

REPORT 5 OF THE COUNCIL ON SCIENCE AND PUBLIC HEALTH (I-17)
Clinical Implications and Policy Considerations of Cannabis Use
(Resolution 907-I-16)
(Reference Committee K)

EXECUTIVE SUMMARY

Background. This report responds to Resolution 907-I-16, “Clinical Implications and Policy Considerations of Cannabis Use” introduced by the Resident and Fellow Section and referred by the House of Delegates. Resolution 907 asked that our AMA amend existing policies.

Methods. English language reports were selected from searches of the PubMed, Google Scholar, and Cochrane Library databases from March 2013 to July 2017 using the search terms as outlined in the body of the report. The 2017 report of the National Academies of Sciences, Engineering, and Medicine (National Academies) on the health effects of cannabis and cannabinoids as well as reports developed by state agencies regarding the impact of legalizing recreational cannabis were also utilized in developing this report.

Results. The National Academies published a comprehensive report on the health effects of cannabis in January 2017. The report found conclusive or substantial evidence that cannabis or cannabinoids have some therapeutic benefits; the report also found substantial or conclusive evidence of a statistical association between cannabis smoking and health harms. The findings of a systematic review on the analgesic effects of cannabis released subsequent to the National Academies report were inconsistent with the National Academies report, which highlights the lack of agreement on this issue, and serves as a source of confusion among physicians, patients, and the public and demonstrates the need for additional research.

Legalizing the recreational use of cannabis may result in increased use over time due to changes in perceptions of safety and health risks. Existing data, although limited, have yet to confirm this pattern of use for children and adolescents. However, cannabis use has increased in adults and pregnant women. Data from jurisdictions that have legalized cannabis demonstrate concerns around unintentional pediatric exposures as well as an increase in traffic deaths due to cannabis-related impaired driving. Limited data also show a decrease in cannabis-related treatment admissions as well as a possible decrease in the use of opioids for chronic pain. Limited data suggest convictions for possession of cannabis may decline in states that legalize cannabis. States have also experienced an increase in governmental revenue through sales and excise taxes on retail cannabis.

Conclusion. The evidence available at this time does not support a substantial change in the AMA’s policy on cannabis. Ongoing surveillance to determine the impact of cannabis legalization and commercialization on public health and safety will be critical. Surveillance should include, but not be limited to the impact on patterns of use, traffic fatalities and injuries, emergency department visits and hospitalizations, unintentional exposures, exposure to second-hand smoke, and cannabis-related treatment admissions. At-risk populations, including pregnant women and children, should be a focus of attention. Continued evaluation of the effectiveness of regulations developed to ensure public health and safety in states that have legalized the medical and/or recreational use of cannabis is necessary. Jurisdictions that have legalized cannabis should allocate a substantial portion of their cannabis tax revenue for public health purposes, including: substance abuse prevention and treatment programs, cannabis-related educational campaigns, scientifically rigorous research on the health effects of cannabis, and public health surveillance efforts.

REPORT OF THE COUNCIL ON SCIENCE AND PUBLIC HEALTH

CSAPH Report 5-I-17

Subject: Clinical Implications and Policy Considerations of Cannabis Use
(Resolution 907-I-16)

Presented by: Robert A. Gilchick, MD, MPH, Chair

Referred to: Reference Committee K
(L. Samuel Wann, MD, Chair)

1 INTRODUCTION

2
3 Resolution 907-I-16, "Clinical Implications and Policy Considerations of Cannabis Use,"
4 introduced by the Resident and Fellow Section and referred by the House of Delegates, asked that
5 our AMA amend Policy H-95.998 by addition and deletion to read as follows:

6
7 H-95.998 AMA Policy Statement on Cannabis

8 Our AMA believes that (1) cannabis is a dangerous drug and as such is a public
9 health concern; (2) ~~sale of cannabis should not be legalized;~~ (3) public health based
10 strategies, rather than incarceration, should be utilized in the handling of individuals
11 possessing cannabis for personal use; and (4) (3) additional research should be
12 encouraged (Modify Current HOD Policy),

13 and amend Policy D-95.976 by deletion to read as follows:

14
15 D-95.976 Cannabis - Expanded AMA Advocacy

16 1. Our AMA will educate the media and legislators as to the health effects of
17 cannabis use as elucidated in CSAPH Report 2, I-13, A Contemporary View of
18 National Drug Control Policy, and CSAPH Report 3, I-09, Use of Cannabis for
19 Medicinal Purposes, and as additional scientific evidence becomes available. 2. Our
20 AMA urges legislatures to delay initiating full legalization of any cannabis product
21 until further research is completed on the public health, medical, economic and social
22 consequences of use of cannabis and, instead, support the expansion of such research.
23 3. Our AMA will also increase its efforts to educate the press, legislators and the
24 public regarding its policy position that stresses a "public health", as contrasted with
25 a "criminal," approach to cannabis. 4. Our AMA shall encourage model legislation
26 that would require placing the following warning on all cannabis products not
27 approved by the U.S. Food and Drug Administration: "Marijuana has a high potential
28 for abuse. ~~It has no scientifically proven, currently accepted medical use for~~
29 ~~preventing or treating any disease process in the United States.~~" (Modify Current
30 HOD Policy)

31
32 The Council on Science and Public Health (Council) has issued four previous reports on cannabis
33 (1997, 2001, 2009, and 2013) establishing a broad policy base.¹⁻⁴ This report focuses on the health

1 effects (both therapeutic and harmful) of cannabis and reviews available data on the impact of
2 legalization. While the AMA prefers to use the scientific term “cannabis,” the colloquial term
3 “marijuana” is used interchangeably in this report, for example, when quoting a source or
4 identifying the official name of a committee.

5

6 METHODS

7

8 English language reports were selected from searches of the PubMed, Google Scholar, and
9 Cochrane Library databases from March 2013 to July 2017 using the search terms “marijuana or
10 cannabis” in combination with “health,” “mental health,” “health effects,” “therapeutic use,”
11 “therapeutic benefits,” “legalization,” “youth or adolescents,” “edibles,” “driving,” “taxes,” and
12 “treatment.” Additional articles were identified by manual review of the reference lists of pertinent
13 publications. Websites managed by federal and state agencies and applicable regulatory and
14 advocacy organizations were reviewed for relevant information.

15

16 CURRENT AMA AND FEDERATION POLICY

17

18 Existing AMA policy on cannabis states that it is a dangerous drug and as such is a public health
19 concern (H-95.998). The AMA calls for further adequate and well-controlled studies of marijuana
20 and related cannabinoids in patients who have serious conditions for which preclinical, anecdotal,
21 or controlled evidence suggests possible efficacy (D-95.952). The AMA also urges that
22 marijuana’s status as a federal schedule I controlled substance be reviewed with the goal of
23 facilitating the conduct of clinical research and development of cannabinoid-based medicines
24 (D-95.952). The AMA also believes that public health based strategies, rather than incarceration,
25 should be utilized in the handling of individuals possessing cannabis for personal use (H-95.998).

26

27 The AMA believes that the sale of cannabis should not be legalized (H-95.998) and urges
28 legislatures to delay initiating full legalization of any cannabis product until further research is
29 completed on the public health, medical, economic, and social consequences of recreational use
30 (D-95.976). The AMA supports requiring the following warning on all cannabis products not
31 approved by the U.S. Food and Drug Administration, “Marijuana has a high potential for abuse. It
32 has no scientifically proven, currently accepted medical use for preventing or treating any disease
33 process in the United States” (D-95.976). The AMA also advocates for regulations requiring point-
34 of-sale warnings and product labeling for cannabis and cannabis-based products regarding the
35 potential dangers of use during pregnancy and breastfeeding (H-95.936). The AMA supports
36 increased educational programs relating to use and abuse of alcohol, marijuana, and controlled
37 substances (H-170.992). (see Appendix A)

38

39 Many medical societies in the Federation have taken positions that are consistent with AMA
40 policy. The California Medical Association (CMA) is one exception. It is on record as urging the
41 legalization and regulation of cannabis to allow for greater clinical research, oversight,
42 accountability, and quality control.⁵ CMA believes that the most effective way to protect the
43 public’s health is to tightly control, track, and regulate cannabis and to comprehensively research
44 and educate the public on its health impacts, not through ineffective prohibition.⁵

45

46 STATE LAWS ON CANNABIS

47

48 At the state level, trends in law have moved from decriminalization, to the legalization of medical
49 use of cannabis, to cannabis regulated for adult recreational use.⁶ California was the first
50 jurisdiction in the United States (U.S.) to legalize the medical use of cannabis. Today, 29 states, the
District of Columbia (D.C.), Guam, and Puerto Rico have legalized the medical use of cannabis

1 through either the legislative process or ballot measures.⁷ These laws vary greatly by jurisdiction
2 from how patients access the product (home cultivated or dispensary), to qualifying conditions,
3 product safety and testing requirements, packaging and labeling requirements, and consumption
4 method (some states prohibit smoking the product). In jurisdictions that have legalized cannabis for
5 medicinal use, physicians can “certify” or “recommend” a qualifying patient for the medicinal use
6 of cannabis, but physicians cannot prescribe cannabis for medical purposes because it is illegal
7 under federal law. In recent years, an additional 17 states have enacted laws allowing access to low
8 delta-9-tetrahydrocannabinol (THC)/high cannabidiol (CBD) products for children with epilepsy.⁷
9

