

Research on Marijuana and Lessons Learned after Legalization: Implications for Youth and the Powerful Role of Parents and Caregivers

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Overview of this presentation

- **Special thank you to:**
 - Nancy Pasquale
 - RyeACT Coalition
 - KNOW 2 Prevent
 - Ellen Morehouse
 - Lisa Tomeny
 - Lauren Johnson
 - All of you for making time for this event

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CANNABIS/MARIJUANA USE – onset

- **Many routes/means of use:**
 - Smoked (joints, bongs, pipes)
 - Vaped (vaporizer)
 - Ingested orally (brewed as a tea, food, edibles)
 - Concentrates (dabbing, hash oil, budder, shatter)
- **When smoked/vaped...**
 - Effects begin immediately
- **When consumed in food or drink...**
 - Effects begin 30-60 minutes

NIDA (2019)

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https://www.theathenforum.org/sites/default/files/public/documents/marijuana_cannabis_terminology_march_2020_final.docx.pdf

Considerations for using the terminology Cannabis or Marijuana*

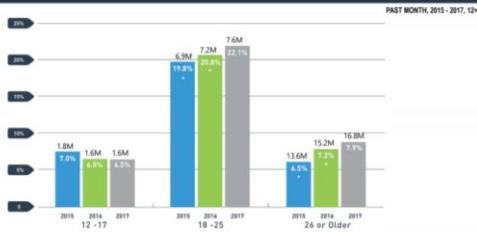
Audience	Term	Considerations
Youth (12-17)	Marijuana	In DCH audience research, youth have not identified one slang term that is universally known. Although not all teens use the term marijuana, it is generally well understood.
Young adults (18-20)	Marijuana	This term is also mostly used by clinicians and prevention experts, which lends an element of credibility to messages. In DCH audience research, young adults have not identified one slang term that is universally known. Although few young adults use the term marijuana, it is well understood across the entire audience.
Parents & influential adults	Marijuana	In DCH audience research and from a general understanding from parents in the field, not all parents or influential adults understand the term cannabis or most slang terms. Marijuana seems to be

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Norms

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Marijuana Use



See figure 13 in the 2017 NSDUH Report for additional information.

* Differences between the denominator and the 2017 estimate is statistically significant at the .05 level.
Source: SAMHSA NSDUH



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Cannabis Use Data from Monitoring the Future Study

- Cannabis/marijuana
 - Any use, Past year
 - 8th graders: 11.8%
 - 10th graders: 28.8%
 - 12th graders: 35.7%
 - Any use, Past 30 days
 - 8th graders: 6.6%
 - 10th graders: 18.4%
 - 12th graders: 22.3%

Source: Schulenberg, et al. (2020)

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Cannabis Use Data from Monitoring the Future Study

- College students
 - 43.0% report past year use
 - 26.3% report past month use
 - 5.9% report use 20+ days in past month
- Young adults (19-28)
 - 40.1% report past year use
 - 26.7% report past month use
 - 9.4% report use 20+ days in past month



Source: Schulenberg, et al. (2020)

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NORM PERCEPTION

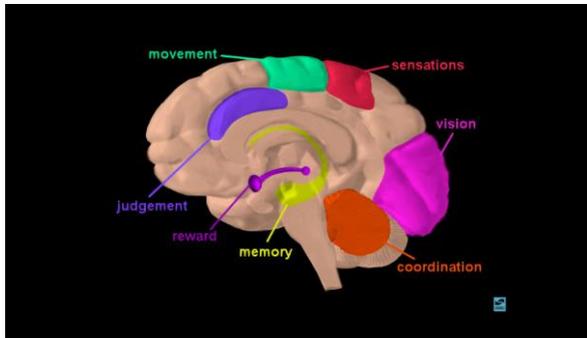
- In survey of 5990 participants, 67.4% of students said the hadn't used MJ in the past year
 - Thus, "most" students don't use marijuana
- Only 2% of students got this right!
 - 98% of students perceived the typical student to use at least once per year
- Misperceptions were related to use and consequences

Kilmer, et al. (2006)

