinent to the legalization of medical marijuana. The issues include:

- marijuana-related arrests;
- use of substances other than marijuana, and
- illegal possession and selling of drugs.

Additionally, stakeholders identified impacts related to economic issues (state and local revenue, jobs) and the medical marijuana model (dispensaries vs. self-grow) as important factors to consider. The HIA Team did not conduct further assessment on these topics due to limited literature and data; however the information provided by stakeholders is included. Monitoring and future assessment of indicators related to state and local revenue, jobs, and enforcement will be important to conduct if legislation passes in order to inform how the legislation could impact the health of Kansans.

Marijuana-Related Arrests

Literature

Marijuana is the most commonly used illicit drug in the United States.[200] Forty-five percent of drug law violations are a result of marijuana possession.[201] The "war on drugs" has been suggested as an important contributor to growing incarceration rates within the United States.[202 203] From 1990 to 2002, marijuana arrests increased 113 percent.[204] During the same time period, non-marijuana related drug arrests increased only around 10 percent.[205] Because marijuana trafficking arrests declined during that period and overall crime rates were lower than they had been since the 1970s, the growth in marijuana arrests is likely due to law enforcement practices.[206] Similarly, marijuana use fluctuated but remained near the same level and the use of other drugs did not appear to decline in this period.[207] This suggests that the efforts of law enforcement in addressing drug use disproportionately affected marijuana consumption.[208]

It also appears that African Americans may be disproportionately affected by marijuana arrests, as there are similar rates of marijuana use among whites and African Americans, but a higher rate of marijuana arrests among African Americans.[209] This issue did not exist prior to 1991,[210] suggesting that as the war on drugs has increasingly affected marijuana, it has also increasingly affected African Americans.[211]

African Americans may use marijuana at a similar rate to whites, but analysis of 2005 National Survey on Drug Use and Health (NSDUH) data showed that low-income African Americans were the most likely to have symptoms outlined by the Diagnostic and Statistical Manual of Mental Disorders (v.4) as indicative of marijuana dependence when compared to whites and Hispanics.[212] Additionally, African Americans may engage in marijuana-related behaviors more likely to lead to arrest. For example, an analysis of 2002 NSDUH data found that African Americans were three times more likely to report buying marijuana from a stranger (predicted probability (PP) = 0.30 for African Americans and 0.09 for whites) and twice as likely to report buying the drug outside where they could be more readily observed by law enforcement (PP =0.31 for African Americans and 0.14 for whites).[213]

Marijuana is the primary drug that exposes youth to the criminal justice system,[214] and marijuana arrests may have serious implications in a young person's future prospects. It is unclear how legalization of medical marijuana may affect marijuana arrests in general or among the African American population.

Data

Data for arrests due to marijuana were available by race for 13 comparison states. An analysis of the differences in arrest rates (per 100,000 people) pre- and post-medical marijuana legalization showed that there was no clear pattern of increased or decreased arrests for either race across the states. While Colorado and Hawaii showed a statistically significant decrease in arrests for both races, Montana showed a statistically significant increase in arrests for

both races. Additionally, Michigan showed a statistically significant increase in arrests for African Americans, but not whites, or for both races combined (*Figure 34*).

Regardless of the change before and after medical marijuana legalization, the rates of arrests for marijuana were significantly higher for African Americans than for whites in all states, and for the United States as a whole. *Figure 35*, page 48, shows data by race for arrest rates for sale, manufacturing and possession of marijuana nationwide between 1993 and 2012. Over these 20 years, the arrest rate remains consistently higher for African American than whites. At their peak, arrests for whites were 182 per 100,000 people, in comparison to 515 per 100,000 for African Americans. It should be noted that there was a significant drop in arrests due to marijuana between 2001 and 2002 for both races. It is unclear what led to this drop.

Use of Substances Other than Marijuana

Literature

Literature suggests that some individuals may use marijuana as a substitute for alcohol or other illicit drugs.[215] Among some members of the population, alcohol and marijuana may also be complements.[216] [217] [218] However, the relationship is not clear. While individuals did report using marijuana to replace alcohol and other illegal drugs (26 to 51 percent),[219] [220] [221] [222] [223] a noteworthy proportion of individuals seeking medical

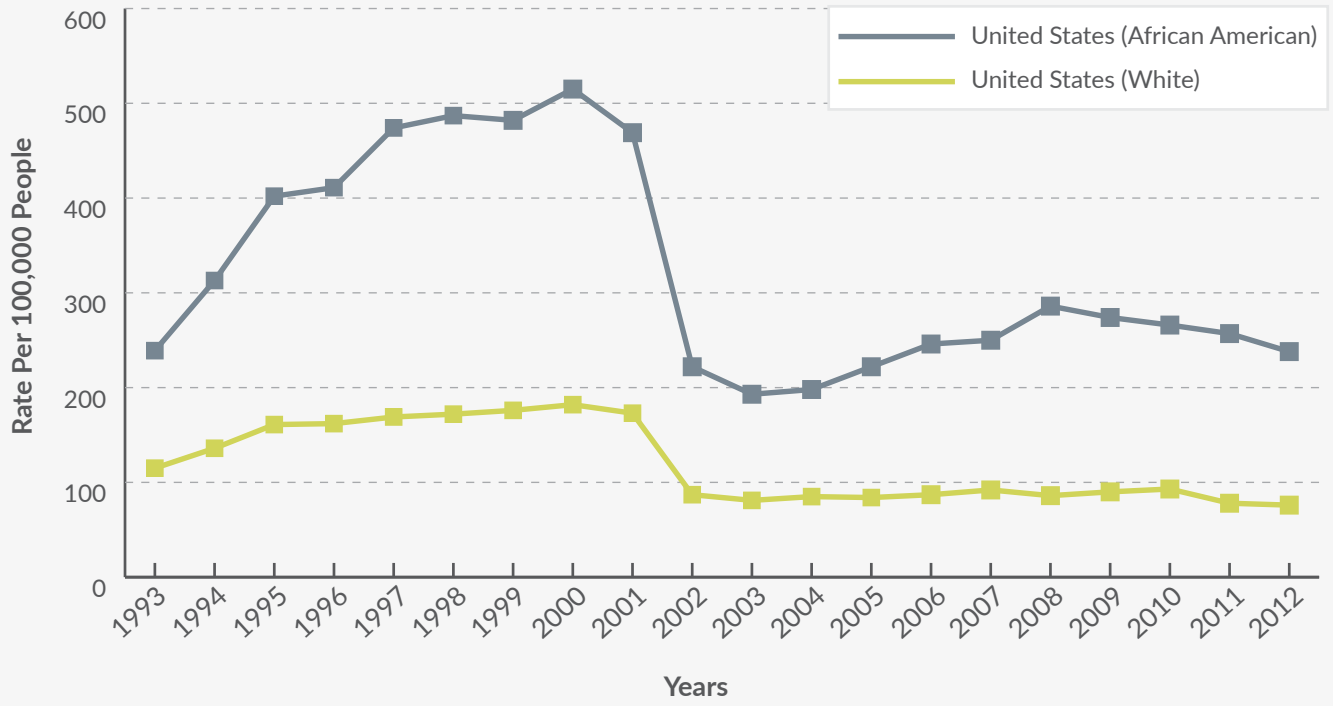
Figure 34. **Annual Arrest Rates Before and After Medical Marijuana Legalization (MML) by Race in Selected States, 1990–2013**

STATE	ARREST RATES (WHITE)		ARREST RATES (AFRICAN AMERICAN)		ARREST RATES (BOTH RACES)	
	PRE-MML	POST-MML	PRE-MML	POST-MML	PRE-MML	POST-MML
Alaska	125.5	136.7	195.2	174.8	128.9	138.5
California	134.8	163.6	286.7	441.7	148.1	187.2
Colorado	181.5	112.7*	599.7	253.5*	200.0	118.8*
Hawaii	152.1	118.5*	159.5	145.9	152.7	120.3*
Maine	196.4	160.5	298.4	270.7	196.9	161.4
Michigan	75.5	69.9	209.0	293.3*	95.7	103.7
Montana	29.5	54.7*	73.3	265.4*	29.6	55.8*
Nevada	141.8	147.4	411.9	713.6	163.7	199.3
New Mexico	60.7	61.3	126.7	160.5	62.4	64.1
Oregon	160.7	138.8	331.5	283.1	163.8	141.5
Rhode Island	147.5	89.0	404.2	298.1	163.9	105.0
Vermont	54.9	64.1	175.9	219.8	55.6	65.6
Washington	120.0	118.4	209.0	231.5	123.2	122.8

Note: *indicates statistically significant at p<0.05; Years of state data are based on the year each legalized medical marijuana (e.g. Colorado legalized medical marijuana in 2000. Pre = 1995-1999; Post = 2001-2005). MML = Medical Marijuana Legalization.