10 In 2012, Colorado (CO) and Washington (WA) were the first U.S. jurisdictions to legalize the adult
11 use of cannabis for recreational purposes.^{8,9} Today, a total of 8 states and D.C. have legalized
12 cannabis for recreational purposes, all through the ballot measure process.⁷ (Figure 1) Most of these
13 jurisdictions have created for-profit, commercial cannabis production and distribution markets
14 where the product is sold and taxed. D.C. is the exception; they have adopted a “grow and give”
15 model whereby residents are permitted to possess, use, grow, and give away cannabis, but they
16 cannot sell it.¹⁰ In 2017, legislatures in 20 states introduced legislation to legalize cannabis for
17 recreational use. Vermont’s legislature was the first in the country to vote in favor of legalizing
18 cannabis for recreational use.¹¹ The bill was ultimately vetoed by the governor due to the lack of
19 provisions to protect public health and safety. Specifically, he called on policymakers to hold off
20 on moving forward with commercialization until the state could:

21
22 ...detect and measure impairment on our roadways, fund and implement
23 additional substance abuse prevention education, keep our children safe and
24 penalize those who do not, [and] measure how legalization impacts mental health
25 and substance abuse issues our communities are already facing.¹²
26

27 RELEVANT FEDERAL LAW AND POLICY

28

29 Under the U.S. Controlled Substances Act (CSA) of 1970, cannabis is classified as a Schedule I
30 controlled substance, meaning it has no currently accepted medical use in treatment in the United
31 States, a lack of accepted safety for use under medical supervision, and a high potential for abuse.¹³
32 In 2011, the governors of Washington and Rhode Island petitioned the Drug Enforcement
33 Administration (DEA) asking it to change cannabis from a Schedule I to a Schedule II drug under
34 the CSA. In August of 2016, the DEA announced that cannabis would remain a Schedule I
35 controlled substance.¹⁴ The notice stated that:

36
37 The DEA and FDA continue to believe that scientifically valid and well-
38 controlled clinical trials conducted under investigational new drug applications
39 are the proper way to research all potential new medicines, including marijuana.
40 Furthermore, we believe that the drug approval process is the proper way to
41 assess whether a product derived from marijuana or its constituent parts is safe
42 and effective for medical use.¹⁴
43

44 Cannabis is not FDA-approved as a safe and effective drug for any indication. However,
45 the agency has approved three drug products containing synthetic versions of the main
46 psychoactive ingredient of cannabis, THC. Marinol® and Syndros™, which include the
47 active ingredient dronabinol, are indicated for nausea and vomiting associated with
48 cancer chemotherapy and anorexia associated with weight loss in patients with AIDS.¹⁵
49 Cesamet®, which contains the active ingredient nabilone, also is indicated for the
50 treatment of nausea and vomiting associated with cancer chemotherapy.¹⁵ Clinical
51 investigations are underway for one CBD-based product, Epidiolex® for Lennox-Gastaut

1 syndrome and Dravet syndrome and the THC/CBD combination product Sativex® for
2 cancer pain.^{15,16}

3 In 2016, the DEA announced a change in policy designed to increase the number of DEA-
4 registered cannabis manufacturers. Currently the University of Mississippi is the only entity
5 authorized to produce cannabis for research purposes in the United States. The new policy will
6 allow additional entities to submit applications and become registered with the DEA to grow and
7 distribute cannabis for FDA-authorized research purposes.¹⁷

8
9 Under the Obama Administration, a memorandum to all U.S. Attorneys outlined cannabis
10 enforcement priorities for the federal government. The memo explained that jurisdictions enacting
11 laws legalizing cannabis that also have strong regulatory enforcement systems would be less likely
12 to be threatened with federal enforcement.¹⁸ Federal priorities include preventing: (1) the
13 distribution of cannabis to minors; (2) revenue from the sale of cannabis from going to criminal
14 enterprises, gangs, and cartels; (3) the diversion of cannabis from states where it is legal under state
15 law in some form to other states; (4) state-authorized cannabis activity from being used as a cover
16 or pretext for the trafficking of other illegal drugs or other illegal activity; (5) violence and the use
17 of firearms in the cultivation and distribution of cannabis; (6) drugged driving and the exacerbation
18 of other adverse public health consequences associated with cannabis use; (7) the growing of
19 cannabis on public lands and the attendant public safety and environmental dangers posed by
20 cannabis production on public lands; and, (8) cannabis possession or use on federal property.¹⁸
21 Accordingly, if particular conduct threatens federal priorities, that person or entity would be subject
22 to federal enforcement actions.

23
24 While the Obama Administration tolerated state laws legalizing cannabis, it is still unclear how the
25 Trump Administration will handle the issue.¹⁹ In July of 2017, the Attorney General sent letters to
26 four governors warning them that he had “serious concerns” about the effects of cannabis
27 legalization, raising questions as to whether the current compromise on enforcement with the
28 Justice Department may be under reconsideration.²⁰

29
30 THE HEALTH EFFECTS OF CANNABIS
31

32 The National Academies of Sciences, Engineering, and Medicine (National Academies) published
33 a comprehensive report in January 2017 commissioned by federal, state, philanthropic, and
34 nongovernmental organizations, entitled “The Health Effects of Cannabis and Cannabinoids: The
35 Current State of Evidence and the Recommendations for Research.”⁶ The report’s
36 recommendations outline priorities for a research agenda and highlight the potential for
37 improvements in data collection efforts and enhanced surveillance capacity.⁶ The report also
38 contained 98 conclusions based on the accumulated evidence related to cannabis or cannabinoid
39 use and health.⁶ (see Appendix B)

40
41 The report examined a broad range of possible health effects of cannabis and cannabinoids. Health
42 effects examined included those related to cancer; cardiometabolic risk; respiratory disease;
43 immunity; injury and death; prenatal, perinatal, and neonatal exposure; psychosocial and mental
44 health; problem cannabis use; and cannabis use and the misuse of other substances. The findings
45 are organized into 5 evidence categories: conclusive, substantial, moderate, limited, and
46 no/insufficient evidence. The report found conclusive or substantial evidence that cannabis or
47 cannabinoids are effective: (1) for the treatment of chronic pain in adults (cannabis); (2) as
48 antiemetics in the treatment of chemotherapy-induced nausea and vomiting (oral cannabinoids);
49 and (3) for improving patient-reported multiple sclerosis spasticity symptoms (oral cannabinoids).⁶
50 The report also found substantial evidence of a statistical association between cannabis smoking

1 and: (1) more frequent chronic bronchitis episodes (long-term cannabis smoking); (2) increased
2 risk of motor vehicle crashes; (3) lower birth weight of offspring (maternal cannabis smoking); and
3 (4) the development of schizophrenia or other psychoses, with the highest risk among the most
4 frequent users.⁶

5

6 A systematic review published subsequent to the National Academies report examined 27 clinical
7 trials involving patients with chronic pain and found limited evidence that cannabis may alleviate
8 neuropathic pain in some patients, but that insufficient evidence exists to demonstrate analgesic
9 effects in patients with other types of chronic pain.²¹ This conclusion contradicts the finding of the
10 National Academies report and is an example of how research findings on the therapeutic effects of
11 cannabis remain inconsistent, leading to confusion among physicians, patients, the media, policy
12 makers, and others.

13

14 IMPACT OF STATE LEGALIZATION OF CANNABIS

15

16 In 2012, CO and WA were the first states to legalize cannabis for recreational use. As jurisdictions
17 continue to follow in their footsteps, many are looking at data from these states to determine the
18 impact of legalization on public health and safety. Issues being examined include the impact of
19 legalization on patterns of use by adults, children and adolescents, and pregnant women; cannabis-
20 related exposures; cannabis-related hospital or emergency department visits; cannabis-related
21 treatment admissions; impaired driving; crime; opioid use; and governmental costs and revenue.
22 Since regulatory structures governing cannabis vary by jurisdiction and continue to evolve, the
23 impact on health and safety is difficult to discern. It is also worth noting that although recreational
24 use of cannabis was first legalized in 2012, cannabis products for recreational use were not
25 commercially available for sale in CO or WA until 2014. Alaska (AK), D.C., and Oregon (OR)
26 voted to legalize recreational use in 2014. While OR allowed limited sales of cannabis through
27 medical dispensaries in 2015, cannabis dispensaries for recreational users did not open in AK or
28 OR until 2016 (Figure 2). As a result, limited data are currently available to determine the overall
29 impact of legalizing recreational cannabis use on specific outcome measures.

30

31 The Colorado Department of Public Health and Environment (CDPHE) appointed a Retail
32 Marijuana Public Health Advisory Committee (RMPHAC), to review scientific literature on the
33 health effects of cannabis and state-specific health outcomes and patterns of use.²² The RMPHAC
34 report was informed by state-based data and national surveys such as the Substance Abuse and
35 Mental Health Services Administration's (SAMHSA) National Survey on Drug Use and Health
36 (NSDUH) and the Center for Disease Control and Prevention's (CDC) Behavioral Risk Factor
37 Surveillance System (BRFSS) and Pregnancy Risk Assessment Monitoring System (PRAMS). The
38 Washington State Institute for Public Policy (WSIPP) has conducted a benefit-cost analysis of the
39 implementation of WA Initiative 502 as required by law.²³ The Northwest High Intensity Drug
40 Trafficking Area (NWHIDTA) and the Rocky Mountain High Intensity Drug Trafficking Area
41 (RMHIDTA) have also issued reports on the impacts of the legalization of cannabis in WA and
42 CO, respectively.^{24,25} The results from these reports were utilized in examining the impact of
43 cannabis legalization on public health and safety.

