Public Health Implications of Cannabis Policy in Minnesota
What data tell us about the state's cannabis landscape prior to legalization

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Summary

Using data from the National Survey on Drug Use and Health, this brief examines three issues related to the public health implications of cannabis prior to its 2023 legalization in Minnesota: The prevalence of cannabis use, cannabis abuse and dependence (i.e., addiction), and driving under the influence of cannabis. It also provides background and context on U.S. and Minnesota cannabis policy.

Introduction

When Gov. Tim Walz signed legislation in May 2023, Minnesota became the 23rd state to legalize non-medical use of cannabis, also commonly called marijuana.[1] Though possession and growth of limited quantities of cannabis by adults became legal later that summer, the full impact of the legislation isn't likely to be realized until the state authorizes commercial sales at a yet-undetermined date.

This resource is designed to provide pre-legalization baseline data, as well as context and interpretation, on several issues pertaining to the public health implications of cannabis legalization in the state. This information may be useful to Minnesota policymakers as they set and refine the state's regulatory framework surrounding cannabis. This resource may also assist the people of Minnesota as they navigate a changing landscape and new choices that come with the removal of decades of cannabis prohibition.

Using data from the National Survey on Drug Use and Health (NSDUH), a survey sponsored by the U.S. Substance Abuse and Mental Health Services Administration, this report provides estimates of the prevalence of cannabis use, abuse of and dependence on cannabis, and driving under the influence of cannabis. It presents data for those estimates for Minnesota and comparison rates for the U.S. average. Where available, we also present comparable estimates for alcohol, another commonly used psychoactive substance that has long been legal, but, like cannabis, entails a range of risks to public health.

Background

While Minnesota, along with almost half of the 50 states, has legalized adult use of non-medical cannabis, the legal status of cannabis in the U.S. remains complex.[2] The federal government still classifies "marijuana" (i.e., psychoactive cannabis) — particularly its main psychoactive chemical, delta-9-tetrahydrocannabinol (THC) — as a Schedule I controlled substance, making it among the most legally restricted drugs in the eyes of the U.S. government.[3] An exception to federal cannabis prohibition was introduced by Congress with the 2018 Farm Bill, which removed hemp (defined as cannabis having 0.3% delta-9 THC or less) from the schedule of Controlled Substances. That policy change opened the door to national sales of legal hemp-derived products, including some with intoxicating levels of THC.[4]

These details are important in the Minnesota context. Prior to the state's 2023 legalization of adult-use cannabis, the legislature in 2022 formalized state law allowing for the sale and production of hemp-derived THC products, specifically edibles and non-alcoholic beverages.[5] That 2022 state legislation included little regulatory structure. However, the state's 2023 cannabis legalization legislation brought those hemp-derived THC products, as well forthcoming cannabis sales, under the purview of a new Office of Cannabis Management agency, with increased regulations and controls.

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To understand the pre-legalization landscape of cannabis in Minnesota, it is necessary to use data collected before cannabis and hemp-derived THC policy began to change in the state in 2022. Though Minnesota began a medical cannabis program in 2015, the program's enrollment is relatively small and not a focus of this report.[6] In this analysis, we use data from the 2018–2019 NSDUH, which are the most recent years available of state-level data. In interpreting the data, it is worth considering that some data may underestimate true population
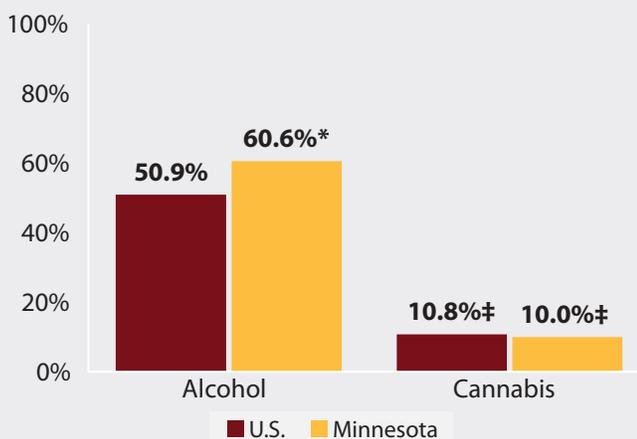
rates, as survey respondents are frequently reluctant to report behaviors that are illegal or objectionable (e.g., cannabis use, driving under the influence), which is why we report comparison data, so Minnesota rates may be compared to U.S. rates and some cannabis measures may be compared to related alcohol measures. Alcohol risks are particularly acute in Minnesota, where rates of excessive alcohol consumption are high compared to the U.S. average, and death rates from alcohol-attributable disease are on the rise.[7]