Source: KHI analysis of data from the Federal Bureau of Investigation Uniform Crime Reporting, 1990–2013.

Figure 35. **Arrest Rates for the Sale, Manufacturing and Possession of Marijuana, United States, 1993–2012**



Source: KHI analysis of data from the Federal Bureau of Investigation Uniform Crime Reporting, 1993–2013.

marijuana prescriptions simultaneously reported using alcohol (48 to 63 percent) and other drugs (11 to 15 percent).[224 225 226 227 228] Whether increased access to and use of marijuana could result in increased use of alcohol or other drugs, or individuals who would already use those substances decide to also use marijuana, remains unclear. Additionally, 12 of 13 individuals entering treatment for marijuana use reported using additional substances with marijuana.[229] In a different study of 18 individuals, medical marijuana use did not appear to interfere with the treatment for the use of other substances.[230] The presence of dispensaries may be correlated with the increased use of alcohol and marijuana in combination.[231 232]

The type of model for medical marijuana (i.e. self-grow or dispensaries) may have differential impacts on the use of substances other than marijuana. See *Appendix E*, page 62, for more detail.

Stakeholder Perspectives

Interviewees were mixed concerning how legalizing medical marijuana might impact the use of other substances. Opponents generally thought that the use of other substances would increase, stating that using substances in combination with one another is common. Proponents disagreed, stating that using other substances would decrease, as patients would be able to use marijuana instead of others that may be addictive like prescription pain medications. Some interviewees did not believe medical marijuana would impact the use of other substances, stating that marijuana use itself would increase.

> *When patients are able to medicate with a safe and effective medicine, they are less likely to medicate in other areas.*
>
> *- Proponent*

> *I think it would increase because a lot of people who become addicted to one substance quickly become addicted to another.*
>
> *- Opponent*

Illegal Possession and Sale of Drugs

Literature

Four studies directly explored whether or not legalization of medical marijuana was associated with the illegal sale or possession of other drugs.[233] [234] [235] [236] Two of the studies found that legalization of medical marijuana positively correlated with increased arrests for illegal marijuana possession.[237] [238] A third found that individuals with a medical marijuana prescription were more likely to make or sell illegal drugs than those without a similar prescription.[239] A final study conducted in a medical marijuana state, but not differentiating medical marijuana use from non-medical use, found that a large proportion of individuals who self-reported marijuana use also reported obtaining marijuana from a friend (50 to 80 percent) or buying it (50 percent).[240]

Stakeholder Perspectives

Interviewees were mixed on whether legalizing medical marijuana would impact the illegal selling or possession of drugs. Most opponents believed that there would be more illegal selling and possession of drugs, as the perception of marijuana may be favorable, and more people would be interested in getting it legally or illegally. Proponents and opponents stated that the illegal market would not dissipate with the legalization of medical marijuana. Other opponents stated that illegal selling or possession of drugs would not change, as more people would be able to obtain it legally.

> *There would probably not be a lot of change. There may be a shift in what is being sold.*
>
> *- Opponent*

Models of Distributing Medical Marijuana

Stakeholder Perspectives

Interviewees were divided on which medical marijuana model they believed would be better for Kansas to implement. Opponents generally did not believe either model (dispensaries and self-grow) would be acceptable, as they are opposed to legalizing medical marijuana under any distribution model. In particular, opponents did not prefer the self-grow model because of the difficulty with regulating the amount and content of medical marijuana. Most proponents stated that they preferred having both models so patients would have the flexibility to access marijuana based on their needs. For instance, an elderly person or apartment-dweller may not be able to grow it themselves, whereas a person with a specific medical condition might need to closely monitor which strain works best for them.

Jobs and Employment

Stakeholder Perspectives

Jobs

Interviewees were mixed regarding how legalizing medical marijuana would impact jobs in Kansas. In general, proponents and a few opponents suggested jobs would increase if Kansas implemented a dispensary system, as they would require employees. Some opponents felt that those under the influence of marijuana may experience challenges with maintaining employment depending upon workplace requirements on medical marijuana.

> *"There could be additional jobs created through dispensaries, but it could also make it difficult when hiring people."*
>
> *- Opponent*

Wages

Interviewees were also mixed on whether medical marijuana legalization would impact wages as a result of any job creation. Opponents either did not believe wages would be impacted or were unsure. Some proponents believed wages would increase with one mentioning that dispensary jobs may pay more than minimum wage.

Health Insurance and Other Benefits

Interviewees were mixed regarding whether medical marijuana legalization would impact health insurance and other benefits provided by jobs in the industry or otherwise. Opponents stated that health insurance costs and claims may rise as a result of possible accidents at work due to being under the influence of medical marijuana. Others noted that insurance companies may not cover the costs of medical marijuana for patients. Proponents either thought there would be no impacts on health insurance or were unsure, with one stating that rates would not increase due to medical marijuana legalization.

Work Environment

A majority of interviewees were concerned about the use of medical marijuana while on the job. Some opponents stated that there could be increased accidents and worker's compensation claims due to being under the influence of marijuana at work. However, a proponent noted that while being under the influence of medical marijuana at work may be a concern, the potential for negative consequences would be less severe than being under the influence of other substances. Additionally, some proponents noted that those with medical conditions may be able to gain employment or perform better at work because medical marijuana would alleviate some of their symptoms (e.g. chronic pain).

> *"I don't think the truck driver, school bus driver or pilot should be able to have THC in their system while at work."*
>
> *- Proponent*

Revenue

Stakeholder Perspectives

Proponents and opponents generally agreed that state revenue would increase due to taxes on medical marijuana. However, some opponents believe that the revenue gained would not outweigh the potential social costs in required enforcement and increased costs for addiction treatment. Other opponents stated that medical marijuana is not generally taxed, and therefore, would not affect state revenue. Proponents stated that money generated could be used for education and community services, creating positive outcomes. Most interviewees were unsure if local tax revenue would be affected, stating that local dollars generated from medical marijuana legalization would depend on regulations and the model implemented at the state level. Some interviewees thought that money from tax revenue could be set aside for prevention and education, but again, it would depend on the legislature to stipulate that in policies.

Figure A-1. **Summary of Health Impacts of Legalizing Medical Marijuana in Kansas**

				Based on Literature and Data					Literature
Health Factor or Outcome	Literature Review	Data Analysis	Stakeholder Perspectives	Overall Projection	Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Access to Marijuana	Increase	N/A	Increase	Increase	Uncertain	Medium	Possible	At-risk youth, people with qualifying medical conditions	***
Consumption of Marijuana (illegal) (general population)	Mixed	None	N/A	None	None	N/A	Uncertain	N/A	**
Consumption of Marijuana (illegal) (youth)	Mixed	None	N/A	Mixed	Negative	Low	Likely	At-risk youth (those in substance abuse treatment, individuals already using drugs)	****
Consumption of Marijuana (legal)	N/A	Increase	Increase	Increase	Uncertain	Low	Likely	People with approved qualifying conditions	**
Violent Crime	Mixed	None	Mixed	None	None	N/A	Possible	N/A	**
Property Crime	Mixed	None	Mixed	None	None	N/A	Possible	N/A	**
Driving Under the Influence of Marijuana	Increase	Increase	Increase	Increase	Negative	Low	Likely	People who use marijuana and drive, passengers	***
Accidental Ingestion	Increase	Increase	Increase	Increase	Negative	Low	Possible	Children under age 5	****
Other Substance Use	Decrease	N/A	Mixed	Decrease	Uncertain	Low	Possible	Substance users and people who use prescription drugs	**

Source: KHI Medical Marijuana HIA Project, 2015. Legend: Figure B-1, page 53.