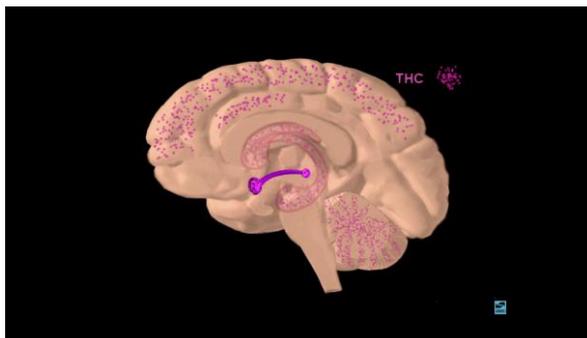
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We have to consider that research on cannabis needs to "catch up" with what people are actually using, since potency is at never before seen rates

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ElSohly M.A., Mehmedic, Z., Foster, S., Gon, C., Chandra, S., & Church, J.C. (2016). Changes in cannabis potency over the last 2 decades (1995–2014) – Analysis of current data in the United States. *Biol Psychiatry*, 79, 613-619.

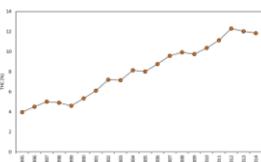
Archival Report

Changes in Cannabis Potency Over the Last 2 Decades (1995–2014): Analysis of Current Data in the United States

Mohammed A. ElSohly, Zolita Mehmedic, Susan Foster, Christian Gon, Sumit Chandra, and James C. Church

ABSTRACT
 Cannabis is the most widely used psychoactive drug in the United States and one of the most abused substances. The potency of cannabis has increased significantly over the last two decades. This increase in potency is associated with an increase in the risk of cannabis use disorder and other mental health problems. The purpose of this study was to analyze the current data on cannabis potency in the United States from 1995 to 2014. The results show that the average THC content of cannabis has increased from 4.7% in 1995 to 11.2% in 2014. This increase in potency is associated with an increase in the risk of cannabis use disorder and other mental health problems. The authors conclude that the increase in cannabis potency over the last two decades is a public health concern that warrants further research.

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ElSohly, M.A., Mehmedic, Z., Foster, S., Gon, C., Chandra, S., & Church, J.C. (2016). Changes in cannabis potency over the last two decades (1995–2014) – Analysis of current data in the United States. *Biol Psychiatry*, 79, 613-619.

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ElSohly, M.A., Chandra, S., Radwan, M., Majumdar, C.G., Church, J.C. (2021). A comprehensive review of cannabis potency in the United States in the last decade. *Biological Psychiatry: Cognitive Neuroscience, and Neuroimaging*, 6, 603-606.

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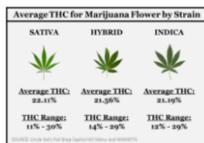
Washington State Impact Report



www.mfiles.org

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Series of horizontal lines for handwritten notes.



Average potency (nation) = 13.18%

Average potency (Seattle) = 21.62%

Concentrates average potency (nation) = 55.85%

Concentrates average potency (Seattle) = 71.71%

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Series of horizontal lines for handwritten notes.



Variation in cannabis potency and prices in a newly legal market: evidence from 30 million cannabis sales in Washington state

Rosanna Smart¹, Jonathan P. Caulkins^{1,2}, Beau Kilmer¹, Steven Davenport¹ & Greg Midgette¹

RAND Corporation, Santa Monica, CA, USA¹ and Hiram College, Conopa, Hiram University, Hiram, PA, USA²

ABSTRACT

Aims: (1) assess trends and variation in the market share of product types and potency sold in a legal cannabis retail market and (2) estimate how potency and purchase quantity influence price variation for cannabis flower. Design: Secondary analysis of publicly available data from Washington State's cannabis traceability system spanning 7 July 2014 to 30 September 2016. Descriptive statistics and linear regressions assessed variation and trends in cannabis

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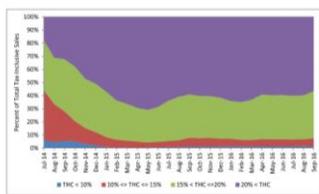


Figure 3 Market share for cannabis flower products sold by delta-9-tetrahydrocannabinol (THC) % category. Market share is calculated as a percent of total cannabis flower expenditures (nicotine-tax-inclusive). [Colour figure can be viewed at [pubmed.ncbi.nlm.nih.gov](https://doi.org/10.1371/journal.pone.0230167.g003)]

Smart, R., Caulkins, J.P., Kilmer, B., Davenport, S., & Midgette, G. (2017). Variation in cannabis potency and prices in newly legal market: Evidence from 30 million cannabis sales in Washington state. *Addiction*, *112*, 2167-2177.