Past-month cannabis use

Different definitions will yield very different estimates of the prevalence of cannabis use. For instance, according to the 2018-2019 NSDUH, almost half of people age 12 and older in Minnesota and the U.S. (48.5% and 45.7%, respectively) reported having used cannabis at some point in their lives. However, using cannabis frequently is more likely to have negative health effects than infrequent use, so definitions that indicate regular use are more likely to be useful in understanding the public health implications of cannabis policy. For this report, we examined the rate of people who report having used cannabis in the past 30 days, which is notably less common than lifetime prevalence.

Of Minnesota's overall adolescent and adult population (age 12 and older), 10.0% reported using cannabis in the past 30 days, which was not significantly different from the U.S. rate of 10.8%.[8] By comparison, 60.6% of Minnesota's overall youth and adult population reported using alcohol in the past 30 days, which was significantly higher than the U.S. rate of 50.9%. For the overall youth and adult populations of both Minnesota and the U.S., rates of cannabis use in the past 30 days were significantly lower than rates of alcohol use.

Table 1: U.S. and Minnesota Rates of Cannabis Use in Past 30 Days for Ages 12 and Older, 2018-2019
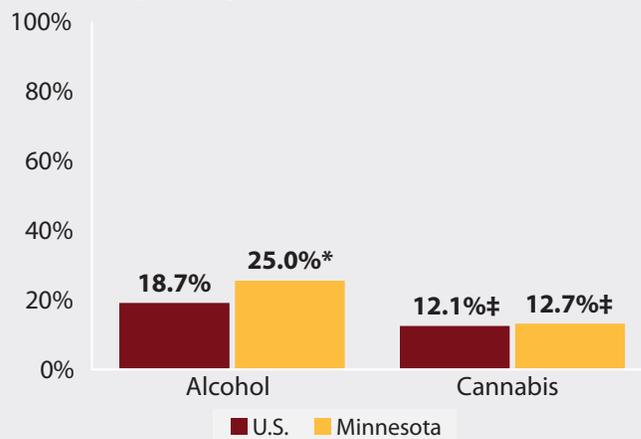

Source: SHADAC/CRC analysis of NSDUH restricted-used data
* Minnesota rate significantly different from U.S. rate at 95% level
‡ Cannabis rate significantly different from alcohol rate at 95% level

A common public health concern regarding cannabis legalization is the potential for increased use among youth. Research finds associations between adolescent use of cannabis and a variety of negative outcomes, including lower educational attainment and worse school performance, and mental health and substance use disorders.[9,10,11] To mitigate the risk of cannabis legalization increasing youth cannabis use, Minnesota's legalization law set a minimum age of 21 to purchase or possess cannabis. We used the same threshold to produce age-based cannabis use rates.

For Minnesota's under-age youth population (age 12 to 20), 12.7% reported using cannabis in the past 30 days, which was not significantly different from the U.S. rate of 12.1%.[12] By comparison, 25.0% of Minnesota's under-age youth population reported using alcohol in the past 30 days, which was significantly higher than the U.S. rate of 18.7%. Rates of cannabis use in the past 30 days were significantly lower than alcohol use in under-age youth populations of both Minnesota and the U.S.