Figure B-1. **Legend: Health Impacts for Kansas**

CRITERIA	DESCRIPTION
Literature Review	Increase — Literature review found that this indicator might increase. Decrease — Literature review found that this indicator might decrease. Mixed — Literature lacked consensus about this indicator's potential direction. None — Literature review didn't find a change for this indicator. N/A — Literature was not available or a review was not performed on this indicator.
Data Analysis	Increase — Data analysis found that this indicator might increase. Decrease — Data analysis found that this indicator might decrease. Mixed — Data analysis lacked consensus about this indicator's potential direction. None — Data analysis didn't find a change for this indicator. N/A — Data were not available or analysis was not performed for this indicator.
Stakeholder Perspectives	Increase — Stakeholders anticipated that this indicator might increase. Decrease — Stakeholders anticipated that this indicator might decrease. Mixed — Stakeholders were divided in their opinions for this indicator. None — Stakeholders didn't anticipate a change for this indicator. N/A — Stakeholders didn't express an opinion regarding this indicator.
Overall Projection	Increase — The assessment found that this indicator might increase. Decrease — The assessment found that this indicator might decrease. Mixed — The assessment lacked consensus about this indicator's potential direction. None — The assessment didn't find a change for this indicator. N/A — The assessment wasn't performed for this indicator.
Expected Health Effect	Positive — Changes may improve health. Negative — Changes may impair health. Uncertain — Unknown how health might be affected. Mixed — Changes may be positive as well as negative. None — No identified effect on health.
Magnitude of Impact (number of people affected)	High — Affects most or all people in Kansas. Medium — Affects a moderate number of people, such as a segment of the population (e.g., youth). Low — Affects few or very few people, such as people with certain medical conditions. It is important to note, that although only some groups of people might be affected, the impact on a particular individual might be high. None — Affects no people. N/A — It was not possible to estimate the magnitude of impact.
Likelihood of Impact	Likely — It is likely that impacts might occur as a result of the proposed changes. Possible — It is possible that impacts might occur as a result of the proposed changes. Unlikely — It is unlikely that impacts might occur as a result of the proposed changes. Uncertain — It is uncertain whether impacts would occur as a result of the proposed changes.
Distribution	People most likely to be affected by changes in the indicator.
Quality of Evidence (based on literature review)	*** — Strong literature and/or data. ** — Sufficient literature and/or data. * — Lacks either quality literature and/or data.

Source: KHI Medical Marijuana HIA Project, 2015.

Key Findings and Recommendations

	FINDINGS	RECOMMENDATIONS
AREAS	The findings were developed based on the literature review, data analysis and stakeholder interviews.	The recommendations are drawn from the findings and are intended to maximize health benefits while minimizing health risks.
ACCESS TO MARIJUANA	• Perception of easy access to marijuana is associated with consumption of marijuana among youth. • Easy access to marijuana is associated with poverty (percent of people below the federal poverty level), median household income and unemployment. • Individuals (e.g., at-risk youth) without legal access to marijuana may obtain marijuana from people with legal access. • In the states with traditional medical marijuana laws, the average medical marijuana patient is a middle-aged, white male (age 35 years and older). • Most medical marijuana prescriptions/ recommendations are for chronic pain.	**Kansas Department of Health and Environment of could consider:** • Requiring dispensaries to limit advertising of services and products to the public. • Conducting a media campaign to highlight the myths and realities of the medical marijuana program in Kansas. **Kansas Department of Health and Environment, in collaboration with Kansas law enforcement agencies, could consider:** • Requiring educational materials to be provided at dispensaries regarding importance of not sharing marijuana. • Ensuring that law enforcement prosecutes those who willingly share medical marijuana with unauthorized individuals.
CONSUMPTION OF MARIJUANA	• The legalization of medical marijuana may result in little to no impact on consumption of marijuana among the general population in Kansas. • Some increase in marijuana consumption might occur for at-risk youth, but the level of change in youth consumption would depend on regulation and law enforcement practices. • Individuals with qualifying medical conditions can become users of medical marijuana. However, the level of change in consumption would depend on regulation. • Some medical marijuana patients who currently use substances such as alcohol and/or prescription pain killers may substitute them with marijuana. However, others may use them in combination.	**Kansas Department of Health and Environment could consider:** *Monitoring and Surveillance* • Adding questions in the state-added module of the Behavioral Risk Factor Surveillance System (BRFSS) related to marijuana use, including: – Medical marijuana use and marijuana use in general, – Source of marijuana, – Concurrent use of marijuana with other substances such as alcohol, and – Whether youth are using someone else's medical marijuana. • Monitoring rates of participation in treatment programs. *Youth Prevention* • Encouraging parents and caregivers to hold regular discussions with their children regarding risks associated with marijuana use. • Discouraging adults from using marijuana in the presence of children because of the influence of role modeling by adults on child and adolescent behavior.* *Provider Accountability* • Identifying evidence-based practices that keep health care providers accountable to the types of prescriptions/recommendations they make for medical marijuana (such as Kansas Tracking and Reporting of Controlled Substances K-TRACS).

Note: (*) Recommendations that were rated the highest by stakeholders are denoted with an asterisk.

Source: KHI Medical Marijuana HIA Project, 2015.

	FINDINGS	RECOMMENDATIONS
AREAS	The findings were developed based on the literature review, data analysis and stakeholder interviews.	The recommendations are drawn from the findings and are intended to maximize health benefits while minimizing health risks.
CONSUMPTION OF MARIJUANA (CONT.)		**The Kansas Legislature could consider:** • Revisiting the legislation regarding opt-in vs. opt-out for the Communities that Care (CTC) survey. **Kansas schools and universities, in collaboration with the Kansas Department of Health and Environment and local health departments, could consider:** • Identifying evidence-based educational programs to implement at schools and universities related to risks associated with marijuana use. **Kansas Department of Health and Environment and Kansas research institutions could consider:** • Researching the efficacy of medical marijuana for current and potential qualifying medical conditions.
VIOLENT/ PROPERTY CRIME	• The legalization of medical marijuana may have no impact on violent and property crime rates. • Areas that are located in close proximity to dispensaries might experience some increase in crime rates. However, dispensaries may be more likely to open in areas that already have high crime rates.	**Kansas Bureau of Investigation and other state and local law enforcement agencies could consider:** • Reporting marijuana use separately from other drug use in surveillance and data systems. • Monitoring changes in crime rates in areas where dispensaries are located. If significant changes are detected, identify appropriate measures for addressing issues. **Kansas Department of Health and Environment could consider:** • Requiring dispensaries to implement safety measures to deter crime, such as video surveillance, locked supply storage, etc. • Implementing zoning requirements for dispensaries stipulating minimum distances to certain entities including schools, universities, child care and correctional facilities.
DRIVING UNDER THE INFLUENCE OF MARIJUANA	• The legalization of medical marijuana may result in an increase in driving under the influence of marijuana and related traffic accidents.	**The Kansas Department of Transportation (KDOT) and local law enforcement could consider:** • Increasing testing and reporting for marijuana in drivers, especially fatally injured drivers and at-fault drivers. **Kansas Department of Health and Environment, local health departments and KDOT could consider:** • Educating the public on marijuana-related impairment (driving, biking), including riding with impaired drivers.*

Note: (*) Recommendations that were rated the highest by stakeholders are denoted with an asterisk.

Source: KHI Medical Marijuana HIA Project, 2015.

	FINDINGS	RECOMMENDATIONS
AREAS	The findings were developed based on the literature review, data analysis and stakeholder interviews.	The recommendations are drawn from the findings and are intended to maximize health benefits while minimizing health risks.
DRIVING UNDER THE INFLUENCE OF MARIJUANA (CONT.)		• Including questions on the state module of the Behavioral Risk Factor Surveillance System (BRFSS) to monitor self-reported impaired driving behaviors and perceptions of risk associated with impaired driving. • Requiring medical marijuana products to have labels with detailed usage and warning information. **Kansas Department of Health and Environment could consider:** • Developing and providing educational materials to health-related service providers, such as dispensaries and doctors' offices, in order to inform medical marijuana cardholders on the dangers of using marijuana with other drugs and substances (i.e. alcohol).
ACCIDENTAL INGESTION	• The accidental ingestion of marijuana could increase, specifically for children. However, increases could be due to several factors; for instance, individuals may be more likely to seek treatment for accidental ingestion, and health care providers may be more likely to test patients for marijuana. • An increase in accidental ingestions of marijuana might be relatively minimal compared to accidental ingestion of opioids.	**The Kansas Hospital Association could consider:** • Monitoring emergency department visits for accidental ingestion of marijuana, especially among children under age five. **Kansas Department of Health and Environment could consider:** • Developing and providing educational materials to health-related service providers, such as dispensaries and doctors' offices, in order to inform marijuana cardholders or caregiver (parents/grandparents/guardians) about safe use and storage.* • Enacting regulations for child-proof packaging in order to prevent accidental ingestion of marijuana.* • Limiting the number of types of edibles, and require those that are allowed be less attractive to kids and youth (e.g., they should not be made to look like candy).*
VULNERABLE POPULATIONS	• The perception of easy access to marijuana is associated with poverty (percent of people below 100 percent of the federal poverty level), median household income and unemployment. • Thirteen Kansas counties may be at risk for disproportionate impacts if medical marijuana were to be legalized in Kansas.	**Kansas Department of Health and Environment could consider:** • Prioritizing 13 "vulnerable" counties for any efforts focused on reducing risks associated with marijuana use.