44

45 *Use among Adults*

46

47 In the United States, cannabis is the most commonly used illicit drug.²⁶ Overall, from 2002-2014,
48 the prevalence of cannabis use during the past month, past year, and daily or almost daily increased
49 among persons aged 18 years and older.²⁷ In 2016, the percentage of young adults (18-25 years)
50 who were current marijuana users (past month) was similar to the percentages in 2014 and 2015,
51 while the percentage of older adults (≥ 26 years) who were current users continued to increase.²⁸

1 The percentage of young Coloradan adults aged 18 to 25 years reporting cannabis use within the
2 past year increased significantly after “medical” cannabis legalization (35 percent in 2007 to 2008
3 to 43 percent in 2010 to 2011).²⁹ The latest data available suggest cannabis use has remained fairly
4 constant in CO (45 percent in 2013-2014). In 2015, based on the BRFSS data, 13 percent of CO
5 adults ages 18 and up had used cannabis in the past-month.²² The NSDUH estimate for past-month
6 use is higher, at 17 percent.²² However, neither survey showed a statistical change from 2014 to
7 2015.²² According to NSDUH data, adult use of cannabis in CO has continued to be higher than the
8 national average, which was 8 percent.²² In WA, young adults’ (18-25 years) past-year cannabis
9 use was 6 percent higher than the nation’s in 2012-2013, and adults’ use (≥ 26 years) was 5 percent
10 higher.²⁴ Past month use of cannabis was 5 percent higher than the nation’s average for young
11 adults and adults in 2012-2013.²⁴ Statewide BRFSS data indicate that since the legalization of
12 recreational cannabis in WA, use has increased among adults.²³

13

14 *Use among Pregnant Women*

15

16 Cannabis is the most commonly used illicit drug during pregnancy.³⁰ The movement toward the
17 legalization of cannabis may result in more women using cannabis during pregnancy.³¹ Cannabis
18 crosses the placenta and is found in breast milk.³⁰ It may have adverse effects on both perinatal
19 outcomes and fetal neurodevelopment, though evidence is limited.³¹ In 2015, the American College
20 of Obstetricians and Gynecologists issued a committee opinion discouraging physicians from
21 suggesting the use of marijuana during preconception, pregnancy, and lactation.³⁰

22

23 Overall, cannabis use during pregnancy is increasing with 3.85 percent of pregnant women
24 between the ages of 18 and 44 years reporting past-month cannabis use in 2014, compared with
25 2.37 percent in 2002.³² PRAMS data for CO showed that among new mothers, 11.2 percent used
26 cannabis prior to pregnancy, 5.7 percent used cannabis during pregnancy, and 4.5 percent of
27 breastfeeding mothers used cannabis after delivery.²² Cannabis use during pregnancy was
28 statistically higher among women with an unintended pregnancy (9.1 percent) than among women
29 who intended to become pregnant (4.0 percent).²² When cannabis use during pregnancy was
30 compared among different demographics, both education and age showed statistical differences,
31 whereas race and ethnicity did not.²²

32

33 *Use among Adolescents*

34

35 Adolescents are of particular interest in cannabis-policy discussions because the negative health
36 effects of the drug are heightened when use begins in adolescence.³³ In addition to the health
37 effects, including the increased risk of addiction, evidence also suggests that cannabis use in
38 adolescence and early adulthood is associated with poor social outcomes, including unemployment,
39 lower income, and lower levels of life and relationship satisfaction.³³⁻³⁵ Changes in the legal status
40 of cannabis may affect use among adolescents by decreasing the perceived risk of harm or through
41 the marketing of legal cannabis. Studies examining the impact of “medical” cannabis laws found
42 no measurable effect on the patterns of adolescent cannabis use.³⁶⁻³⁸ States with recreational or
43 adult use cannabis laws also have not experienced an increase in adolescent use in the short
44 term.^{22,23} However, further surveillance is necessary to determine long-term results.

45

46 NSDUH data for 2016 suggest that 6.5 percent or 1.6 million adolescents (12-17 years) were
47 current (past month) users of cannabis.²⁸ The percentage of adolescents who were current cannabis
48 users in 2016 was lower than the percentages in most years from 2009 to 2014, but was similar to
49 the percentage in 2015.²⁸ In CO, estimates of current cannabis use (2002-2015) among high school
50 students have fluctuated between approximately 20 percent and 25 percent.²² Survey results from

1 2015 indicate that approximately 38 percent of CO high school students reported having ever used
2 cannabis and 21 percent reported use in the past 30 days.²² These estimates are similar to national
3 estimates of ever and current cannabis use among high school students. Among CO middle school
4 students in 2015, an estimated 7.6 percent had ever used cannabis and an estimated 4.4 percent
5 reported currently using cannabis.²² In WA, the Healthy Youth Survey, found that cannabis use
6 indicators across grades 6, 8, 10, and 12, have been stable or fallen slightly since the legalization of
7 recreational cannabis.²³

8

9 *Cannabis-Related Exposures*

10

11 Cannabis-related exposures generally refer to the number of human exposures related to accidental
12 or excessive consumption or inhalation of cannabis and cannabis edibles. Early data from states
13 that have legalized cannabis have shown an increase in calls to poison control centers related to
14 cannabis exposures. According to the WA State Poison Control Center (WAPC), calls related to
15 cannabis exposure nearly doubled from 2011 (n=146) to 2016 (n=286).³⁹ In 2016, over 42 percent
16 (n=120) of the total cannabis-related calls involved individuals 13-29 years of age who had been
17 exposed to some form of cannabis.³⁹ Over 70 percent (n=226) of patients were exposed to cannabis
18 through ingestion.³⁹

19

20 In CO, 7.9 percent of adults with children 1-14 years old in the home reported having cannabis or
21 cannabis products in or around the home (2015).²² It was estimated that approximately 14,000
22 homes in CO with children 1-14 years old had cannabis in the home with potentially unsafe
23 storage.²² Cannabis-related exposures in CO increased 100 percent in the three-year average (2013-
24 2015) since CO legalized recreational use of cannabis compared to the three-year average (2010-
25 2012) prior to legalization.²⁵ In children (\leq 5 years old), cannabis-related exposures increased 169
26 percent after legalization of recreational cannabis in CO.²⁵ However, overall human exposures
27 reported to Rocky Mountain Poison Center involving cannabis were marginally lower in 2016
28 (n=224) compared with 2015 (n=231).²²

29

30 A retrospective cohort study of CO children's hospital admissions and regional poison control
31 (RPC) cases for cannabis exposures between January 1, 2009, and December 31, 2015, found that
32 hospital visits and RPC case rates for cannabis exposures in patients under 10 years of age
33 increased between the 2 years prior to and the 2 years after legalization.⁴⁰ During this time period,
34 RPC calls increased at a significantly higher rate in CO than in the rest of the U.S. (34 percent vs.
35 19 percent per year).⁴⁰ In CO, edible products were responsible for more than half of the
36 exposures.⁴⁰

37

38 *Cannabis Secondhand Smoke Exposure*

39

40 For 2014 and 2015 together, 3.2 percent of adults with children 1-14 years old reported cannabis
41 being used inside the home in CO.²² Of these, 83.2 percent reported the cannabis was smoked,
42 vaporized, or dabbed (dabs are a highly concentrated extract of THC).²² It is estimated that
43 approximately 16,000 homes in CO had children 1-14 years old with possible exposure to
44 secondhand cannabis smoke or vapor in the home.²²

45

46 *Cannabis-Related Emergency Department Visits and Hospital Admissions*

47

48 In addition to hospitalizations for unexpected pediatric exposure to cannabis, increased cannabis
49 use after legalization has resulted in an increase in the number of ED visits and hospitalizations
50 related to acute marijuana intoxication.²⁹ Retrospective data from the CO Hospital Association has
51 shown that the prevalence of hospitalizations for cannabis exposure in patients aged 9 years and

1 older essentially doubled after the legalization of medical cannabis (15 per 100,000 hospitalizations
2 in 2001 to 2009 versus 28 per 100,000 hospitalizations from 2010 to 2013) and that cannabis-
3 related ED visits nearly doubled after the legalization of recreational cannabis (22 per 100,000 ED
4 visits in 2010 to 2013 versus 38 per 100,000 ED visits from January to June of 2014).²⁹

5
6 Cannabis legalization may also eventually contribute to increased ED visits for the sequelae of
7 chronic cannabis use, including cannabinoid hyperemesis syndrome.²⁹ Patients with cannabinoid
8 hyperemesis present to the ED with periodic bouts of intractable vomiting that are unresponsive to
9 traditional antiemetics. CO saw a doubling of ED visits for cyclic vomiting after the legalization of
10 medical cannabis in CO in 2009, although the total number of visits remained small.²⁹

11
12 *Cannabis-Related Treatment Admissions*
13

14 Limited data is available regarding the impact of laws legalizing the recreational use of cannabis on
15 cannabis-related treatment admissions,* though the early data suggests a decline in treatment
16 admissions. A study of cannabis-related treatment admissions in Denver from 2001-2013 found
17 that such admissions increased from 2005 (2,694) to 2008 (3,295) and then declined by 10.6
18 percent to 2,887 in 2011.⁴¹ Significant decreases in treatment entries after 2009, a time when access
19 to cannabis through CO's medical cannabis program was increasing, have been hypothesized to be
20 a reflection of an accepting public opinion of cannabis use resulting in fewer individuals seeking
21 treatment.⁴¹ In WA, cannabis-related treatment admissions fell in the three years following
22 legalization of recreational use dropping from 7,843 in 2012, to 7,374 in 2013, 6,885 in 2014, and
23 6,142 in 2015.²³ Youth treatment admissions for cannabis have remained between 66 percent and
24 70 percent of overall admissions in WA state since 2010.²⁴