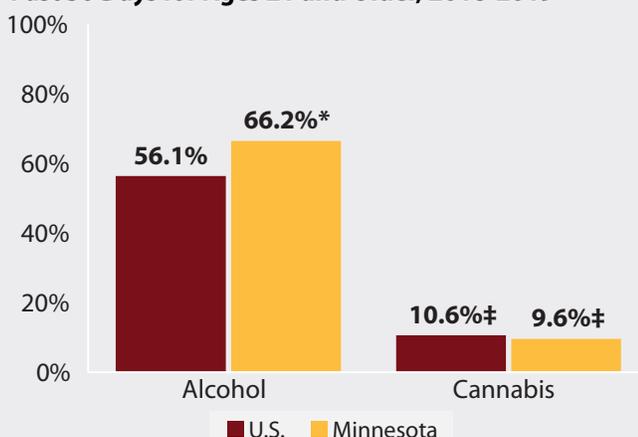**Table 2: U.S. and Minnesota Rates of Cannabis Use in Past 30 Days for Ages 12-20, 2018-2019**

Source: SHADAC/CRC analysis of NSDUH restricted-used data
* Minnesota rate significantly different from U.S. rate at 95% level
‡ Cannabis rate significantly different from alcohol rate at 95% level

For Minnesota's adult population (age 21 and older), 9.6% reported using cannabis in the past 30 days, which was not significantly different from the U.S. rate of 10.6%. By comparison, 66.2% of Minnesota's adult population reported using alcohol in the past 30 days, which was significantly higher than the U.S. rate of 56.1%. For the adult populations of both Minnesota and the U.S., rates of cannabis use in the past 30 days were significantly lower than alcohol use.

While the U.S. prevalence of cannabis use was significantly higher among youth compared to adults, there was no statistically significant difference in the prevalence of cannabis use between adults and youth in Minnesota (significance test results not shown in a figure).

Table 3: U.S. and Minnesota Rates of Cannabis Use in Past 30 Days for Ages 21 and Older, 2018-2019

Source: SHADAC/CRC analysis of NSDUH restricted-used data
* Minnesota rate significantly different from U.S. rate at 95% level
‡ Cannabis rate significantly different from alcohol rate at 95% level

Table 4: Rates of Cannabis Use in Past 30 Days for Ages 12 and Older, 2012-2013 to 2018-2019

Source: SHADAC/CRC analysis of NSDUH restricted-used data
* 2018-2019 rate significantly different from 2012-2013 rate at 95% level

Another approach to understanding cannabis use before Minnesota legalized the substance is to examine trends. In this instance, we present data on past-month cannabis use (age 12 and older) from 2012–2013 to 2018–2019 for Minnesota and the U.S., as well as data for the first two states to legalize cannabis—Colorado and Washington. Both Colorado and Washington began cannabis sales in 2014, so these estimates also provide a glimpse of how cannabis use trends developed in those states pre- and post-legalization of sales.

While past-month cannabis use rates increased significantly in Colorado and Washington between 2012–2013 and 2018–2019, we found that rates also increased significantly at the U.S. level and in Minnesota. What's more, there was little difference among these populations in the size of the increase; while Colorado's rate of monthly cannabis use increased 5.2 percentage points between 2012–2013 and 2018–2019 and Washington's rate increased 5.5 percentage points, the U.S. rate increased by 3.4 percentage points and Minnesota's rate increased by 4.2 percentage points over the same period.

"The question of risks is not unique to cannabis, as practically every substance used by humans entails some level of risk."

Taken together, these data show that cannabis use rates have been increasing at the U.S. level from 2012–2013 to 2018–2019, and they were increasing both in states that legalized cannabis sales (Colorado and Washington) and in Minnesota, which did not legalized cannabis in this timeframe. And though both Colorado and Washington had cannabis use rates in 2018-2019 that were significantly higher than the U.S. rate, their rates already were significantly higher than the U.S. rate in 2012-2013 (significance not shown in figure).