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Cash, M.C., Cunnane, K., Fan, C., Romero-Sandoval, E.A. (2020). Mapping cannabis potency in medical and recreational programs in the United States. *PLoS ONE* 15(3): e0230167. <https://doi.org/10.1371/journal.pone.0230167>

PLOS ONE

RESEARCH ARTICLE
Mapping cannabis potency in medical and recreational programs in the United States

Mary Catherine Cash^{1*}, Katharine Cunnane², Ching-Fan¹, E. Alfonso Romero-Sandoval^{1†}

¹ The University of North Carolina, Eshelman School of Pharmacy, Chapel Hill, NC, United States of America, ² Department of Anesthesiology, Wake Forest University School of Medicine, Winston-Salem, NC, United States of America

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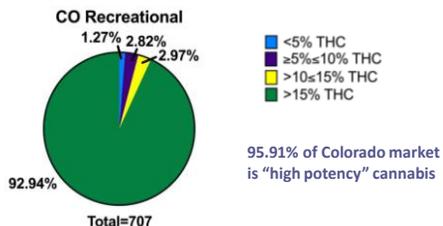


Abstract

Cannabis related online searches are associated with positive attitudes toward medical cannabis, particularly when information is obtained from dispensaries. Since pain is the main reason for medical cannabis use, information from dispensary websites has the potential to shape the attitudes of pain patients towards cannabis. This is relevant because cannabis

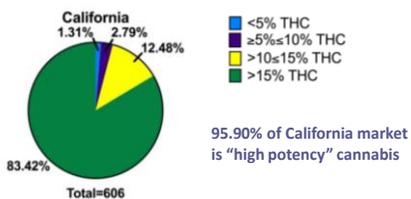
OPEN ACCESS
Citation: Cash MC, Cunnane K, Fan C, Romero-Sandoval EA (2020) Mapping cannabis potency in medical and recreational programs in the United States. *PLoS ONE* 15(3): e0230167. <https://doi.org/10.1371/journal.pone.0230167>

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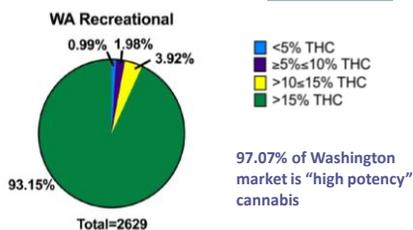
Cash, M.C., Cunnane, K., Fan, C., Romero-Sandoval, E.A. (2020). Mapping cannabis potency in medical and recreational programs in the United States. *PLoS ONE* 15(3): e0230167. <https://doi.org/10.1371/journal.pone.0230167>

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Cash, M.C., Cunnane, K., Fan, C., Romero-Sandoval, E.A. (2020). Mapping cannabis potency in medical and recreational programs in the United States. *PLoS ONE* 15(3): e0230167. <https://doi.org/10.1371/journal.pone.0230167>

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Cash, M.C., Cunnane, K., Fan, C., Romero-Sandoval, E.A. (2020). Mapping cannabis potency in medical and recreational programs in the United States. *PLoS ONE* 15(3): e0230167. <https://doi.org/10.1371/journal.pone.0230167>

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Why potency matters

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DiForti, M., Quattrone, D., Freeman, T.P., Tripoli, G., et al. (2019). The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): A multicenter case-control study. *Lancet Psychiatry*, 6 (5), 426-436.

Articles **Increased risk of psychosis**

The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): a multicentre case-control study

DiForti, M., Quattrone, D., Freeman, T.P., Tripoli, G., et al. (2019). The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): a multicentre case-control study. *Lancet Psychiatry*, 6 (5), 426-436.

Summary
Cannabis use is associated with increased risk of later psychotic disorder but whether it affects incidence of the disorder remains unclear. We aimed to identify patterns of cannabis use with the strongest effect on early-onset psychotic disorder, across Europe, with regional variation in use, and to assess whether differences in such patterns contribute to variation in the incidence of psychosis (EU-GEI).