Note: Stakeholders provided their perspectives on whether each recommendation was 1) feasible 2) responsive to predicted impacts, and 3) addressed vulnerable populations. (*) Recommendations that were rated the highest by stakeholders are denoted with an asterisk.

Glossary of Key Terms

KEY TERM OR PHRASE	MEANING	PAGE OF FIRST REFERENCE
EXECUTIVE SUMMARY		
Marijuana (Cannabis)	Cannabis, commonly known as marijuana, means all parts of the plant Cannabis sativa L., whether growing or not; the seeds thereof; the resin extracted from any part of such plant; and every compound, manufacture, salt, derivative, mixture, or preparation of such plant, its seeds or resin. Such term does not include the mature stalks of such plant, fiber produced from such stalks, oil or cake made from the seeds of such plant, any other compound, manufacture, salt, derivative, mixture, or preparation of such mature stalks (except the resin extracted therefrom), fiber, oil, or cake, or the sterilized seed of such plant which is incapable of germination.[241] It is classified as a Schedule 1 controlled substance under the federal Controlled Substances Act of 1970 and is subject to federal prosecution.	Page 2
Medical Marijuana	Medical marijuana laws differ from state to state, but medical marijuana is generally defined as marijuana that is used for medicinal purposes. In Kansas, the 2015 bills (House Bill 2011, Senate Bill 9 and House Bill 2282) defined medical marijuana as follows: • Senate Bill 9 and House Bill 2011: "cannabis" means all parts of all varieties of the plant cannabis whether growing or not, the seeds thereof, the resin extracted from any part of the plant and every compound, manufacture, salt, derivative, mixture or preparation of the plant, its seeds or resin.[242] • House Bill 2282: "cannabis" means all parts of all varieties of the plant Cannabis sativa L., not exceeding 3 percent tetrahydrocannabinol by weight.[243]	Page 2 and after
Legalization of Medical Marijuana	Medical marijuana legalization would allow individuals to consume marijuana for medical purpose when in accordance with state law.	Page 2
Forms of Medical Marijuana	Medical marijuana can be produced and ingested in various forms, including edibles (e.g., candies, cookies), pills, and oils, and can also be smoked.	Page 2
OVERVIEW OF LEGISLATION		
Dispensary	A registered entity that can grow, transport, manufacture, distribute and/or sell medical marijuana to qualified patients (e.g., patients and/or caregivers who have a medical marijuana card). The term "dispensary" is not used uniformly across states. Some states use such terms as "hemp preparation center," "compassion center" or "medical hemp establishment," among others.	Page 7
Growing or Self-Growing Medical Marijuana	Some laws allow patients or caregivers to grow marijuana for consumption. The amount of marijuana a person or their primary caregiver may legally possess for medical reasons or the number of plants one can grow depends on their state's medical marijuana law.	Page 7

Source: KHI Medical Marijuana HIA Project, 2015.

KEY TERM OR PHRASE	MEANING	PAGE OF FIRST REFERENCE
OVERVIEW OF LEGISLATION (CONT.)		
State (Kansas) Drug Tax	Kansas was one of the first states to enact a tax on illegal drugs. The purpose of the tax is to tax the underground economy and provide a source of revenue for the state. Pursuant to K.S.A. 79-5202, the tax rates are: processed = $3.50 per gram; wet plant = 40 cents per gram, and dry plant = 90 cents per gram. Payment of the drug tax (the purchase and affixation of stamps) is due immediately upon acquisition or possession by the dealer. The Kansas Department of Revenue's Investigation and Criminal Enforcement (ICE Unit), organizationally placed within the Alcoholic Beverage Control Division, is responsible for administering the tax on illegal drugs.[244]	Page 7
Registration Fee	Most of the states require dispensaries and individuals registering for a medical marijuana card to pay a registration fee. Nonrefundable fees for dispensary applications generally range from $1,000 to $5,000, with registration or annual fees typically between $5,000 and $20,000. Patient fees are typically between $25 and $100 for medical marijuana cards.[245]	Page 7
Medical Marijuana Card	A medical marijuana card is a state-issued identification card that enables a patient with a doctor's recommendation to obtain, possess or cultivate marijuana for medicinal use. These cards are issued by a state or county in which medical marijuana is legalized. Typically a patient is required to pay a fee to the state in order to obtain a medical marijuana card. In most states with medical marijuana card programs, the card is valid for up to 12 months and may be renewed. States where medical marijuana is legal differ in regard to requirements for obtaining a medical marijuana card.[246]	Page 7
Traditional Medical Marijuana Laws	Twenty-three states and the District of Columbia allow medical marijuana for a number of conditions and place few restrictions on forms and content of medical marijuana. Other states have more restrictive laws.	Page 7
Epilepsy	Epilepsy, which is one of various seizure disorders, is a disorder of the brain. A person is diagnosed with epilepsy when they have had two or more seizures. A seizure is a short change in normal brain activity.[247]	Page 7
Seizure Disorders	Seizure disorders are neurological disorders that may cause physical convulsions, minor physical signs, thought disturbances, or a combination of symptoms that are the result of uncontrolled electrical activity in the brain. An individual with a seizure disorder, such as epilepsy, may experience one or more different types and levels of seizure severity.	Page 7
Conditions Causing Seizures	Epilepsy is just one of many conditions that may cause seizures. Others include head injuries, lack of sleep, infections in the brain, low blood sugar, drug use and alcohol withdrawal.[248]	Page 8
Tetrahydrocannabinol (THC)	Delta-9-tetrahydrocannabinol, delta-9-THC. THC is the main psychoactive ingredient in marijuana and is the most responsible for intoxication.	Page 7
Cannabidiol (CBD)	CBD is not psychoactive and may even have an antipsychotic effect. Research suggests that marijuana with a higher ratio of CBD to THC may have fewer negative side effects than high-THC, low-CBD strains.	Page 7
MARIJUANA'S POTENTIAL MEDICAL BENEFITS AND RISKS		
Medical Benefit	Effectiveness of a drug in improving health status.	Page 8
Non-Systematic Review of Literature	A summary of published evidence on a research question or topic that used informal methods to identify and collect included studies.	Page 8

Source: KHI Medical Marijuana HIA Project, 2015.