25
26 *Impaired Driving*
27

28 A potential unintended consequence of legalizing cannabis use for medical or recreational purposes
29 is increased cannabis-related driving impairment. While the effects of alcohol on driving
30 performance and crash risk are well understood, less is known regarding the effects of cannabis on
31 driving. Research, including direct observations made in a driving simulator, has demonstrated the
32 potential of cannabis to impair driving related skills.⁴²⁻⁴⁴ Individuals driving under the influence of
33 cannabis seem to exhibit a general reckless driving style and cannabis smoking increases the risk of
34 involvement in a motor vehicle accident approximately 2-fold.⁴⁴ Cannabis use is associated with
35 slower driving, an increased tendency to drive below the speed limit, increased following distance,
36 increased lane weaving, and increased mean distance headway to the preceding vehicle.⁴³ These
37 behaviors suggest that those driving under the influence of cannabis are aware of their impairment
38 and decrease their speed to compensate.⁴⁴

39
40 Unlike alcohol, THC is not water soluble, but is stored in fatty tissues and released over time. A
41 clear relationship between THC levels and impairment has been difficult to establish, in part,
42 because a urine or even serum level of THC could reflect cannabis used quite remotely from the
43 date of the specimen collection.⁴⁵ Peak THC level can occur when low impairment is measured,
44 and high impairment can be measured when THC level is low.⁴⁵ Additionally, some individuals
45 may demonstrate little or no impairment at a THC level that impairs someone else.⁴⁵

46
47 The most recent data from CO show that cannabis-related traffic deaths increased 48 percent in the
48 three-year average (2013-2015) after recreational use of cannabis was legalized compared with the

* Treatment admissions data as reported by substance abuse treatment facilities for inclusion in the national Treatment Episode Data Set.

1 three-year average (2010-2012) prior to legalization.”²⁵ Similarly, the WA State Traffic Safety
2 Commission found that the number of drivers with THC in their blood involved in fatal driving
3 accidents increased more than 120 percent from 2010 to 2014.²⁴ Despite data from these individual
4 states, another study found that three years after recreational cannabis legalization, motor vehicle
5 crash fatality rates overall for WA and CO were not statistically different from those in similar
6 states without recreational cannabis legalization.⁴⁶

7

8 *Criminal Justice*

9

10 Legalizing cannabis for recreational use could have variable impacts on crime. Some have argued
11 that legalization could result in a decrease in drug-trafficking and possession charges; others
12 contend that the increased use of cannabis could result in increases in violent crime.

13

14 Data from WA’s Administrative Office of the Courts demonstrated that among adult offenders,
15 misdemeanor cannabis possession convictions declined from 297 convictions in January 2012 to 0
16 by January 2013.²³ Among youth offenders, misdemeanor cannabis convictions dropped from
17 1,015 in the first three months of 2012 to 722 in the first quarter of 2013.²³ WA reports that from
18 2012 through 2014, cannabis seizure offenses reported to the National Incident-Based Reporting
19 System decreased by nearly 62 percent.²⁴ Despite the overall decline in seizures in the state, youth
20 cannabis seizure offenses have not followed this trend. In 2010, youth twelve to seventeen years
21 old represented 28.9 percent (n=855) of all seizures.²⁴ In 2012 (legalization), they represented 37.5
22 percent (n=2,378) of seizures, and in 2013 they represented 68.6 percent (n=1,840) of total
23 seizures.²⁴ By the end of 2014 (commercialization), 74 percent (n=1,791) of seizures involved
24 youth aged twelve to seventeen years.²⁴

25

26 Crime in Denver and Colorado has increased from 2013 to 2015.²⁵ Since 2014, there has been an
27 increase in organized, large-scale home grows for trafficking to states where cannabis is not
28 legalized.²⁵ Seizures of Colorado marijuana in the U.S. mail increased 471 percent from an average
29 of 129 pounds (2010-2012) to 736 pounds (2013-2015) over the three-year period after
30 recreational use was legalized.²⁵ In addition, in Colorado, property crime increased 6.2 percent,
31 violent crime increased 6.7 percent, and all crime increased 6.2 percent from 2014 to 2015.²⁵

32

33 *Opioid Use*

34

35 According to the Centers for Disease Control and Prevention, increases in unintentional overdoses
36 and deaths due to prescription opioids and heroin are the biggest driver of the drug overdose
37 epidemic. Studies have found a decrease in the use of opioids among pain patients provided with
38 medical cannabis.⁴⁷ Furthermore, medical cannabis laws are associated with significantly lower
39 state-level opioid overdose mortality rates.⁴⁷ Additional research is necessary to determine how
40 cannabis laws may impact opioid use, morbidity, and mortality.

41

42 *Governmental Costs and Revenue*

43

44 Cannabis tax collections in CO and WA have continued to increase, and, on a national basis,
45 legalization and associated taxation of cannabis could result in billions of dollars per year of tax
46 revenue for states.⁴⁸ In WA, I-502 required the WA State Liquor and Cannabis Board to oversee
47 the recreational cannabis market and imposed a 25% excise tax on producers, processors, and
48 retailers, which was later replaced with a 37% excise tax on retail sales.²³ The Dedicated Marijuana
49 Account was created for cannabis revenues and expenditures.²³ Voters were told legalization could
50 bring in as much as \$1.9 billion over five years, with 40 percent going to the state general fund and
local budgets and the remaining 60 percent intended for substance abuse prevention, research,

1 education, and health care. As of April 2016, state sales average over \$2 million a day, which
2 translates into mean excise tax revenue approaching \$270 million per year.⁴⁸

3
4 In CO, voters were initially told cannabis excise taxes would boost state revenues by \$70 million
5 per year, with the first \$40 million each year to be allocated to school construction, leaving \$30
6 million for enforcement and general state funds.⁴⁸ Revenues in calendar year 2016 reached nearly
7 \$200 million. The CO legislature established a Marijuana Tax Cash Fund (MTCF) in 2014, which
8 collects tax revenue from both medical and recreational cannabis sales. Funds in the MTCF have
9 been appropriated to government agencies to address the possible health and safety consequences
10 of legalization such as monitoring the health effects of cannabis, conducting health education
11 campaigns, and providing substance abuse prevention and treatment programs.

12
13 The legalization and commercialization of cannabis results in revenue for states through taxes and
14 fees, but it also comes with costs, both in regulating and enforcement actions and in protecting
15 public health and safety. For example, in Colorado, the Marijuana Enforcement Division (MED) is
16 responsible for regulating both medical and recreational cannabis businesses in the state. The
17 MED's four offices and 55 employees are responsible for rulemaking, licensing and inspecting
18 cannabis-related businesses, and taking enforcement actions. The annual budget for the MED is
19 approximately \$10.5 million.

20

21 MINIMIZING HEALTH RISKS OF LEGALIZATION

22

23 As jurisdictions continue to understand the impact of legalization on health and other outcomes, the
24 regulatory structure governing cannabis will continue to evolve. In CO, CDPHE continues to assess
25 the knowledge gaps related to cannabis and develop policies to protect vulnerable populations.⁴⁹
26 For example, the issue of child cannabis exposure from edibles has been concerning. In CO,
27 confusion surrounding the serving size for edible products and the delayed onset of the effects of
28 THC are thought to have contributed to overconsumption.⁴⁹ Regulations were changed to ensure
29 easier identification of average serving size in a single edible product.⁴⁹ CO, OR and WA now
30 require a universal symbol to be affixed to edibles. Four states (Alaska, CO, OR, and WA) prohibit
31 the manufacture or packaging of edibles that appeal to youth.⁵⁰ Concerns remain regarding the
32 regulatory gaps that exist in each of these states and whether these regulations are actually
33 informing consumers and keeping the public safe.⁵⁰

34

35 To address motor vehicle crashes due to driving under the influence of cannabis, some states have
36 established *per se* limits for driving under the influence of cannabis. For example, CO and WA
37 have established 5 ng/ml of THC as the legal limit for cannabis-impaired driving.⁴⁹ However, little
38 evidence exists to support the enactment of specific *per se* limits for cannabis.²⁴ As a first step,
39 states are being encouraged to conduct prevalence studies on the number and proportion of drivers
40 testing positive for THC.²⁴

41

42 The Vermont Department of Health has conducted a health impact assessment to determine the
43 potential impact of legislation to regulate and tax cannabis for recreational use on the health of
44 Vermonters and to recommend ways to mitigate the adverse health impacts of such legislation. The
45 recommendations include expanding all current tobacco laws to include cannabis, prohibiting the
46 use of cannabis in public places, standardizing and testing packaging and potency, funding
47 prevention and education, restricting advertising, prohibiting infused products on the regulated
48 market, setting a blood level operating limit for THC, expanding screening for substance use
49 disorders in primary care, training health care providers on the health impacts of cannabis, and
50 funding surveillance and research.⁵¹

1 CONCLUSION
2

3 Although the National Academies found conclusive or substantial evidence that cannabis or
4 cannabinoids have some therapeutic benefits, they also found substantial or conclusive evidence of
5 a statistical association between cannabis smoking and health harms. Furthermore, the findings of a
6 systematic review on the analgesic effects of cannabis released subsequent to the National
7 Academies report were inconsistent with the National Academies report, which highlights the lack
8 of agreement on this issue, and serves as a source of confusion among physicians, patients, and the
9 public and demonstrates the need for additional research.