Methods We included patients aged 17-47 years who presented to psychiatric services in 17 sites across Europe and South America between 2000 and 2016, and recorded incident psychotic disorder. We applied a Bayesian hierarchical model to estimate the association between cannabis use and incident psychotic disorder, using European and national data on the regional concentration of Δ^9 -tetrahydrocannabinol (THC) in cannabis. We assessed whether the association between cannabis use and incident psychotic disorder varied by age, sex, and the different types of cannabis available across the sites, and tested for signs of possible bias by comparing the

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JAMA Psychiatry | Original Investigation
Association of High-Potency Cannabis Use With Mental Health and Substance Use in Adolescence

Lindley A. Hines, PhD, Don P. Freeman, PhD, Suzanne H. Lige, PhD, Stanley Zammit, PhD, Matthew Horwood, PhD, Mary-Carmen, PhD, Marisa Mouton, PhD, John McEwan, PhD, Janice Hines, PhD

IMPORTANCE Cannabis use is consistently linked to poorer mental health outcomes, and there is evidence that use of higher potency cannabis increases these risks. To date, no studies have described the association between cannabis potency and concurrent mental health in a general population sample or addressed confounding using longitudinal data.

OBJECTIVE To explore the association between cannabis potency and substance use and mental health outcomes, accounting for preceding mental health and frequency of cannabis use.

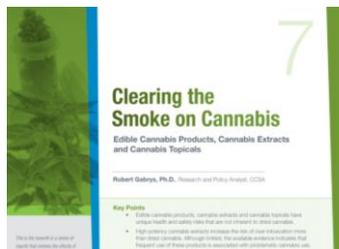
DESIGN, SETTING, AND PARTICIPANTS This cohort study used data from the Avon Longitudinal Study of Parents and Children, a UK birth cohort of participants born between April 1, 1991, and December 31, 1992. Prevalent data on outcomes and exposures were collected between June 2016 and October 2017 from 1087 participants at 24 years of age who reported recent cannabis use.

EXPOSURES Self-reported type of cannabis most commonly used in the past year, coded to a binary measure of use of both synthetic cannabinoids or both natural cannabinoids.

Increased risk of addiction and generalized anxiety disorder

Hines, et al., (2020)

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For concentrates/ extracts, more association with "problematic cannabis use, cannabis use disorder, and mental health disorders." -- Gabrys (2020)

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<https://adai.uw.edu/research/cannabis-research-education/high-potency-cannabis/>

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5 domains/outcomes relevant to education/prevention/public health

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(5) Impact on attention, concentration, and memory

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Relationship Between Cannabis Use and Academic Success

- More frequent cannabis use associated with lower GPA, skipping more classes, less current enrollment, and being less likely to graduate on time (Arria, et al., 2013, 2015; Suerken, et al., 2016)

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Relationship Between Cannabis Use, Alcohol Use, and Academic Success

- Alcohol and marijuana are both associated with lower GPA; when entered in same regression, effects of alcohol became non-significant (Bolin, Pate, McClintock, 2017)
- Students using both marijuana and alcohol at moderate to high levels have significantly lower GPAs over two years (Meda, et al., 2017)
- Students who moderate or curtail substance use improved GPA (Meda, et al., 2017)

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(4) Impact of substance use on sleep quality (and subsequent effects)

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Health and Mental Health

n=30,084 students in the undergraduate reference group from 58 colleges/universities in Fall 2019

• Of 51 possibilities, the top student-identified factors affecting academic performance:

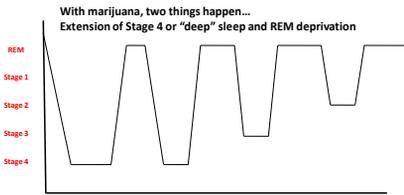
- 46.8% Procrastination
- 40.2% Stress
- 29.3% Anxiety
- 23.6% Sleep difficulties



▫ 1.7% Cannabis/marijuana use (40th of 51 factors)

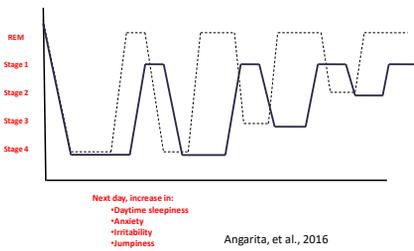
American College Health Association, 2020