KEY TERM OR PHRASE	MEANING	PAGE OF FIRST REFERENCE
MARIJUANA'S POTENTIAL MEDICAL BENEFITS AND RISKS (CONT.)		
Clinical Studies	Research to test an intervention in human subjects, also known as clinical trials. Clinical trials are carefully designed studies that closely monitor people as they undergo an investigational intervention. Before reaching clinical trials, the intervention typically will have been studied in a laboratory (non-clinical studies) and in animals (pre-clinical studies). Clinical trials are designed to answer questions about the safety and effectiveness of a new intervention or the long-term effects of an approved intervention.	Page 8
Neuropathy	A condition that develops as a result of damage to the peripheral nervous system — the vast communications network that transmits information between the central nervous system (the brain and spinal cord) and every other part of the body.[249]	Page 8
Cachexia	A condition of advanced protein-calorie malnutrition and is characterized by involuntary weight loss, muscle wasting and decreased quality of life.[250]	Page 8
Crohn's Disease	Crohn's disease is a disease that causes inflammation, or swelling and irritation of any part of the digestive tract—also called the gastrointestinal (GI) tract. The part most commonly affected is the end part of the small intestine, called the ileum.[251]	Page 8
Glaucoma	Glaucoma is a group of diseases that damage the eye's optic nerve and can result in vision loss and blindness.[252]	Page 8
Amyotrophic Lateral Sclerosis (ALS)	Amyotrophic lateral sclerosis (ALS), sometimes called Lou Gehrig's disease, is a rapidly progressive, invariably fatal neurological disease that attacks the nerve cells (neurons) responsible for controlling voluntary muscle movement (muscle action we are able to control, such as those in the arms, legs and face).[253]	Page 8
Hepatitis C	Hepatitis C is a liver disease that results from infection with the Hepatitis C virus. It can range in severity from a mild illness lasting a few weeks to a serious, lifelong illness. Hepatitis C is usually spread when blood from a person infected with the Hepatitis C virus enters the body of someone who is not infected.[254]	Page 8
Alzheimer's Disease	Alzheimer's disease is an irreversible, progressive brain disease that slowly destroys memory and thinking skills, and eventually the ability to carry out the simplest of tasks. In most people with Alzheimer's, symptoms first appear after age 65.[255]	Page 8
Nail Patella	Nail-patella syndrome (NPS) involves changes in the nails, knees, and elbows, and the presence of iliac horns. Nail changes are the most constant feature of NPS. Nails may be absent, hypoplastic, or dystrophic; ridged longitudinally or horizontally; pitted; discolored; separated into two halves by a longitudinal cleft or ridge of skin; and thin or (less often) thickened.[256]	Page 8
Multiple Sclerosis	Multiple Sclerosis (MS) involves an immune-mediated process in which an abnormal response of the body's immune system is directed against the central nervous system (CNS). The CNS is made up of the brain, spinal cord and optic nerves.[257]	Page 8
Fibromyalgia	Fibromyalgia is a disorder characterized by widespread pain, abnormal pain processing, sleep disturbance, fatigue and often psychological distress.[258]	Page 8
Schizophrenia	Schizophrenia is a serious mental illness characterized by incoherent or illogical thoughts, bizarre behavior and speech, and delusions or hallucinations, such as hearing voices. Schizophrenia typically begins in early adulthood.[259]	Page 9
Carcinogens	Any substance or agent capable of causing cancer in living tissue.	Page 9
HEALTH PROFILE OF KANSAS		
Median Annual Household Income	Median annual household income refers to the income level earned by a given household where half of the homes in the sample earn more and half earn less. It's used instead of the average or mean household income because it can give a more accurate picture of actual economic status when the income distribution is skewed.[260]	Page 10

Source: KHI Medical Marijuana HIA Project, 2015.

KEY TERM OR PHRASE	MEANING	PAGE OF FIRST REFERENCE
HIA METHODOLOGY		
Environmental Scan	A study and interpretation of the political, economic and social factors surrounding a particular issues.	Page 11
Statistically Significant Difference	An indication that a result or relationship is caused by something other than random chance. Statistical hypothesis testing is traditionally employed to determine if a result is statistically significant. Hypothesis testing provides a "p-value" representing the probability that random chance could explain the result. In general, a five percent or lower p-value is considered to be statistically significant.	Page 13
ACCESS		
Rates of Diversion to Non-Authorized Individuals	Diversion occurs when individuals not authorized to obtain medical marijuana are able to acquire it from someone who is authorized to obtain it. The rate of diversion is the proportion of individuals illegally accessing medical marijuana through diversion within a specific time period (e.g., a year).	Page 19
CONSUMPTION OF MARIJUANA		
Dependent Variable	A dependent variable is what is measured in an experiment or statistical analysis.	Page 25
Independent Variable	An independent variable or variables are those that are thought to affect the dependent variable or what is being measured.	Page 25
I-70 Corridor	Cities in Kansas along the I-70 Highway corridor include: Kansas City, Bonner Springs, Lawrence, Lecompton, Topeka, Manhattan, Junction City, Abilene, Salina, Russell, Hays, WaKeeney, Oakley, Colby and Goodland.	Page 25
DRIVING UNDER THE INFLUENCE		
Systemic-Level Intervention	A set of strategies implemented to modify a culture.	Page 34
ACCIDENTAL INGESTION		
Infused Edibles	Food products made by infusing medical marijuana into them. Examples of infused edibles include cookies and candies.	Page 39
Protective Packaging Requirements	Standards to ensure that special packaging is used to reduce the risk of children ingesting dangerous items.	Page 39
Opioids	Medications that relieve pain. These medications are classified as narcotics and can be dangerous when abused. When used properly, opioids, such as morphine, have long been known to help the severe pain that follows surgery and to alleviate the suffering of people with advanced cancer.[261]	Page 39

Source: KHI Medical Marijuana HIA Project, 2015.

KEY TERM OR PHRASE	MEANING	PAGE OF FIRST REFERENCE
VULNERABLE POPULATIONS		
Vulnerable or Disproportionately Affected Populations	Vulnerable populations can be defined as populations that have experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender, mental health; cognitive, sensory, or physical disability; sexual orientation; or gender identity or geographical location.	Page 43
Population Health	The health outcomes of a group of individuals, including the distribution of such outcomes within the group.[262]	Page 44
OTHER ISSUES		
Marijuana Trafficking Arrests	Selling or distributing marijuana to another person that results in arrest.	Page 46

Source: KHI Medical Marijuana HIA Project, 2015.

Potential Differential Impacts of Self-Grow and Dispensaries: Medical Marijuana Models

Though the HIA Team did not explore varying impacts of different medical marijuana models in-depth, it is worth noting that different models of medical marijuana distribution may have different impacts on the issues explored in the report. In some cases, literature indicates that there may be differential impacts of self-grow and dispensaries. The table below outlines where there are differences indicated in the literature.

CATEGORY	SELF-GROW	DISPENSARY	EVIDENCE
Illegal Access to Marijuana	N/A	Potential Increase	Dispensaries • One study examined 465 medical marijuana dispensaries in California and found that 37.9 percent of dispensaries marketed themselves toward recreational marijuana users.[263] • Another study analyzed 39,157 marijuana samples seized from across the U.S. (1990–2010) and found that allowing dispensaries correlated with increased average marijuana potency, which may indicate increased access to THC.[264]
Consumption of Marijuana	N/A	Increase	Dispensaries • Two studies compared marijuana use (National Longitudinal Survey of Youth, 1997) and treatment admissions (Treatment Episode Data Set) data from before and after medical marijuana legalization and found dispensaries positively correlated with increased marijuana use and treatment.[265 266] • One study analyzed 2004–2012 National Survey on Drug Use and Health data and found that allowing for dispensaries associated with an 18.9 percent increase in marijuana purchase.[267] • Another study compared medical marijuana availability (using dispensaries and marijuana delivery services as proxies for availability) to self-reported use among adults age 18 and over in 50 California cities and found availability positively correlated with current marijuana use and frequency of use.[268]
Violent or Property Crime	Potential Decrease	Potential Increase	Dispensaries • One study compared the locations of 26 San Francisco medical marijuana dispensaries to 2010 police department data and found that dispensary density correlated with total violent crimes and non-violent crimes per 1,000 residents ($p=0.05$). However, other variables (e.g., poverty) had stronger positive correlations with crime suggesting that dispensaries did not attract crime but were more often opened in high crime areas.[269] • A study compared the locations of 275 medical marijuana dispensaries in 75 Denver neighborhoods to 2006–2010 police department data and found the strongest predictor of dispensaries was crime ($p<0.05$) and proportion of retail jobs ($p<0.05$), suggesting higher crime rates may relate to dispensaries moving into heavy retail areas.[270] • Another study explored attitudes of Colorado university students who were also legal medical marijuana users in 2009 (n=40) and found that the dangers of the unregulated marijuana market led students to seek marijuana prescriptions, and students appreciated dispensaries for reducing problems associated with past illegal marijuana transactions.[271] • The California Police Chief's Association published a whitepaper suggesting that dispensary-related crime often goes unreported because victims fear repercussions from law enforcement; dispensaries are often money-making enterprises, and operations have been tied to organized crime, gangs, and large marijuana growing operations.[272] Self-grow • One study compared Uniform Crime Reporting data from 18 states that legalized medical marijuana before 2013 to those that did not and found that home cultivation correlated with decreased robbery ($p<0.05$) and dispensary density correlated with increased property crime, burglary, and larceny/theft ($p<0.05$).[273]

Source: KHI Medical Marijuana HIA Project, 2015.