10 Legalizing the recreational use of cannabis may result in its increased use over time due to changes
11 in perceptions of safety and health risks. Existing data, although limited, have yet to confirm this
12 expectation for children and adolescents. However, cannabis use has increased in adults and
13 pregnant women. Data from jurisdictions that have legalized cannabis demonstrate concerns
14 particularly around unintentional pediatric exposures resulting in increased calls to poison control
15 centers and ED visits as well as an increase in traffic deaths due to cannabis-related impaired
16 driving. Limited data also show a decrease in cannabis-related treatment admissions as well as a
17 possible decrease in the use of opioids for chronic pain. In terms of crime, convictions for the
18 possession of cannabis may decline in states that legalize cannabis. While states have seen an
19 increase in revenue through sales and excise taxes on retail cannabis, the administrative and
20 enforcement costs as well as the costs to society in terms of public health and safety should not be
21 minimized.

22
23 Ongoing surveillance to determine the impact of cannabis legalization and commercialization on
24 public health and safety will be critical. Surveillance should include, but not be limited to, the
25 issues covered in this report – impact on patterns of use, traffic fatalities and injuries, emergency
26 department visits and hospitalizations, unintentional exposures, exposure to second-hand smoke,
27 and cannabis-related treatment admissions. There should also be a focus on at-risk populations
28 including pregnant women and children. Continued evaluation of the effectiveness of regulations
29 developed to ensure public health and safety in states that have legalized the medical and/or
30 recreational use of cannabis is necessary. Jurisdictions that have legalized cannabis should allocate
31 a substantial portion of their cannabis tax revenue for public health purposes, including substance
32 abuse prevention and treatment programs, cannabis-related educational campaigns, scientifically
33 rigorous research on the health effects of cannabis, and public health surveillance efforts.

34
35 For physicians, legalization may require practice modifications, particularly regarding patient-
36 provider conversations about use and risk. Additional education on counseling patients about the
37 danger of second hand smoke exposure, underage use, safe storage, impaired driving, and the over-
38 consumption of edibles may be warranted.

39
40 RECOMMENDATIONS
41

42
43 The Council on Science and Public Health recommends that the following statements be adopted in
44 lieu of Resolution 907-I-16 and the remainder of this report be filed:

45
46 1. That portions of Policies H-95.998, "AMA Policy Statement on Cannabis," H-95.995
47 "Cannabis Use," H-95.938 "Immunity from Federal Prosecution for Physicians Recommending
48 Cannabis," and D-95-976 "Cannabis – Expanded AMA Advocacy," be retained and used, in
49 part, to establish the following new policies:

1 Cannabis Legalization for Recreational Use

2 Our AMA: (1) believes that cannabis is a dangerous drug and as such is a serious public health
3 concern; (2) believes that the sale of cannabis for recreational use should not be legalized; (3)
4 discourages cannabis use, especially by persons vulnerable to the drug's effects and in high-risk
5 populations such as youth, pregnant women, and women who are breastfeeding; (3) believes
6 states that have already legalized cannabis (for medical or recreational use or both) should be
7 required to take steps to regulate the product effectively in order to protect public health and
8 safety and that laws and regulations related to legalized cannabis use should consistently be
9 evaluated to determine their effectiveness; (5) encourages local, state, and federal public health
10 agencies to improve surveillance efforts to ensure data is available on the short- and long-term
11 health effects of cannabis use; (6) supports public health based strategies, rather than
12 incarceration, in the handling of individuals possessing cannabis for personal use. (New HOD
13 Policy)

14

15 Cannabis Legalization for Medicinal Use

16 Our AMA: (1) believes that scientifically valid and well-controlled clinical trials conducted
17 under federal investigational new drug applications are necessary to assess the safety and
18 effectiveness of all new drugs, including potential cannabis products for medical use; (2)
19 believes that cannabis for medicinal use should not be legalized through the state legislative,
20 ballot initiative, or referendum process; (3) will develop model legislation requiring the
21 following warning on all cannabis products not approved by the U.S. Food and Drug
22 Administration: "Marijuana has a high potential for abuse. This product has not been approved
23 by the Food and Drug Administration for preventing or treating any disease process."; (4)
24 supports legislation ensuring or providing immunity against federal prosecution for physicians
25 who certify that a patient has an approved medical condition or recommend cannabis in
26 accordance with their state's laws; and (5) believes that effective patient care requires the free
27 and unfettered exchange of information on treatment alternatives and that discussion of these
28 alternatives between physicians and patients should not subject either party to criminal
29 sanctions. (New HOD Policy)

30

31 2. That the following new policy be adopted:

32

33 Taxes on Cannabis Products

34 Our AMA encourages states and territories to allocate a substantial portion of their cannabis
35 tax revenue for public health purposes, including: substance abuse prevention and treatment
36 programs, cannabis-related educational campaigns, scientifically rigorous research on the
37 health effects of cannabis, and public health surveillance efforts. (New HOD Policy)

38

39 3. That Policy H-95.952, "Cannabis for Medicinal Use," be amended by addition and deletion
40 to read as follows:

41

42 H-95.952, "Cannabis and Cannabinoid Research for Medicinal Use"

43 (1) Our AMA calls for further adequate and well-controlled studies of marijuana and related
44 cannabinoids in patients who have serious conditions for which preclinical, anecdotal, or
45 controlled evidence suggests possible efficacy and the application of such results to the
46 understanding and treatment of disease. (2) Our AMA urges that marijuana's status as a federal
47 schedule I controlled substance be reviewed with the goal of facilitating the conduct of clinical
48 research and development of cannabinoid-based medicines, and alternate delivery methods.
49 This should not be viewed as an endorsement of state-based medical cannabis programs, the
50 legalization of marijuana, or that scientific evidence on the therapeutic use of cannabis meets
51 the current standards for a prescription drug product. (3) Our AMA urges the National

- 1 Institutes of Health (NIH), the Drug Enforcement Administration (DEA), and the Food and
2 Drug Administration (FDA) to develop a special schedule and implement administrative
3 procedures to facilitate grant applications and the conduct of well-designed clinical research
4 involving cannabis and its potential medical utility. This effort should include: a) disseminating
5 specific information for researchers on the development of safeguards for cannabis clinical
6 research protocols and the development of a model informed consent form for institutional
7 review board evaluation; b) sufficient funding to support such clinical research and access for
8 qualified investigators to adequate supplies of cannabis for clinical research purposes; c)
9 confirming that cannabis of various and consistent strengths and/or placebo will be supplied by
10 the National Institute on Drug Abuse to investigators registered with the DEA who are
11 conducting bona fide clinical research studies that receive FDA approval, regardless of whether
12 or not the NIH is the primary source of grant support. (4) ~~Our AMA believes that effective
13 patient care requires the free and unfettered exchange of information on treatment alternatives
14 and that discussion of these alternatives between physicians and patients should not subject
15 either party to criminal sanctions. Our AMA supports research to determine the consequences
16 of long-term cannabis use, especially among youth, adolescents, pregnant women, and women
17 who are breastfeeding.~~ (5) Our AMA urges legislatures to delay initiating the legalization of
18 cannabis for recreational use until further research is completed on the public health, medical,
19 economic, and social consequences of its use. (Modify Current HOD Policy)
- 20
- 21 4. That Policy H-95.936, “Cannabis Warnings for Pregnant and Breastfeeding Women,” be
22 reaffirmed. (Reaffirm HOD Policy)
- 23
- 24 5. That Policies H-95.998, “AMA Policy Statement on Cannabis,” H-95.995, “Cannabis Use,”
25 H-95.938, “Immunity from Federal Prosecution for Physicians Recommending Cannabis,” and
26 D-95.976, “Cannabis – Expanded AMA Advocacy,” be rescinded since they have been
27 implemented, were duplicative of another policy, or portions were incorporated into new
28 policies proposed in this report. (Rescind HOD Policy)

Fiscal Note: Less than \$1,000

FIGURE 1
Status of State Laws on Cannabis Legalization (Source: ASTHO)