Studies have shown that cannabis use has increased in other states that have legalized, so it seems reasonable to anticipate that may occur in Minnesota, too.[13] There may be multiple reasons that cannabis legalization can increase consumption. For instance, economic principles tell us that when the price of a product decreases, consumption of that product often increases. Especially once legal sales begin, multiple forms of "costs" associated with cannabis may decline, such as the purchase price of cannabis itself, the time and effort to obtain cannabis, and the legal risks and social repercussions of buying and using cannabis.[14]

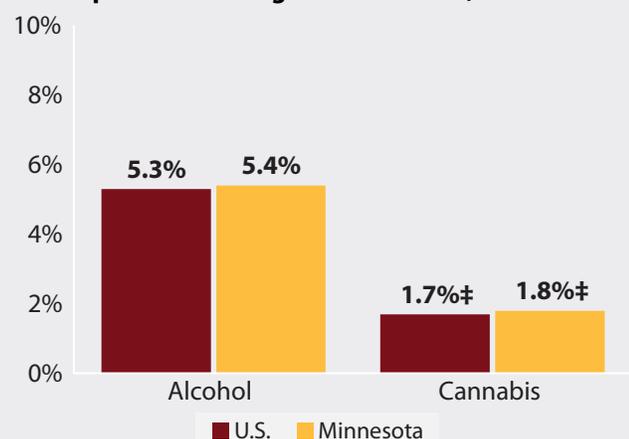## Cannabis abuse and dependence

Another critical question regarding cannabis legalization pertains to the potential benefits and risks to public health. The question of risks is not unique to cannabis, as practically every substance used by humans entails some level of risk, which often increases with dose and duration of use — how much people use and for how long. For instance, use of alcohol and tobacco carries health risks, as does the use of more mundane substances such as Tylenol.

One often-cited potential public health concern relating to cannabis legalization is the risk of increased rates of addiction. Among medical professionals, addiction to cannabis is known by the diagnosis "cannabis use disorder" (or cannabis abuse and dependence, prior to a revision and renaming of the diagnosis). While cannabis use disorder is generally the preferred terminology, we refer to "cannabis abuse and dependence" in this section because prior to 2021 the NSDUH used questions based on the earlier diagnosis definition. The NSDUH asks a series of questions derived from the way that substance abuse and dependence are defined by health care professionals, such as whether a person:

- Needed to use increasing amounts of a substance to get the desired effect
- Was unable to reduce or stop use of a substance when they wanted or tried
- Experienced serious problems at home, work, or school due to use of a substance
- Repeatedly got in trouble with the law as a result of use of a substance

For Minnesota's overall adolescent and adult population (age 12 and older), 1.8% reported signs of cannabis abuse and dependence, which was not significantly different from the U.S. rate of 1.7%. By comparison, 5.4% of Minnesota's overall adolescent and adult population reported signs of alcohol abuse and dependence, which was also not significantly different from the U.S. rate of 5.3%. For the overall adolescent and adult populations of both Minnesota and the U.S., rates of cannabis abuse and dependence were significantly lower than for alcohol.

Table 5: U.S. and Minnesota Rates of Cannabis Abuse and Dependence for Ages 12 and Older, 2018-2019

Source: SHADAC/CRC analysis of NSDUH restricted-used data
* Minnesota rate significantly different from U.S. rate at 95% level
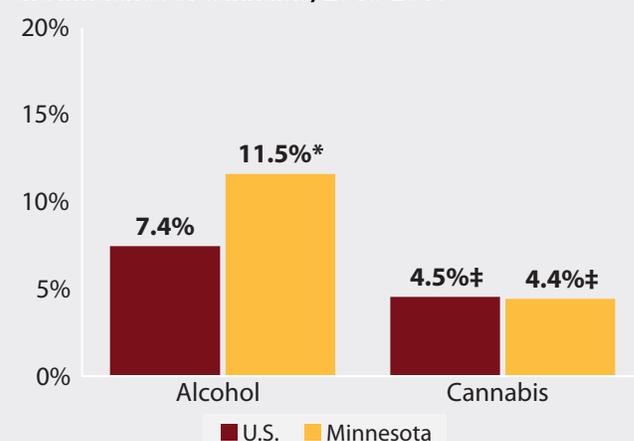‡ Cannabis rate significantly different from alcohol rate at 95% level