CATEGORY	SELF-GROW	DISPENSARY	EVIDENCE
Driving Under the Influence (Alcohol or Drugs)	Decrease	Increase	Dispensaries • One study analyzed 2004–2012 National Survey on Drug Use and Health data and found a positive correlation between allowing dispensaries and driving under the influence of alcohol (9.1 percent increase) as well as driving under the influence of drugs (23.9 percent increase).[274] • Two studies analyzed 1990 to 2009 Fatal Accident Reporting System (FARS) data and found that medical marijuana legislation negatively associated with fatal alcohol-involved accident rates, but the negative relationship turned positive in states that allowed dispensaries.[275 276] • The same studies also found that when data were restricted to include only accidents involving individuals under age 21, the positive relationship between dispensaries and increased fatalities was stronger.[277 278] Self-grow • One study also found that self-grow decreased driving under the influence by 12.8 percent.[279]
Accidental Ingestion of Medical Marijuana	N/A	Increase	Dispensaries • One study found increased accidental exposure in children after the dispensary system was in place.[280]
Use of Non-Prescription Drugs	Potential Increase	Increase	Dispensaries • One study examined data from the National Longitudinal Survey of Youth (1997–2009), Youth Behavior Risk Survey (1991–2011), Treatment Episode Data Set (1992–2009), and Fatality Analysis Reporting System (1990–2009) and found that dispensaries positively correlated with self-reported alcohol use.[281] • Another study analyzed 2004–2012 National Survey on Drug Use and Health data and found that allowing dispensaries led to a 12.1 percent increase in other illegal drug use (excluding marijuana).[282] Self-grow • The same study found a correlation between self-grow and dispensaries and an increase in alcohol abuse and dependence.[283]

Source: KHI Medical Marijuana HIA Project, 2015.

Note:

- **Self-grow:** State allows for individuals to possess and grow their own medical marijuana but does not allow dispensaries.
- **Dispensaries:** State allows the sale of marijuana through a single source to multiple patients.
- **N/A:** Studies did not specifically look at this issue.

Interview Documents and Survey Questionnaires

Health Impact Assessment Key-Informant Interview Informed Consent

The Kansas Health Institute (KHI) is conducting a health impact assessment (HIA) that will inform Kansas legislators and stakeholders about the potential positive and negative health effects that could result from the legalization of medical marijuana. During the 2014 Kansas Legislative Session, two bills (SB 9 and HB 2198) were introduced to legalize the use of marijuana for certain medical conditions. These bills are likely to be re-introduced for consideration in 2015. If passed, they could result in multiple impacts. A health impact assessment is a policy tool, which combines the best available research, data and community input in order to project the potential health impacts of a decision.

The purpose of this interview is to bring varying perspectives into the health impact assessment analysis, and you have been identified as a potential key stakeholder. We will also talk with additional relevant stakeholders from Kansas communities, state policymakers and experts in the field from other states that have adopted medical marijuana about the potential health impacts of this legislation. As a part of the HIA process, we will ask you to identify any possible health-related impacts of the proposed medical marijuana legislation.

While your participation is invaluable to the process, it is voluntary. This interview should take approximately 45 minutes to an hour of your time. In our HIA report, we will include the perspective from you and other stakeholders about how the proposed legislation may impact health. All responses will be kept strictly confidential and no statements will be attributed directly to you unless we get your consent to do so. If that is the case, we will follow up with you at a later date.

If you have any questions about this project or this interview, please email (ssmith@khi.org) or call (785) 233-5443 and ask for Sheena Smith.

_____

Signature

_____

Date

Health Impact Assessment Key-Informant Interview Questionnaire

The Kansas Health Institute (KHI) is conducting a health impact assessment (HIA) that will inform Kansas legislators and stakeholders about the potential positive and negative health effects that could result from the legalization of medical marijuana. During the 2014 Kansas Legislative Session, two bills (SB 9 and HB 2198) were introduced to legalize the use of marijuana for certain medical conditions. These bills are likely to be re-introduced for consideration in 2015. If passed, they could result in multiple impacts. A health impact assessment is a policy tool, which combines the best available research, data and community input in order to project the potential health impacts of a decision.

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If you have any questions about this project or this interview, please email (ssmith@khi.org) or call (785) 233-5443 and ask for Sheena Smith.

Part I. Medical Marijuana Legislation

We will first start off by asking a few questions related to the medical marijuana legislation.

1. What is your understanding of the proposed state legislation regarding the legalization of medical marijuana? *Please inform them of the legislation just introduced (SB 9 and HB 2011) and provide a short description of the proposed bill(s).*

2. Do you/your organization have a specific position on this legislation? If so, what is that position? Please explain.

3. In your opinion, what are the primary arguments of those in support of this legislation?

4. In your opinion, what are the primary arguments of those in opposition to this legislation?

5. How might this legislation impact you/your community/your organization/your constituents if passed?

Part II: Health Impacts of the Legislation

So far we have largely asked a few general questions about the legislation, but now I would like you to think more specifically about the health impacts of legislation to legalize medical marijuana in Kansas.

1. Do you think the legalization of medical marijuana would have any impacts on Kansas? If so, please explain.

2. Do you think the proposed legislation could affect the health of Kansas communities? If so, how?

    a. What potential positive impacts could result from the proposed legislation, if any? Please explain.

    b. What negative consequences do you anticipate, if any? Please explain.

3. Do you think that health considerations are part of the policy discussion on the legislation? If not, what health considerations are important, if any?

4. Do you think that this legislation would impact certain groups over others (e.g. people with qualifying medical conditions, minorities, youth, elderly, children and etc.)? If so, please explain. If not, why?

5. Some states that have legalized marijuana have systems that allow people to grow medical marijuana themselves at home, while some states require people get it through a dispensary. Other states allow both systems. What positive or negative impacts might be associated with these different models?

Part III. Key Issues: Pathway Diagram

Preliminary analysis of legalization of medical marijuana identified a few areas that could be impacted if this legislation passes. Now, we would like to get your thoughts on how each area we identified might be impacted, if at all?

1) Revenue
Question: How could (a), (b) and (c) be impacted if the medical marijuana legislation passes? *(e.g. would it increase, decrease, or not be affected? Or provide any other thoughts you may have related to the issue)*

a) State tax revenue
b) Local tax revenue
c) Funding for health-related services or programs

2) Employment
Question: How could (a), (b), (c) and (d) be impacted if the medical marijuana legislation passes? *(e.g., would it increase, decrease, or not be affected? Or provide any other thoughts you may have related to the issue)*

a) Jobs
b) Health insurance, other benefits
c) Wages
d) Work environment

3) Access/Availability
Question: How could (a) and (b) be impacted if the medical marijuana legislation passes? *(e.g., would it increase, decrease, or not be affected? Or provide any other thoughts you may have related to the issue).*

a) Access to marijuana
b) Consumption of marijuana

4) Behaviors
Question: How could (a), (b), (c), (d), (e) and (f) be impacted if the medical marijuana legislation passes? *(e.g. would it increase, decrease, or not be affected? Or provide any other thoughts you may have related to the issue)*

a) Property crime
b) Violent crime
c) Illegal selling or possession of drugs
d) Use of substances other than marijuana (e.g., alcohol)
e) Driving Under the Influence (DUI)
f) Accidental Ingestion/Overdose

Part IV. Closing Questions

1. If medical marijuana were to become legal in Kansas, what would you recommend policymakers do to mitigate potential negative impacts (e.g., include certain things in the legislation, monitor, etc.)?

2. Is there anything else you would like to add?

3. Are there others that you recommend we contact?

Thank you for your time! If you have any questions, please call (785) 233-5443 and ask for Sheena Smith.

Health Impact Assessment Scoping Survey, November 2014

Dear Colleagues,

The Kansas Health Institute (KHI) is an independent, nonprofit health policy and research organization that informs policymakers about issues affecting the health of Kansans. KHI is currently conducting a health impact assessment (HIA) that will inform Kansas legislators and stakeholders about the potential positive and negative health effects that could result from the legalization of medical marijuana.

During the 2014 Kansas Legislative Session, two bills (SB 9 and HB 2198) were introduced to legalize the use of marijuana for certain debilitating medical conditions. These bills are likely to be re-introduced for consideration in 2015. If passed, they could result in multiple impacts. The HIA will focus primarily on assessing the potential positive and negative impacts that could result from changes in access and consumption of medical marijuana. Based on a preliminary review of literature, media and public comments, we have identified several issues that might be associated with legalization of medical marijuana.