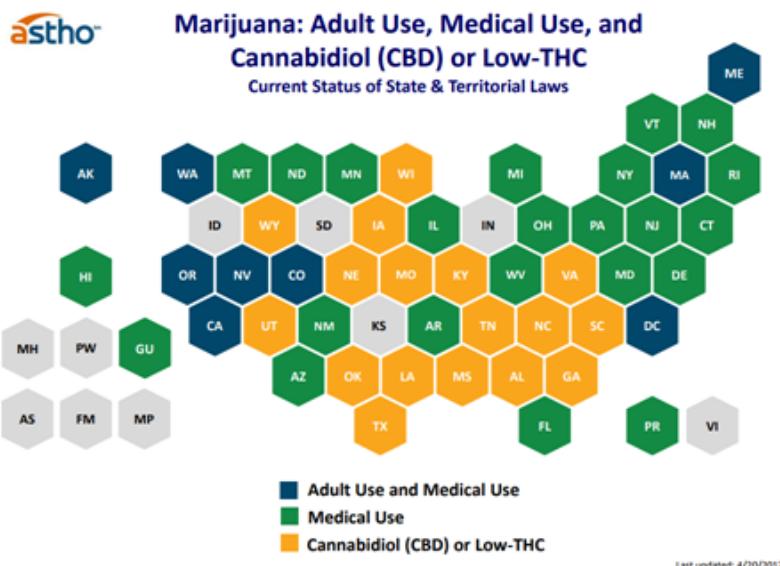


FIGURE 2
Timeline of State Recreational Cannabis Laws



REFERENCES

- 1 Council on Science and Public Health Report 3. Use of Cannabis for Medicinal Purposes. American Medical Association, Interim Meeting, Houston, TX, November 2009.
- 2 Council on Science and Public Health Report 2. A Contemporary View of National Drug Control Policy. American Medical Association, Interim Meeting, National Harbor, MD, November 2013.
- 3 Council on Scientific Affairs Report 6. Medical marijuana. American Medical Association, Annual Meeting, Chicago, IL, June 2001.
- 4 Council on Scientific Affairs Report 10. Medical marijuana. American Medical Association, Interim Meeting, Dallas, TX, December 1997.
- 5 California Medical Association. CA Medical Association announces support for responsible marijuana ballot initiative. February 1, 2016.
<http://www.cmanet.org/news/press-detail/?article=ca-medical-association-announces-support-for>. Accessed August 22, 2017.
- 6 The National Academies of Sciences Engineering and Medicine. The health effects of cannabis and cannabinoids: Current state of evidence and recommendations for research. Washington, DC: The National Academies Press. 2017.
- 7 National Conference of State Legislatures. State Medical Marijuana Laws. 2017.
<http://www.ncsl.org/research/health/state-medical-marijuana-laws.aspx>. Accessed August 22, 2017.
- 8 CO Amendment 64. (2012).
- 9 WA I-502. (2012).
- 10 Washington, D.C. Initiative 71. (2014).
- 11 VT S. 22. (2017).
- 12 Phillip B.Scott. VT S. 22 Veto Message. 2017. <http://legislature.vermont.gov/assets/All-Senate-Documents/S-22-Veto-Message.pdf>. Accessed August 22, 2017.
- 13 21 USC 812.
- 14 81 FR 53687.
- 15 U.S.Food and Drug Administration. FDA and Marijuana: Questions and Answers.
<https://www.fda.gov/newsevents/publichealthfocus/ucm421168.htm>. Accessed September 18, 2017.
- 16 Devinsky O, Cross JH, Laux L, et al. Trial of Cannabidiol for Drug-Resistant Seizures in the Dravet Syndrome. *N Engl J Med* 2017;376:2011-2020.

- 17 81 FR 53846.
- 18 Department of Justice, Office of the Deputy Attorney General. Memorandum for All United States Attorneys, Guidance Regarding Marijuana Enforcement. August, 29, 2013. <https://www.justice.gov/iso/opa/resources/3052013829132756857467.pdf>. Accessed August 22, 2017.
- 19 Kilmer B. Recreational Cannabis - Minimizing the Health Risks from Legalization. *N Engl J Med* 2017;376:705-707.
- 20 Brooks J. U.S. Attorney General has 'serious concerns,' but Gov. Walker stands behind legal marijuana. *Jeaneau Empire* August 16, 2017.
- 21 Nugent SM, Morasco BJ, O'Neil ME, Freeman M, Low A, Kondo K. et al. The Effects of Cannabis Among Adults With Chronic Pain and an Overview of General Harms: A Systematic Review. *Ann Intern Med* 2017;167(5):319-331.
- 22 Colorado Department of Public Health and Environment RMPHAC. Monitoring Health Concerns Related to Marijuana in Colorado: 2016 Changes in Marijuana Use Patterns, Systematic Literature Review, and Possible Marijuana-Related Health Effects. January, 30, 2017. <https://www.researchgate.net/mwg-internal/de5fs23hu73ds/progress?id=4R4DTWtLOoGBqMadhCLdFoS5XOPoCYuAjvAbVdfS2ho,&dl>. Accessed August 22, 2017.
- 23 Darnell A, Bitney K. I-502 Evaluation and Benefit-Cost Analysis: Second Required Report. 17-09-3201. 2017. Olympia, Washington State Institute for Public Policy.
- 24 Northwest High Intensity Drug Trafficking Area. Washington State Marijuana Impact Report. 2016. <http://www.riag.ri.gov/documents/NWHIDTAMarijuanaImpactReportVolume1.pdf>. Accessed August 22, 2017.
- 25 Rocky Mountain High Intensity Drug Trafficking Area. The Legalization of Marijuana in Colorado: The Impact. 2016. <https://www.sheriffs.org/sites/default/files/2016%20FINAL%20Legalization%20of%20Marijuana%20in%20Colorado%20The%20Impact.pdf>. Accessed August 22, 2017.
- 26 Substance Abuse and Mental Health Services Administration. Key substance use and mental health indicators in the United States: Results from the 2015 National Survey on Drug Use and Health. HHS Publication No. SMA 16-4984, NSDUH Series H-51. 2016. Rockville, MD, Center for Behavioral Health Statistics and Quality.
- 27 Azofeifa A, Mattson ME, Schauer G, McAfee T, Grant A, Lyerla R. National Estimates of Marijuana Use and Related Indicators — National Survey on Drug Use and Health, United States, 2002–2014. *MMWR Surveill Summ* 2016;65:1-25.
- 28 Substance Abuse and Mental Health Services Administration. Key substance use and mental health indicators in the United States: Results from the 2016 National Survey on Drug Use and Health. HHS Publication No. SMA 17-5044, NSDUH Series H-52. 2017. Rockville, MD, Center for Behavioral Health Statistics and Quality.

- 29 Kim HS, Monte AA. Colorado Cannabis Legalization and Its Effect on Emergency Care. *Ann Emerg Med* 2016;68:71-75.
- 30 American College of Obstetricians and Gynecologists. Marijuana use during pregnancy and lactation. Committee Opinion No. 637. *Obstet Gynecol* 2015;126:234-238.
- 31 Metz T, Stickrath E. Marijuana use in pregnancy and lactation: a review of the evidence. *American Journal of Obstetrics & Gynecology* 2017;213:761-778.
- 32 Brown QL, Sarvet AL, Shmulewitz D, Martins SS, Wall MM, Hasin DS. Trends in Marijuana Use Among Pregnant and Nonpregnant Reproductive-Aged Women, 2002-2014. *JAMA* 2017;317:207-209.
- 33 Volkow ND, Baler RD, Compton WM. et al. Adverse health effects of marijuana use. *N Engl J Med* 2014;370:2219-2227.
- 34 Fergusson DM, Boden JM. Cannabis use and later life outcomes. *Addiction* 2008;103:969-976.
- 35 Hall W, Lynesky M. Evaluating the public health impacts of legalizing recreational cannabis use in the United States. *Addiction* 2016;111:1764-1773.
- 36 Anderson DM, Hansen B, Rees DI. Medical Marijuana Laws and Teenage Marijuana Use. IZA Discussion Paper Series # 6592. 2012. Bonn Germany. <http://ftp.iza.org/dp6592.pdf>. Accessed August 22, 2017.
- 37 Gorman DM, Charles Huber J. Jr. Do Medical Cannabis Laws Encourage Cannabis Use? *International Journal of Drug Policy* 2007;18:160-167.
- 38 Lynne-Landsman SD, Livingston MD, Wagenaar AC. Effects of state medical marijuana laws on adolescent marijuana use. *Am J Public Health* 2013;103:1500-1506.
- 39 Washington Poision Center. Toxic Trends Report: 2016 Annual Cannabis Report. <https://www.wapc.org/wp-content/uploads/Cannabis-Report.pdf>. Accessed August 22, 2017.
- 40 Wang GS, Le Lait MC, Deakyne SJ, Bronstein AC, Bajaj L, Roosevelt G. Unintentional Pediatric Exposures to Marijuana in Colorado, 2009-2015. *JAMA Pediatr* 2016;170:e160971.
- 41 Davis JM, Mendelson B, Berkes JJ, Suleta K, Corsi KF, Booth RE. Public Health Effects of Medical Marijuana Legalization in Colorado. *Am J Prev Med* 2016;50:373-379.
- 42 Bergeron J, Paquette M. Relationships between frequency of driving under the influence of cannabis, self-reported reckless driving and risk-taking behavior observed in a driving simulator. *J Safety Res* 2014;49:19-24.
- 43 Bondallaz P, Favrat B, Chtioui H, Fornari E, Maeder P, Giroud C. Cannabis and its effects on driving skills. *Forensic Sci Int* 2016;268:92-103.
- 44 Hartman RL, Huestis MA. Cannabis effects on driving skills. *Clin Chem* 2013;59:478-492.

- 45 Compton R. Marijuana-Impaired Driving - A Report to Congress. July 1, 2017. Washington, DC, National Highway Traffic Safety Administration. <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf>. Accessed August 22, 2017.
- 46 Aydelotte JD, Brown LH, Luftman KM et al. Crash Fatality Rates After Recreational Marijuana Legalization in Washington and Colorado. *Am J Public Health* 2017;e1-e3.
- 47 Bachhuber MA, Saloner B, Cunningham CO, Barry CL. Medical Cannabis Laws and Opioid Analgesic Overdose Mortality in the United States, 1999-2010. *JAMA Intern Med* 2014;174:1668-1673.
- 48 Henchman J, Scarboro M. Marijuana Legalization and Taxes: Lessons for Other States from Colorado and Washington. 2016. The Tax Foundation. <https://taxfoundation.org/marijuana-taxes-lessons-colorado-washington/>. Accessed August 22, 2017.
- 49 Ghosh TS, Vigil DI, Maffey A, et al. Lessons learned after three years of legalized, recreational marijuana: The Colorado experience. *Prev Med* 2017; Feb 21. pii: S0091-7435(17)30076-2.
- 50 Gourdet C, Giombi KC, Kosa K, Wiley J, Cates S. How Four U.S. States Are Regulating Recreational Marijuana Edibles. *Int J Drug Policy* 2017;43:83-90.
- 51 Vermont Department of Health. Health Impact Assessment: Marijuana Regulation in Vermont. 2016. http://www.healthvermont.gov/sites/default/files/documents/2016/11/HIA_marijuana_regulation_in_VT_2016.pdf. Accessed August 22, 2017.