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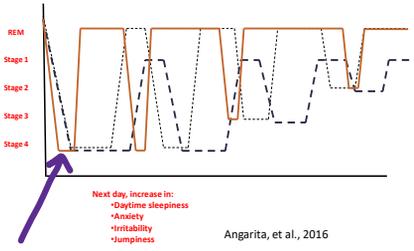
Angarita, et al., 2016

44

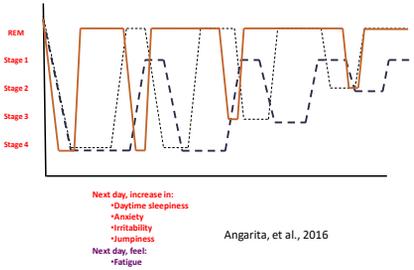


Angarita, et al., 2016

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(3) Factors associated with health and mental health (not already addressed earlier)

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Cannabis Use Associated with Risk of Psychiatric Disorders (Hall & Degenhardt, 2009; Hall, 2009; Hall 2013)

• **Schizophrenia**

- Those who had used cannabis 10+ times by age 18 were 2-3 times more likely to be diagnosed with schizophrenia
- "13% of schizophrenia cases could be averted if cannabis use was prevented (Hall & Degenhardt, 2009, p. 1388)"



• **Depression and suicide**

- "Requires attention in cannabis dependent" (Hall, 2013)

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Screening

• **Screening suggestions**

- Cannabis Use Disorder Identification Test-Revised (CUDIT-R)
- <http://www.warecoveryhelpline.org/wp-content/uploads/2018/04/CUDIT.pdf>

The Cannabis Use Disorder Identification Test - Revised (CUDIT-R)

Have you used any cannabis over the past six months? Yes _____ No _____
 If you answered "Yes" to the previous question, please answer the following questions about your cannabis use. Circle the response that is most correct for you in relation to your cannabis use over the past six months.

1. How often do you use cannabis?	Never 0	Monthly or less 1	2-4 times a month 2	2-3 times a week 3	4+ times a week 4
2. How many hours were you "stoned" on a typical day when you had been using cannabis?	Less than 1 0	1 or 2 1	3 or 4 2	5 or 6 3	7 or more 4
3. How often during the past 6 months did you find that you were not able to stop using cannabis once you had started?	Never 0	Less than monthly 1	Monthly 2	Weekly 3	Daily/almost daily 4
4. How often during the past 6 months did you fail to do what was normally expected from you because of using cannabis?	Never 0	Less than monthly 1	Monthly 2	Weekly 3	Daily or almost daily 4

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5. How often in the past 6 months have you devoted a great deal of your time to getting, using, or recovering from cannabis?	Never 0	Less than monthly 1	Monthly 2	Weekly 3	Daily/almost daily 4
6. How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?	Never 0	Less than monthly 1	Monthly 2	Weekly 3	Daily or almost daily 4
7. How often do you use cannabis in situations that could be physically hazardous, such as driving, operating machinery, or caring for children?	Never 0	Less than monthly 1	Monthly 2	Weekly 3	Daily/almost daily 4
8. Have you ever thought about cutting down, or stopping, your use of cannabis?	Never 0	Yes, but not in the past 6 months 2	Yes, during the past 6 months 4		

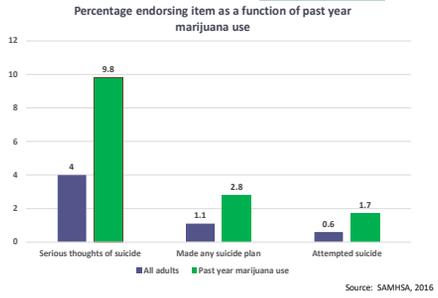
This questionnaire was designed for self-administration and is scored by adding each of the 8 items:
 Question 1-7 are scored on a 0-4 scale
 Question 8 is scored 0, 2, or 4

Score: _____

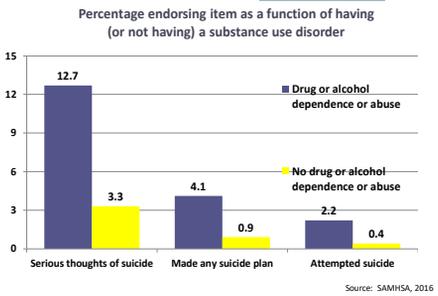
Source:
 Washington
 Recovery
 Helpline

Scores of 8 or more indicate hazardous cannabis use, while scores of 12 or more indicate a possible cannabis use disorder for which further intervention may be required.
 Adkins K, Kay-Lambkin FJ, Baker AL, Lewis T, Thornton L, Kelly RL, and Salmann B. (2016). An Improved Brief Measure of Cannabis Misuse: The Cannabis Use Disorder Identification Test - Revised (CUDIT-R). *Drug and Alcohol Dependence* 158:151-166.