As we are finalizing the scope of this study, we are seeking your opinion regarding which issues are important to examine during this HIA. The survey should take no more than 10 minutes of your time and all responses will remain confidential. Please complete the survey by Friday, Nov. 7. In addition to the survey, we will be reaching out to a few stakeholders to learn more about their perspectives on potential impacts of legalizing medical marijuana.

We appreciate your participation in the survey and your feedback! If you have any questions about the survey, please contact Tatiana Lin at KHI by email (tlin@khi.org) or phone (785) 233-5443.

Please indicate the type of organization you work for:

- ❍ Business
- ❍ Education
- ❍ Health care
- ❍ Academia
- ❍ Government (city, county, state)
- ❍ Finance/Banking
- ❍ Nonprofit
- ❍ Advocacy
- ❍ Law enforcement
- ❍ Other _____

Please answer the following related to your thoughts about potential impacts of legalizing medical marijuana.

Do you think the legalization of medical marijuana would have any impact(s) on Kansas communities?

- ❍ Yes
- ❍ No
- ❍ Unsure

What potential POSITIVE impacts could result from legalizing medical marijuana in Kansas, if any? Please explain.

What potential NEGATIVE impacts could result from legalizing medical marijuana in Kansas, if any? Please explain.

Do you think the legalization of marijuana would have any HEALTH (positive or negative) impacts on Kansas communities?

- ❍ Yes
- ❍ No
- ❍ Unsure

What potential HEALTH impacts (positive or negative) do you think could result from legalizing medical marijuana in Kansas? Please explain.

Based on a preliminary literature review, several areas have been identified that might be associated with legalization of medical marijuana (e.g., state revenue, crime). Please answer the following questions about those areas.

Do you think the following areas might be impacted by legalizing medical marijuana in Kansas? If so, how?

	Yes				No
	Increase	No Impact	Decreased	Don't Know	Please explain.
Access to Marijuana	❍	❍	❍	❍	
Consumption of Marijuana	❍	❍	❍	❍	
State Tax Revenue	❍	❍	❍	❍	
Local Tax Revenue	❍	❍	❍	❍	
Jobs	❍	❍	❍	❍	
Citizen Retention	❍	❍	❍	❍	
Incarceration	❍	❍	❍	❍	
Crime	❍	❍	❍	❍	
Driving Under the Influence	❍	❍	❍	❍	

Please rank the following issues in terms of their importance of being included in the scope of the Medical Marijuana HIA by entering a number next to each issue in the text box provided. Scale: A rank of 1 means you feel it is the most important issue to include and a rank of 9 is the least important.

_____ Access to marijuana
_____ Consumption of marijuana
_____ State tax revenue
_____ Local tax revenue
_____ Jobs
_____ Citizen retention
_____ Incarceration
_____ Crime
_____ Driving Under the Influence

Are there any other issues you think would be important to include in the Medical Marijuana HIA? If so, please describe below.

Do you think that the legalization of medical marijuana might impact some segments of the population over others (e.g., minorities, youth, elderly, etc.)?

- ❍ Yes
- ❍ No
- ❍ Unsure

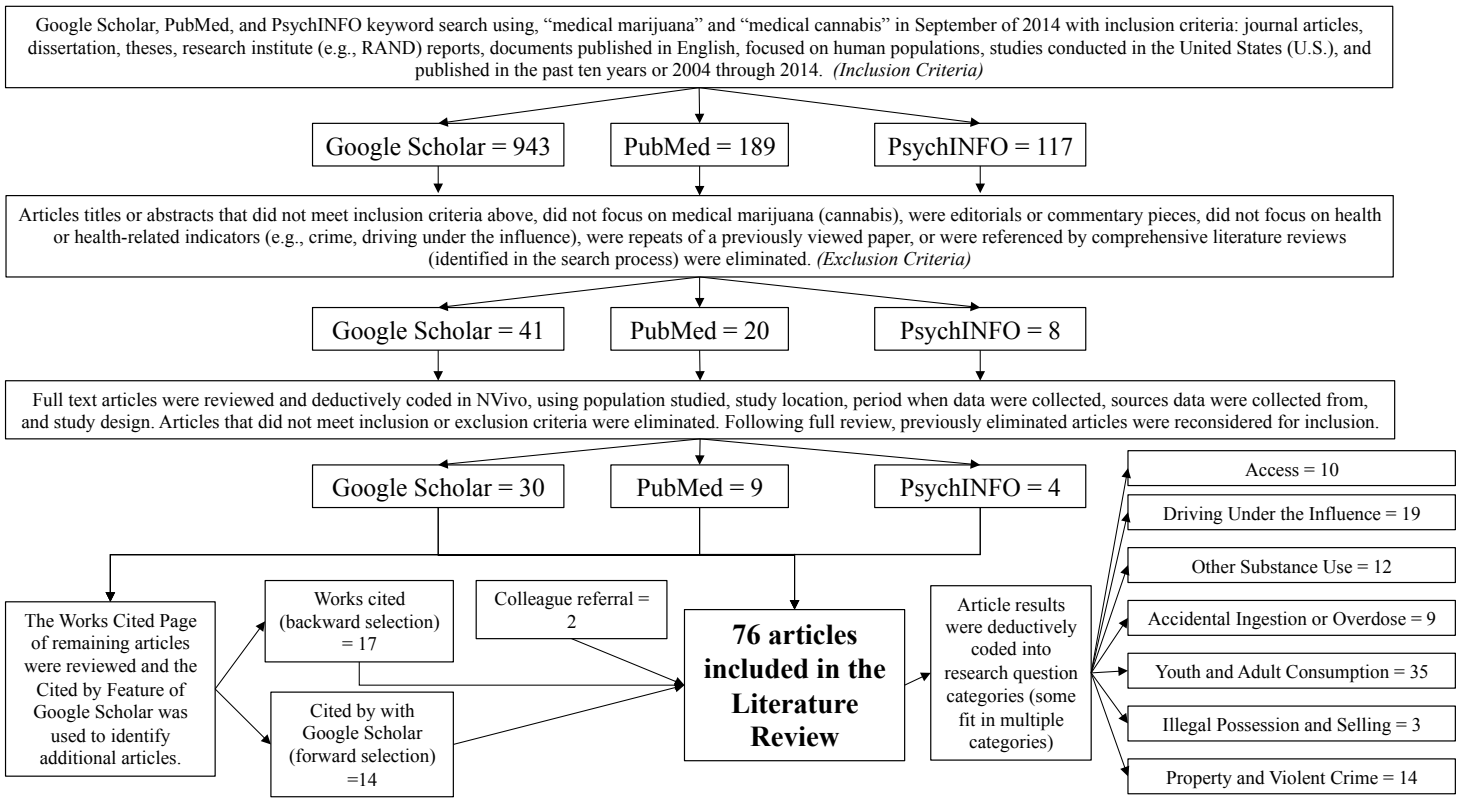
What segments of the population might be impacted if medical marijuana was legalized in Kansas? Please explain your answers.

In addition to the survey, we will be reaching out to a few stakeholders to learn more about their perspectives on potential impacts of legalizing medical marijuana through key-informant interviews. If you are willing to participate in a telephone interview, please provide your email address and/or phone number below. Note: Your contact information will remain confidential and will not be linked to your survey responses.

Thank you for taking the time to complete this survey!

Literature Review Search Protocol

Figure G-1. **Literature Review Search Protocol**



Literature Review Framework and Quality of Evidence

Figure G-2. **Summary Table (for analysis and use by the project team)**

Author, Year, Type of Literature (e.g., journal vs. gray), and How Identified	Chu, 2014 Google Scholar Working Paper (Univ. of Wellington School of Economics and Finance)
Population and Sample (bold specific locations)	**U.S. cities with populations >50,000 in 11 states** that passed medical cannabis laws before 2008
Years and Data Source	**1992–2008** Treatment Episodes Data Set (TED-S)
Study Design and Limitations	**Longitudinal** Information on past treatment was missing in large amounts for some states for some years; those data points were excluded from analysis.
Findings	Among admitted patients, about 75 percent did not have marijuana as their primary problem. Among non-criminal justice referrals, 50 percent had alcohol as their primary problem, ~30 percent had cocaine and heroin, and 8 percent had cannabis. For all cannabis-non-primary treatment admissions, only 7 percent were juveniles, and 40 percent were referred by the criminal justice system.
Policy Recommendations and Notes	Based on estimates from all-time treatments, the net effect on treatment is somewhat smaller, and therefore there could be a substitution between cannabis and other substances, which could be a benefit of medical marijuana laws.