APPENDIX A

Existing AMA Policies Related to Cannabis

D-95.976, "Cannabis - Expanded AMA Advocacy"

1. Our AMA will educate the media and legislators as to the health effects of cannabis use as elucidated in CSAPH Report 2, I-13, A Contemporary View of National Drug Control Policy, and CSAPH Report 3, I-09, Use of Cannabis for Medicinal Purposes, and as additional scientific evidence becomes available. 2. Our AMA urges legislatures to delay initiating full legalization of any cannabis product until further research is completed on the public health, medical, economic and social consequences of use of cannabis and, instead, support the expansion of such research. 3. Our AMA will also increase its efforts to educate the press, legislators and the public regarding its policy position that stresses a "public health", as contrasted with a "criminal," approach to cannabis. 4. Our AMA shall encourage model legislation that would require placing the following warning on all cannabis products not approved by the U.S. Food and Drug Administration: "Marijuana has a high potential for abuse. It has no scientifically proven, currently accepted medical use for preventing or treating any disease process in the United States." Res 213, I-14.

H-95.952, "Cannabis for Medicinal Use"

(1) Our AMA calls for further adequate and well-controlled studies of marijuana and related cannabinoids in patients who have serious conditions for which preclinical, anecdotal, or controlled evidence suggests possible efficacy and the application of such results to the understanding and treatment of disease. (2) Our AMA urges that marijuana's status as a federal schedule I controlled substance be reviewed with the goal of facilitating the conduct of clinical research and development of cannabinoid-based medicines, and alternate delivery methods. This should not be viewed as an endorsement of state-based medical cannabis programs, the legalization of marijuana, or that scientific evidence on the therapeutic use of cannabis meets the current standards for a prescription drug product. (3) Our AMA urges the National Institutes of Health (NIH), the Drug Enforcement Administration (DEA), and the Food and Drug Administration (FDA) to develop a special schedule and implement administrative procedures to facilitate grant applications and the conduct of well-designed clinical research involving cannabis and its potential medical utility. This effort should include: a) disseminating specific information for researchers on the development of safeguards for cannabis clinical research protocols and the development of a model informed consent form for institutional review board evaluation; b) sufficient funding to support such clinical research and access for qualified investigators to adequate supplies of cannabis for clinical research purposes; c) confirming that cannabis of various and consistent strengths and/or placebo will be supplied by the National Institute on Drug Abuse to investigators registered with the DEA who are conducting bona fide clinical research studies that receive FDA approval, regardless of whether or not the NIH is the primary source of grant support. (4) Our AMA believes that effective patient care requires the free and unfettered exchange of information on treatment alternatives and that discussion of these alternatives between physicians and patients should not subject either party to criminal sanctions. CSA Rep. 10, I-97, Modified: CSA Rep. 6, A-01, Modified: CSAPH Rep. 3, I-09, Modified in lieu of Res. 902, I-10, Reaffirmed in lieu of Res. 523, A-11, Reaffirmed in lieu of Res. 202, I-12, Reaffirmed: CSAPH Rep. 2, I-13.

H-95.998, "AMA Policy Statement on Cannabis"

Our AMA believes that (1) cannabis is a dangerous drug and as such is a public health concern; (2) sale of cannabis should not be legalized; (3) public health based strategies, rather than

incarceration, should be utilized in the handling of individuals possessing cannabis for personal use; and (4) additional research should be encouraged. BOT Rep. K, I-69, Reaffirmed: CLRPD Rep. C, A-89, Reaffirmed: Sunset Report, A-00, Reaffirmed: CSAPH Rep. 1, A-10, Reaffirmed in lieu of Res. 202, I-12, Modified: CSAPH Rep. 2, I-13.

H-95.995, “Cannabis Use”

Our AMA (1) discourages cannabis use, especially by persons vulnerable to the drug's effects and in high-risk situations; (2) supports the determination of the consequences of long-term cannabis use through concentrated research, especially among youth and adolescents; and (3) supports the modification of state and federal laws to emphasize public health based strategies to address and reduce cannabis use. CSA Rep. D, I-77, Reaffirmed: CLRPD Rep. C, A-89, Reaffirmed: Sunset Report, A-00, Reaffirmed: CSAPH Rep. 1, A-10, Modified: CSAPH Rep. 2, I-13.

H-95.936, “Cannabis Warnings for Pregnant and Breastfeeding Women”

Our AMA advocates for regulations requiring point-of-sale warnings and product labeling for cannabis and cannabis-based products regarding the potential dangers of use during pregnancy and breastfeeding wherever these products are sold or distributed. Res. 922, I-15.

H-95.938, “Immunity from Federal Prosecution for Physicians Recommending Cannabis”

Our American Medical Association supports legislation ensuring or providing immunity against federal prosecution for physicians who certify that a patient has an approved medical condition or recommend cannabis in accordance with their state's laws. Res. 233, A-15.

H-95.997, “Cannabis Intoxication as a Criminal Defense”

Our AMA believes a plea of cannabis intoxication not be a defense in any criminal proceedings. BOT Rep. J, A-72 Reaffirmed: CLRPD Rep. C, A-89 Reaffirmed: Sunset Report, A-00 Reaffirmed: CSAPH Rep. 1, A-10 Modified: CSAPH Rep. 2, I-13.

H-170.992, “Alcohol and Drug Abuse Education”

Our AMA: (1) supports continued encouragement for increased educational programs relating to use and abuse of alcohol, marijuana and controlled substances; (2) supports the implementation of alcohol and marijuana education in comprehensive health education curricula, kindergarten through grade twelve; and (3) encourages state medical societies to work with the appropriate agencies to develop a state-funded educational campaign to counteract pressures on young people to use alcohol. Sub. Res. 63, I-80 Reaffirmed: CLRPD Rep. B, I-90 Reaffirmation and Reaffirmed: Sunset Report, I-00 Appended: Res. 415, I-01 Reaffirmed: CSAPH Rep. 1, A-11.

APPENDIX B

The National Academies of Sciences, Engineering, and Medicine

The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research (2017)

EVIDENCE	CONCLUSIONS FOR THERAPEUTIC EFFECTS
There is conclusive or substantial evidence that cannabis or cannabinoids are effective:	<ul style="list-style-type: none"> For the treatment for chronic pain in adults (cannabis) Antiemetics in the treatment of chemotherapy-induced nausea and vomiting (oral cannabinoids) For improving patient-reported multiple sclerosis spasticity symptoms (oral cannabinoids)
There is moderate evidence that cannabis or cannabinoids are effective for:	<ul style="list-style-type: none"> Improving short-term sleep outcomes in individuals with sleep disturbance associated with obstructive sleep apnea syndrome, fibromyalgia, chronic pain, and multiple sclerosis (cannabinoids, primarily nabiximols)
There is limited evidence that cannabis or cannabinoids are effective for:	<ul style="list-style-type: none"> Increasing appetite and decreasing weight loss associated with HIV/AIDS (cannabis and oral cannabinoids) Improving clinician-measured multiple sclerosis spasticity symptoms (oral cannabinoids) Improving symptoms of Tourette syndrome (THC capsules) Improving anxiety symptoms, as assessed by a public speaking test, in individuals with social anxiety disorders (cannabidiol) Improving symptoms of posttraumatic stress disorder (nabilone)
There is limited evidence of a statistical association between cannabinoids and:	<ul style="list-style-type: none"> Better outcomes (i.e., mortality, disability) after a traumatic brain injury or intracranial hemorrhage.
There is limited evidence that cannabis or cannabinoids are ineffective for:	<ul style="list-style-type: none"> Improving symptoms associated with dementia (cannabinoids) Improving intraocular pressure associated with glaucoma (cannabinoids) Reducing depressive symptoms in individuals with chronic pain or multiple sclerosis (nabiximols, dronabinol, and nabilone)
There is no or insufficient evidence to support or refute the conclusion that cannabis or cannabinoids are an effective treatment for:	<ul style="list-style-type: none"> Cancers, including glioma (cannabinoids) Cancer-associated anorexia cachexia syndrome and anorexia nervosa (cannabinoids) Symptoms of irritable bowel syndrome (dronabinol) Epilepsy (cannabinoids) Spasticity in patients with paralysis due to spinal cord injury (cannabinoids) Symptoms associated with amyotrophic lateral sclerosis (cannabinoids) Chorea and certain neuropsychiatric symptoms associated with Huntington's disease (oral cannabinoids) Motor system symptoms associated with Parkinson's disease or the levodopa-induced dyskinesia (cannabinoids) Dystonia (nabilone and dronabinol) Achieving abstinence in the use of addictive substances (cannabinoids) Mental health outcomes in individuals with schizophrenia or schizopreniform psychosis (cannabidiol)
EVIDENCE	CONCLUSIONS FOR CANCER
There is moderate evidence of no statistical association between cannabis use and:	<ul style="list-style-type: none"> Incidence of lung cancer (cannabis smoking) Incidence of head and neck cancers
There is limited evidence of a statistical association between cannabis smoking and:	<ul style="list-style-type: none"> Non-seminoma-type testicular germ cell tumors (current, frequent, or chronic cannabis smoking)
There is no or insufficient	<ul style="list-style-type: none"> Incidence of esophageal cancer (cannabis smoking)