Given that some portion of people who use cannabis develop addiction (i.e., abuse and dependence), we can anticipate that those rates may increase if overall cannabis use increases.[15] It will be important to monitor trends in cannabis addiction and ensure that substance use disorder treatment is available and accessible to those who need help.

Driving under the influence of cannabis

Traffic crashes kill tens of thousands of people in the U.S. each year, and roughly one-third of those deaths involve alcohol or other substances.[16] There is concern that legalization of cannabis could increase the prevalence of people driving under the influence of cannabis and possibly result in increased traffic accidents.[17,18]

For Minnesota's overall adolescent and adult population (age 12 and older), 4.4% reported having driven under the influence of cannabis in the past 30 days, which was not significantly different from the U.S. rate of 4.5%. By comparison, 11.5% of Minnesota's overall adolescent and adult population reported having driven under the influence of alcohol in the past 30 days, which was significantly higher than the U.S. rate of 7.4%. Rates of driving under the influence of cannabis were significantly lower than for alcohol for the overall adolescent and adult populations in both Minnesota and the U.S.

Table 6: U.S. and Minnesota Rates of Driving Under the Influence of Cannabis, 2018-2019

Source: SHADAC/CRC analysis of NSDUH restricted-used data
* Minnesota rate significantly different from U.S. rate at 95% level
‡ Cannabis rate significantly different from alcohol rate at 95% level

It is unclear whether legalization of cannabis will increase the prevalence of people driving under the influence of the substance. It will be important to monitor rates of people driving under the influence of cannabis as Minnesota implements legalization, as well as whether there is an increase in traffic crashes.

Conclusions and discussion

Minnesota's legalization of cannabis marked a landmark change in drug policy for the state — and one with potential public health implications. The data presented in this report touch on only a few of the open questions related to cannabis use, and they provide only a glimpse of the cannabis landscape prior to legalization.

It will be crucial for researchers and policymakers to monitor these and other issues into the future. For example, it will be imperative to understand precisely how cannabis use changes in Minnesota post-legalization. Will individuals who hadn't previously used cannabis begin to use it? Will individuals who were already using cannabis use it more frequently or in larger quantities? Will the ways people use cannabis change? Will the price and other costs associated with cannabis influence use patterns? The implications of cannabis legalization on public health also depend on the risks and benefits associated with cannabis use, which remain areas of uncertainty that warrant further study. It will be important for researchers to study these and other questions once more data become available.

While we may learn lessons from the experiences of other states that have already legalized cannabis, the unique context of Minnesota — including differences in population, culture, legalization and regulatory policies, and other factors — mean that cannabis legalization may have different impacts here. For instance, Minnesota has higher than average rates of alcohol use, as presented in this report, as well as relatively high rates of binge drinking and heavy drinking — along with a growing rate of deaths attributable to excessive alcohol consumption.[19] While cannabis use will have its own public health implications, it may also influence people's use of other substances with known health risks, such as alcohol and tobacco.

The data in this report are intended to serve as a starting point for discussions on the public health impacts of cannabis policy. It will take years for the full effects of Minnesota cannabis policy to be determined. It also is likely that effects may change over time, especially if more states legalize cannabis and if the federal government changes U.S. cannabis policy (e.g., rescheduling and reducing restrictions).[20] Another open question pertains to the health equity implications of cannabis policy and whether changes will affect sub-populations differentially, such as by age, race and ethnicity, and income — either positively or negatively. Ultimately, there will be a great need for research into the rapidly evolving cannabis policy landscape and potentially refinements in policy to maximize benefits and minimize harms.