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MARIJUANA USE – effects after use

- With high doses, may experience acute toxic psychosis
 - Hallucinations
 - Delusions
 - Depersonalization
- Seem more likely when person takes too much or potency is high

NIDA (2019)

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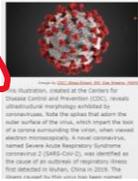
(2) COVID-19

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COVID-19: Potential Implications for Individuals with Substance Use Disorders

March 24, 2020

As people across the U.S. and the rest of the world contend with coronavirus disease 2019 (COVID-19), the research community should be alert to the possibility that it could hit populations with special vulnerability. Because it attacks the lungs, the coronavirus that causes COVID-19 could be an especially serious threat to those with smoke-related or drug-related conditions.



Substance use disorder may also be vulnerable due to those drugs' effects on respiratory and pulmonary health. Additionally, individuals with a substance use disorder are more likely to experience homelessness or incarceration than those in the general population, and these circumstances pose unique challenges regarding transmission of the virus that causes COVID-19. All these

... (caption text) ...

<https://www.drugabuse.gov/about-nida/noras-blog/2020/03/covid-19-potential-implications-individuals-substance-use-disorders>

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Smoking/Vaping & Coronavirus (COVID-19)
Give your lungs a fighting chance

How to your risk of COVID-19 (continued)

SMOKING OR VAPING INCREASES YOUR RISK OF COVID-19

- Damages lungs
- Weakens the immune system
- Makes it harder to fight disease

COVID-19 Exposure

Infection is 10 times greater

We can help you quit!

MISSISSIPPI STATE TOBACCO QUITLINE
1-800-QUIT-NOW

SMALL BUSINESS QUITLINE
800-WA-QUIT-4U

Why you quit
• Smoother breathing
• Better sleep
• Better taste
• Better health

COVID-19 Exposure

Infection is 10 times greater

For more information visit <https://www.doh.wa.gov/Portal/0/Document/1500/coronavirus/Infographic-Smoking-Vaping.pdf>

<https://www.doh.wa.gov/Portal/0/Document/1500/coronavirus/Infographic-Smoking-Vaping.pdf>

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COVID-19 diagnosis 5x greater for people who vape, 7x greater for people who vape and smoke (Gaiha, Cheng, & Halpern-Feisher, 2020)



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(1) Addiction risk (and withdrawal)

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MaCoun (2013), Frontiers in Psychiatry

Criterion	DSM-IV substance dependence	DSM-5 substance use disorder
Tolerance	✓	✓
Withdrawal	✓	✓
Taken more/longer than intended	✓	✓
Desire/unsuccessful efforts to quit use	✓	✓
Great deal of time taken by activities involved in use	✓	✓
Use despite knowledge of problems associated with use	✓	✓
Important activities given up because of use	✓	✓
Recurrent use resulting in a failure to fulfill important role obligations	✓	✓
Recurrent use resulting in physically hazardous behavior (e.g., driving)	✓	✓
Continued use despite recurrent social problems associated with use	✓	✓
Craving for the substance	✓	✓



Mild: 2-3 symptoms
Moderate: 4-5 symptoms
Severe: 6+ symptoms

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Documented solidly in the science with "high" confidence

- **Addiction**
 - 9% who experiment become addicted
 - 17% who begin in adolescence
 - 25-50% of those with daily use
 - Compared to those who begin using in adulthood, those who begin in adolescence are 2-4 times as likely to develop cannabis dependence within 2 years

Volkow, N.D., Baler, R.D., Compton, W.M., & Weiss, S.R.B. (2014). Adverse health effects of marijuana use. *The New England Journal of Medicine*, 370 (23), 2219-2227.