evidence to support or refute a statistical association between cannabis use and:	<ul style="list-style-type: none"> Incidence of prostate cancer, cervical cancer, malignant gliomas, non-Hodgkin lymphoma, penile cancer, anal cancer, Kaposi's sarcoma, or bladder cancer Subsequent risk of developing acute myeloid leukemia/acute non-lymphoblastic leukemia, acute lymphoblastic leukemia, rhabdomyosarcoma, astrocytoma, or neuroblastoma in offspring (parental cannabis use)
EVIDENCE	CONCLUSIONS FOR CARDIOMETABOLIC RISK
There is limited evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> The triggering of acute myocardial infarction (cannabis smoking) Ischemic stroke or subarachnoid hemorrhage Decreased risk of metabolic syndrome and diabetes Increased risk of prediabetes
There is no evidence to support or refute a statistical association between <i>chronic effects</i> of cannabis use and:	<ul style="list-style-type: none"> The increased risk of acute myocardial infarction
EVIDENCE	CONCLUSIONS FOR RESPIRATORY DISEASE
There is substantial evidence of a statistical association between cannabis smoking and:	<ul style="list-style-type: none"> Worse respiratory symptoms and more frequent chronic bronchitis episodes (long-term cannabis smoking)
There is moderate evidence of a statistical association between cannabis smoking and:	<ul style="list-style-type: none"> Improved airway dynamics with acute use, but not with chronic use Higher forced vital capacity (FVC)
There is moderate evidence of a statistical association between <i>the cessation</i> of cannabis smoking and:	<ul style="list-style-type: none"> Improvements in respiratory symptoms.
There is limited evidence of a statistical association between cannabis smoking and:	<ul style="list-style-type: none"> An increased risk of developing chronic obstructive pulmonary disease (COPD) when controlled for tobacco use (occasional cannabis smoking)
There is no or insufficient evidence to support or refute a statistical association between cannabis smoking and:	<ul style="list-style-type: none"> Hospital admissions for COPD Asthma development or asthma exacerbation
EVIDENCE	CONCLUSIONS FOR IMMUNITY
There is limited evidence of a statistical association between cannabis smoking and:	<ul style="list-style-type: none"> A decrease in the production of several inflammatory cytokines in healthy individuals
There is limited evidence of <i>no</i> statistical association between cannabis use and:	<ul style="list-style-type: none"> The progression of liver fibrosis or hepatic disease in individuals with viral hepatitis C (HCV) (daily cannabis use)
There is no or insufficient evidence to support or refute a statistical association between cannabis use and:	<ul style="list-style-type: none"> Other adverse immune cell responses in healthy individuals (cannabis smoking) Adverse effects on immune status in individuals with HIV(cannabis or dronabinol use) Increased incidence of oral human papilloma virus (HPV) (regular cannabis use)
EVIDENCE	CONCLUSIONS FOR INJURY AND DEATH
There is substantial evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> Increased risk of motor vehicle crashes
There is moderate evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> Increased risk of overdose injuries, including respiratory distress, among pediatric populations in U.S. states where cannabis is legal
There is no or insufficient evidence to support or refute a statistical association between cannabis use and:	<ul style="list-style-type: none"> All-cause mortality (self-reported cannabis use) Occupational accidents or injuries (general, nonmedical cannabis use) Death due to cannabis overdose

EVIDENCE	CONCLUSIONS FOR PRENATAL, PERINATAL, AND NEONATAL EXPOSURE
There is substantial evidence of a statistical association between maternal cannabis smoking and:	<ul style="list-style-type: none"> Lower birth weight of the offspring
There is limited evidence of a statistical association between maternal cannabis smoking and:	<ul style="list-style-type: none"> Pregnancy complications for the mother Admission of the infant to the neonatal intensive care unit (NICU)
There is insufficient evidence to support or refute a statistical association between maternal cannabis smoking and:	<ul style="list-style-type: none"> Later outcomes in the offspring (e.g., sudden infant death syndrome, cognition/academic achievement, and later substance use)
EVIDENCE	CONCLUSIONS FOR PSYCHOSOCIAL
There is moderate evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> The impairment in the cognitive domains of learning, memory, and attention (acute cannabis use)
There is limited evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> Impaired academic achievement and education outcomes Increased rates of unemployment and/or low income Impaired social functioning or engagement in developmentally appropriate social roles
There is limited evidence of a statistical association between <i>sustained abstinence from</i> cannabis use and:	<ul style="list-style-type: none"> Impairments in the cognitive domains of learning, memory, and attention
EVIDENCE	CONCLUSIONS FOR MENTAL HEALTH
There is substantial evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> The development of schizophrenia or other psychoses, with the highest risk among the most frequent users
There is moderate evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> Better cognitive performance among individuals with psychotic disorders and a history of cannabis use Increased symptoms of mania and hypomania in individuals diagnosed with bipolar disorders (regular cannabis use) A small increased risk for the development of depressive disorders Increased incidence of suicidal ideation and suicide attempts with a higher incidence among heavier users Increased incidence of suicide completion Increased incidence of social anxiety disorder (regular cannabis use)
There is moderate evidence of <i>no</i> statistical association between cannabis use and:	<ul style="list-style-type: none"> Worsening of negative symptoms of schizophrenia (e.g., blunted affect) among individuals with psychotic disorders
There is limited evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> An increase in positive symptoms of schizophrenia (e.g., hallucinations) among individuals with psychotic disorders The likelihood of developing bipolar disorder, particularly among regular or daily users The development of any type of anxiety disorder, except social anxiety disorder Increased symptoms of anxiety (near daily cannabis use) Increased severity of posttraumatic stress disorder symptoms among individuals with posttraumatic stress disorder
There is no evidence to support or refute a statistical association between cannabis use and:	<ul style="list-style-type: none"> Changes in the course or symptoms of depressive disorders The development of posttraumatic stress disorder
EVIDENCE	CONCLUSIONS FOR PROBLEM CANNABIS USE
There is substantial evidence that:	<ul style="list-style-type: none"> Stimulant treatment of attention deficit hyperactivity disorder (ADHD) during adolescence is <i>not</i> a risk factor for the development of problem cannabis use

	<ul style="list-style-type: none"> • Being male and smoking cigarettes are risk factors for the progression of cannabis use to problem cannabis use • Initiating cannabis use at an earlier age is a risk factor for the development of problem cannabis use
There is substantial evidence of a statistical association between:	<ul style="list-style-type: none"> • Increases in cannabis use frequency and the progression to developing problem cannabis use • Being male and the severity of problem cannabis use, but the recurrence of problem cannabis use does not differ between males and females
There is moderate evidence that:	<ul style="list-style-type: none"> • Anxiety, personality disorders, and bipolar disorders are <i>not</i> risk factors for the development of problem cannabis use • Major depressive disorder is a risk factor for the development of problem cannabis use • Adolescent ADHD is <i>not</i> a risk factor for the development of problem cannabis use • Being male is a risk factor for the development of problem cannabis use • Exposure to the combined use of abused drugs is a risk factor for the development of problem cannabis use • Neither alcohol nor nicotine dependence alone are risk factors for the progression from cannabis use to problem cannabis use • During adolescence the frequency of cannabis use, oppositional behaviors, a younger age of first alcohol use, nicotine use, parental substance use, poor school performance, antisocial behaviors, and childhood sexual abuse are risk factors for the development of problem cannabis use
There is moderate evidence of a statistical association between:	<ul style="list-style-type: none"> • A persistence of problem cannabis use and a history of psychiatric treatment • Problem cannabis use and increased severity of posttraumatic stress disorder symptoms
There is limited evidence that:	<ul style="list-style-type: none"> • Childhood anxiety and childhood depression are risk factors for the development of problem cannabis use
EVIDENCE	CONCLUSIONS FOR CANNABIS USE AND THE ABUSE OF OTHER SUBSTANCES
There is moderate evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> • The development of substance dependence and/or a substance abuse disorder for substances, including alcohol, tobacco, and other illicit drugs
There is limited evidence of a statistical association between cannabis use and:	<ul style="list-style-type: none"> • The initiation of tobacco use • Changes in the rates and use patterns of other licit and illicit substances
EVIDENCE	CONCLUSIONS FOR CHALLENGES AND BARRIERS IN CONDUCTING CANNABIS RESEARCH
There are several challenges and barriers in conducting cannabis and cannabinoid research, including:	<ul style="list-style-type: none"> • There are specific regulatory barriers, including the classification of cannabis as a Schedule I substance, that impede the advancement of cannabis and cannabinoid research • It is often difficult for researchers to gain access to the quantity, quality, and type of cannabis product necessary to address specific research questions on the health effects of cannabis use • A diverse network of funders is needed to support cannabis and cannabinoid research that explores the beneficial and harmful health effects of cannabis use • To develop conclusive evidence for the effects of cannabis use on short- and long-term health outcomes, improvements and standardization in research methodology (including those used in controlled trials and observational studies) are needed