About the Cannabis Research Center

In 2023, the Minnesota State Legislature passed H.F. 100, legalizing the cannabis in Minnesota for non-medical use individuals age 21 and older. This followed legislation establishing the state's medical cannabis program a decade earlier. As part of the 2023 law, the legislature designated funding to the University of Minnesota School of Public Health to establish a Cannabis Research Center (CRC).

The CRC strives to understand the public health implications of cannabis legalization. To accomplish its mission, the center will:

- Provide, interpret, and disseminate research to guide policy and practice related to cannabis.
- Conduct timely, cutting-edge research on the positive and negative public health effects of legalization.
- Study issues pertaining to equity in cannabis production, sales, marketing, and use.
- Address research questions asked by community members and leaders, policymakers, and other Minnesota partners.
- Train and support future practitioners and scholars to study cannabis policy and its effects on health and health equity.

To learn more about the Cannabis Research Center, visit https://www.sph.umn.edu/research/centers/cannabis.

Cannabis Research Center
UNIVERSITY OF MINNESOTA

References

[1] Cannabis Finance and Policy Bill, Laws of Minnesota 2023, Chapter 63, HF100; https://www.revisor.mn.gov/laws/2023/0/Session+Law/Chapter/63/

[2] Even more states — most states, in fact — allow some form of medical-use cannabis.

[3] Because the federal government's classification scheme for controlled substances is often misunderstood, it is useful to explain how drugs are categorized in the "schedules." If and whether a drug is scheduled as a controlled substance is not determined by its level of "danger" in terms of risk of overdose death or other short-term injury. Instead, the scheduling framework entails two distinct and unrelated components: 1) potential for abuse and dependence (i.e., addiction), and 2) federally recognized accepted medical use.

Substances that the federal government deems to have the highest potential for abuse and dependence are listed as Schedule I or Schedule II controlled substances, while those in Schedules III, IV, and V are deemed to have decreasing potential for abuse and dependence. Drugs without a sufficient recognized potential for abuse and dependence (e.g., Tylenol, ibuprofen) are not categorized on the schedule of controlled substances. Notably, alcohol is not subject to the scheduling regime under the Controlled Substances Act.

While substances in Schedule I and Schedule II are considered to have the highest potential for abuse and dependence, the factor that differentiates them is whether a given substance has federally accepted medical uses. Regardless of the fact that most states allow for medical use of marijuana for treatment of a variety of health conditions, the federal government does not recognize any approved medical uses of the drug, leading it to list the substance as Schedule I — and prohibiting it outright. As another example, the drug cocaine also is considered to have among the highest potential for abuse and dependence, but because the federal government recognizes legitimate medical use of the drug (e.g., as a local anesthetic), cocaine is listed as a Schedule II controlled substance, meaning that it is highly restricted and prohibited for non-medical use, but it can be used for approved health care purposes.

[4] The distinction between psychoactive cannabis ("marijuana" in the language of the federal government) and hemp is nuanced. For decades, cannabis of any form was prohibited as a Schedule I substance by the U.S. under the Controlled Substances Act. But the 2018 Farm Bill removed prohibitions on hemp, which the new federal legislation defined as cannabis with concentrations of the delta-9 THC no more than 0.3 percent. Cannabis with higher concentrations of delta-9 THC remains prohibited by federal government. Notably, hemp and psychoactive cannabis (i.e., marijuana) are both forms of the same cannabis plant with the critical distinction being the level of THC it contains. Both hemp and psychoactive cannabis also contain a number of other compounds, such as cannabidiol (CBD) and other forms of THC that are similar to, but distinct from, delta-9 THC.