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A quick word about medical cannabis use (particularly if people are declining referrals for counseling or health consultations)

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Doctors should think twice before prescribing medical marijuana: guideline Source: CTVNews.com

New guideline warns pain benefits of medical cannabis overstated
University of Alberta led guideline warns health risks may outweigh benefits, provides guidance on when (and when not) to prescribe. Source: ScienceDaily.com

Canadian Doctors Warn Medical Pot Is Overhyped Source: Gizmodo.com

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Allan, G.M., Ramjli, J., Perry, D., Ton, J., Beahm, N.P., Crisp, N., Dockrill, B., Dublin, R.E., Findlay, T., Kirkwood, J., Fleming, M., Makus, K., Zhu, X., Korownyk, C., Kolber, M., McCormack, J., Nickel, S., Guillermina, N., & Lindblad, A.J. (2018). Simplified guidelines for prescribing medical cannabinoids in primary care. *Canadian Family Physician, 64*, 111-120.



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Only are recommending for neuropathic pain, palliative and end-of-life pain, chemotherapy-induced nausea and vomiting, and spasticity due to multiple sclerosis or spinal cord injury...

AND
if tried traditional therapies/treatments first...

Allan, et al. (2018)

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"This study suggests that oral CBD does not alter responses to emotional stimuli, or produce anxiolytic-like effects in healthy human subjects. (p. 112)"

Arndt & de Wit (2017)

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Separating reported medical use from management of withdrawal

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Motivations for Use

Motivations for Use	Motivations for Use	Proportion of participants endorsing/motives	Proportion of primary motives
Enjoyment/ fun	Enjoyment/ fun (e.g., be happy, get high, enjoy feeling)	52.14%	24.03%
	Conformity (e.g., peer pressure, friends do it)	42.81%	16.40%
	Experimentation (e.g., new experience, curiosity)	41.25%	29.36%
Social enhancement	Social enhancement (e.g., bonding with friends, hang out)	25.71%	8.66%
	Boredom (e.g., something to do, nothing better to do)	25.08%	4.19%
Boredom	Relaxation (e.g., to relax, helps me sleep)	24.64%	6.97%
	Coping (e.g., depressed, relieve stress)	18.14%	5.10%
	Availability (e.g., easy to get, it was offered)	13.74%	2.23%
	Relative low risk (e.g., low health risk, no hangover)	10.88%	0.95%
Altered perception	Altered perception or perspectives (e.g., to enhance experiences, makes things more fun)	10.58%	1.81%
	Activity enhancement (e.g., music sounds better, every day activities more interesting)	6.88%	0.80%
Activity enhancement	Rebellion (e.g., rebelling against parents, thrill of something illegal)	5.21%	0.32%
	Alcohol intoxication (e.g., I was drunk)	4.42%	0.47%
	Food enhancement (e.g., enjoy good food, food tastes better)	3.79%	0.00%
	Anxiety reduction (e.g., be less shy, feel less insecure)	3.31%	0.00%
	Image enhancement (e.g., to be cool, to feel cool)	2.89%	0.32%
Image enhancement	Celebration (e.g., special occasion, to celebrate)	1.26%	0.16%
	Medical use (e.g., alleviate physical pain, have a headache)	1.26%	0.16%
Celebration	Habit (e.g., feeling was addictive, became a habit)	0.95%	0.00%

Lee, Neighbors & Walsh (2007)

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	Boredom (e.g., something to do, nothing better to do)	25.08%	4.19%
Boredom	Relaxation (e.g., to relax, helps me sleep)	24.64%	6.97%
	Coping (e.g., depressed, relieve stress)	18.14%	5.10%
	Availability (e.g., easy to get, it was offered)	13.74%	2.23%
	Relative low risk (e.g., low health risk, no hangover)	10.88%	0.95%
Altered perception	Altered perception or perspectives (e.g., to enhance experiences, makes things more fun)	10.58%	1.81%
	Activity enhancement (e.g., music sounds better, every day activities more interesting)	6.88%	0.80%
Activity enhancement	Rebellion (e.g., rebelling against parents, thrill of something illegal)	5.21%	0.32%
	Alcohol intoxication (e.g., I was drunk)	4.42%	0.47%
	Food motives (e.g., enjoy good food, food tastes better)	3.79%	0.00%
	Anxiety reduction (e.g., be less shy, feel less insecure)	3.31%	0.00%
	Image enhancement (e.g., to be cool, to feel cool)	2.89%	0.32%
Image enhancement	Celebration (e.g., special occasion, to celebrate)	1.26%	0.16%
	Medical use (including pain and headache) (e.g., alleviate physical pain, have a headache)	1.26%	0.16%
Celebration	Habit (e.g., feeling was addictive, became a habit)	0.95%	0.00%

Lee, Neighbors & Walsh (2007)

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Withdrawal: Cannabis

Diagnostic Criteria **292.0 (F12.288)**

A. Cessation of cannabis use that has been heavy and prolonged (i.e., usually daily or almost daily use over a period of at least a few months).