Source: KHI Medical Marijuana HIA Project, 2015.

Figure G-3. **Literature Review Scoring System**

SCORE FOR METHODOLOGY CRITERIA												
1	2	3	4	5	6	7	8	9	10	11	12	Total Score
Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

Source: KHI Medical Marijuana HIA Project, 2015.

1. Conducted by or funded by non-advocacy or non-industry entity.
2. The study or text was peer–reviewed (i.e., an article in a journal or a book (or book chapter) published by an academic press).
3. Findings are directly relevant to the research question.
4. Strong methodology and data analysis techniques.
5. The study design was grounded in a theoretical framework.
6. Findings were statistically significant at the 0.05 level or better.
7. Covariates were examined.
8. Findings are generalizable to the population of interest.
9. Data consist of more than one time point or are beyond cross-sectional (e.g., longitudinal, with follow-up).
10. Data are not self-reported and/or contain little inter-rater reliability error.
11. Data were collected within the past ten years.
12. Limitations are fully disclosed and are discussed within the text.

Each study should be assessed using the above criteria and assigned a score. If something is unclear, such as the source of funding, assign the "no" value. Scores that fall within the 1 to 4 range are low, within the 5 to 8 range are medium, and 9 to 12 range are high. Within summaries, report the number of low, medium and high quality studies included.

Figure G-4. **Example Evaluation Table with Weight of the Evidence**

Does a change in access to legal and illegal marijuana increase accidental ingestion and overdose from marijuana?

If so, what would be the impact?

STUDY	INCREASE	NO INCREASE	MIXED	NEITHER INCREASE NOR NO INCREASE	SCORE	FINDING
Carstairs et al., 2011				X	3	Case study of a 14-month old child who presented comatose to the ER following ingestion of extremely concentrated hashish.
Wang et al., 2011				X	4	Five children were identified as having visited the ER from 11/2009 to 3/2010 with marijuana exposure; patients required expensive and unpleasant diagnostic examination; two were admitted.
Schaeffer et al., 2014	X				4	The poison control center in northern New England went from one pediatric marijuana exposure in 2009 to 12 in 2013.
Colorado Department of Public Health and Environment, 2015	X				6	Hospitalizations and emergency room visits related to marijuana increased.
Meola et al., 2012	X				7	Increased medical marijuana toxosis in dogs correlated with number of medical marijuana license holders. Additionally, the number of marijuana toxosis in dogs increased fourfold from 1/1/05 to 10/1/10.
Wang et al., 2013	X				9	The number of accidental marijuana ingestion cases among those under age 12 increased from 0 of 790 from 2005 to 2009 to 14 of 588 from 2009 to 2011.
Wang et al., 2014	X				9	The number of calls to poison control centers increased 30.3 percent call per year in decriminalized marijuana states but did not change in non-legal states.
Gorman et al., 2007		X			9	Data are from pre-2009 but show no increase in ER visits following medical marijuana legalization for three geographic areas.
Bachhuber et al., 2014				X	9	States with medical marijuana laws had a 24.8 percent lower mean of opioid overdose mortality. In addition, examination of before and after legalization found legalization associated with a lower rate of overdose mortality that generally strengthened over time.
Total	**5**	**1**	**0**	**3**		

Source: KHI Medical Marijuana HIA Project, 2015.

Data Sources and Measures and Years

DATA SOURCE AND YEAR	MEASURE(S)
GENERAL DEMOGRAPHICS AND SOCIOECONOMIC STATUS	
U.S. Census Bureau, Quick Facts (retrieved March 2015)	Kansas state values for: • Population, 2013 estimate • White alone, not Hispanic or Latino, percent, 2013 • Hispanic or Latino, percent, 2013 • African American, percent, 2013 • High school graduate or higher, percent of persons age 25+, 2009–2013 • Bachelor's degree or higher, percent of persons age 25+, 2009–2013 • Median household income, 2009–2013 • Percent of persons below the federal poverty level, 2009–2013
U.S. Census Bureau, American Community Survey, 5-year (2008–2012)	Kansas county values for: • White alone, not Hispanic or Latino, percent, 2008–2012 • Hispanic or Latino, percent, 2008–2012 • African American, percent, 2008–2012 • High school graduate or higher, percent of persons age 25+, 2008–2012 • Male population, percent, 2008–2012 • Median household income, 2008–2012 • Unemployed population, percent, 2008–2012 • Median age, 2008–2012 • Percent of persons below the federal poverty level (FPL), 2008–2012
MARIJUANA USE	
National Survey on Drug Use and Health (2002–2011)	Kansas and comparison state values for: • Adults who have ever smoked marijuana, percent, 2002–2011
Youth Behavioral Risk Factor Survey (2013)	Kansas and comparison state values for: • Youth who have ever smoked marijuana, percent, 1991–2013 (odd years) • Youth who have smoked marijuana in the past 30 days, percent, 1991–2013 (odd years) • Percent of youth who tried marijuana before age 13, percent, 1991–2013 (odd years)
Kansas Communities That Care Survey (2014)	Kansas county values for: • Youth who have ever smoked marijuana, percent, 2000–2014 • Youth who have smoked marijuana in the past 30 days, 2000–2014 • Average age of marijuana initiation for youth, 2000–2014

Source: KHI Medical Marijuana HIA Project, 2015.

DATA SOURCE AND YEAR	MEASURE(S)
CRIME	
Federal Bureau of Investigation, Uniform Crime Reporting Statistics (2013)	Kansas and comparison state values for: • Property crime, 1960–2012 • Violent crime, total, 1960–2012 • Robberies, total, 1960–2012
Kansas Bureau of Investigation (2014)	Kansas county values for: • Property crime, 2003–2013 • Violent crime, 2003–2013 • Marijuana-related offenses, 2004–2013
Federal Bureau of Investigation (2013)	Kansas and comparison state values for: • Arrests for possession of marijuana, by age and race/ethnicity, 1990–2013 • Arrests for sale of marijuana, by age and race/ethnicity, 1990–2013
DRIVING UNDER THE INFLUENCE	
Federal Accident Reporting System (2014)	Kansas and comparison state values for: • Marijuana-related traffic fatalities, 1994–2013
Kansas Department of Transportation (2013)	Kansas values for: • Drug-involved accidents, 2000–2012 • Alcohol-involved accidents, 2000–2012

Source: KHI Medical Marijuana HIA Project, 2015.

Monitoring Plan

The monitoring plan provides suggestions on indicators that could be used for tracking the possible impacts of medical marijuana legalization in Kansas at the state level, as well as at the county level, where possible. It includes relevant indicators that are already available either by request or from a publically accessible source. The plan also suggests how frequently these indicators should be monitored and the agencies that might be best suited to monitor the information. If a substantial change in these indicators is observed, the monitoring agency could consider further study and/or efforts to correct any negative trends that could occur.

INDICATOR TO MONITOR	GEOGRAPHY	SOURCE	FREQUENCY	MONITORING AGENCY
ACCESS				
Medical marijuana qualifying medical conditions	State	Kansas Laws	Annually	Kansas Department of Health and Environment (KDHE)
Number of individuals with qualifying medical conditions	State	Kansas Health Insurance Information System (KHIS) database OR various sources, including KDHE vital statistics	Annually	KDHE
CONSUMPTION				
Marijuana consumption among youth (lifetime and 30-day)	State and County	Kansas Communities That Care Survey	Annually	Local substance abuse prevention agencies, KDHE
Youth perception of easy access to marijuana	State and County	Kansas Communities That Care Survey	Annually	Local substance abuse prevention agencies, KDHE
Marijuana consumption among adults	State	National Survey on Drug Use and Health	Bi-Annually	KDHE
CRIME				
Number of property crimes	State and County	Federal Bureau of Investigation (FBI) Uniform Crime Reporting Statistics (state) Kansas Bureau of Investigation (KBI) (county)	Annually	KBI
Number of violent crimes	State and County	FBI Uniform Crime Reporting Statistics (state) KBI (county)	Annually	KBI
Marijuana-related offenses	State and County	KBI	Annually	KBI
DRIVING UNDER THE INFLUENCE				
Marijuana-related traffic fatalities nationally and in Kansas	State	Fatal Accident Reporting System	Annually	Kansas Department of Transportation and KBI

Source: KHI Medical Marijuana HIA Project, 2015.

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