[5] Sale of Certain Cannabinoid Products, 2023 Minnesota Statutes Health, Chapter 151 Sec. 151.72 (2023) https://www.revisor.mn.gov/statutes/cite/151.72

[6] *Minnesota Medical Cannabis Dashboard* (n.d.) Minnesota Department of Health. https://www.health.state.mn.us/people/cannabis/data/dashboard.html

[7] SHADAC. (2021, April 19). U.S. Alcohol-Related Deaths Grew Nearly 50% in Two Decades: SHADAC Briefs Examine the Numbers among Subgroups and States. *SHADAC Blog*. https://www.shadac.org/news/us-alcohol-related-deaths-grew-nearly-50-two-decades

[8] t-tests are conducted at the 95% confidence level. The word "significant" is only used where we conducted statistical testing and the results were statistically significant.

[9] National Academies of Sciences, Engineering, and Medicine. (2017). *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*. The National Academies Press. https://doi.org/10.17226/24625.

[10] Volkow, ND, Swanson, JM, Evins, AE, et al. (2016). Effects of Cannabis Use on Human Behavior, Including Cognition, Motivation, and Psychosis: A Review. *JAMA Psychiatry. 73*(3), 292-297. doi:10.1001/jamapsychiatry.2015.3278

[11] Winters, KC, Lee, CY. (2008). Likelihood of developing an alcohol and cannabis use disorder during youth: association with recent use and age. *Drug and Alcohol Dependence. 92*(1-3), 239-247. https://doi.org/10.1016%2Fj.drugalcdep.2007.08.005

[12] There can be various approaches to selecting comparison groups in public health and policy research. For this report, we chose to compare Minnesota rates to the overall U.S. rate as a benchmarking approach that is accessible to a broader audience. In using that approach, it is important to acknowledge that since 2014, the U.S. estimates include both states that had legalized cannabis and states where cannabis remained prohibited. Where we compare estimates for distinct groups (e.g., Minnesota youth versus Minnesota adults), we employ an independent samples t-test to determine whether differences are statistically significant; where we compare Minnesota estimates to U.S. estimates, we employ a dependent samples t-test to account for the fact that Minnesota is part of the U.S.

[13] Zellers, SM, Ross, JM, Saunders, G, et al. (2022). Impacts of recreational cannabis legalization on cannabis use: a longitudinal discordant twin study. *Addiction. 118*(1), 110-118. https://doi.org/10.1111/add.16016

[14] Kilmer, B, Caulkins, JP, Pacula, RL, MacCoun, RJ, Reuter, P. (2010). Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets. *RAND Corporation Occasional Paper*. https://www.rand.org/pubs/occasional_papers/OP315.html

[15] Hasin DS, Saha TD, Kerridge BT, et al. (2015) Prevalence of Marijuana Use Disorders in the United States Between 2001-2002 and 2012-2013. *JAMA Psychiatry. 75*(12), 1235-1242. doi:10.1001/jamapsychiatry.2015.1858

[16] National Center for Statistics and Analysis. (2023, June). Alcohol-impaired driving: 2021 data (Traffic Safety Facts. Report No. DOT HS 813 450). National Highway Traffic Safety Administration. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813450

[17] National Academies of Sciences, Engineering, and Medicine. (2017). The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research. *The National Academies Press*. https://doi.org/10.17226/24625.

[18] Compton, R. (2017, July). Marijuana-Impaired Driving - A Report to Congress. (DOT HS 812 440). Washington, DC: National Highway Traffic Safety Administration. https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf

[19] Planalp, C, Au-Yeung, CM, Winkelman, T. (2021). Escalating Alcohol-Involved Death Rates: Trends and Variation across the Nation and in the States from 2006 to 2019. *State Health Access Data Assistance Center (SHADAC)*. https://www.shadac.org/sites/default/files/publications/Alcohol-Involved-Deaths/AID-4.21-SHADAC-Brief.pdf

[20] Sacco, LN, Sheikh, HZ. (2023, Sept 13). Department of Health and Human Services Recommendation to Reschedule Marijuana: Implications for Federal Policy. *Congressional Research Service* (Insight No. IN12240). https://crsreports.congress.gov/product/pdf/IN/IN12240