B. Three (or more) of the following signs and symptoms develop within approximately 1 week after Criterion A:

1. Irritability, anger, or aggression.
2. Nervousness **< Anxiety**.
3. **Sleep difficulty** (e.g., insomnia, disturbing dreams).
4. **Decreased appetite** weight loss.
5. Restlessness.
6. **Decreased libido**.

7. At least one of the following physical symptoms causing significant discomfort: abdominal pain, shakiness/tremors, sweating, fever, chills, **< Headache**.

C. The signs or symptoms in Criterion B cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

D. The signs or symptoms are not attributable to another medical condition and are not better explained by another mental disorder, including intoxication or withdrawal from another substance.

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Impaired driving and duration of effects

- **Effects on the brain**
 - Authors of I-502 set DUI at 5 ng THC/ml of blood for those over 21 (any positive value for those under 21)
 - Why 5 ng? Similarities in impairment to .08% for alcohol
 - How long does it take to drop below 5 ng?
 - Fischer and colleagues (2021) encourages waiting at least 6-8 hours after inhaling and 8-12 hours after ingesting



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www.seattletimes.com/health/news/local/air-pollution-pot-use-fatal-crashes-in-fatal-crashes

More pot use found in fatal crashes, data says

Washington state appears to have increased as a factor in deadly crashes last year in Washington.

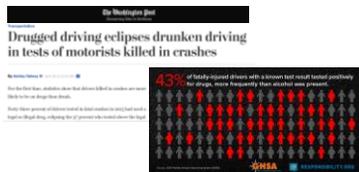
By Bill Young

Washington state appears to have increased as a factor in deadly crashes last year in Washington.

New data from the Washington Traffic Safety Center shows the number of drivers involved in fatal crashes with THC in their body increased from 21 in 2019 to 23 last year. About half those 23 drivers had active THC — the state's production-based license — when the fatal drug tests administered.

Source: Seattle Times, August 20, 2015

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Released 4/26/17: <http://www.ghsa.org/resources/drugged-driving-2017>

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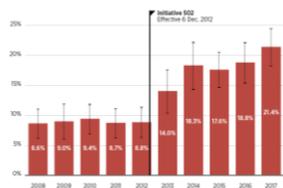


Figure 1. Estimated Percentage of Drivers Involved in Fatal Crashes Who Were THC-Positive, Washington State, 2008-2017.

Taft, B. C. & Arnold, L. S. (2022). Cannabis Use Among Drivers in Fatal Crashes in Washington State Before and After Legislation (Research Brief). Washington, D.C. AAA Foundation for Traffic Safety.

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Review

Lower-Risk Cannabis Use Guidelines (LRCUG) for reducing health harms from non-medical cannabis use: A comprehensive evidence and recommendations update

Benedikt Fischer^{a,b,c,d}, Tessa Robinson^{b,d}, Chris Bullen^{b,e}, Valerie Curran^{b,f}, Didier Jutras-Aswad^{b,g}, Maria Elena Medina-Mora^{b,h}, Rosalie Liccardo Paculaⁱ, Jürgen Rehm^{b,m}, Robin Room^{b,n}, Wim van den Brink^{b,o}, Wayne Hall^b

Released 8/28/2021

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General Precaution A:

“There is no universally safe level of cannabis use; thus, the only reliable way to avoid any risk for harm from using cannabis is to abstain from its use.”

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Among other recommendations:

- Avoid driving while under the influence (waiting at least 6-8 hours after inhaling, 8-12 hours after use of edibles)

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Suggestions for prevention

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COLLEGEAIM



www.collegedrinkingprevention.gov/CollegeAIM

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“Consider a mix of strategies.

Your best chance for creating a safer campus could come from a combination of individual- and environmental-level interventions that work together to maximize positive effects (p. 5).”

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This “mix” includes (but is not limited to):

- Policies
- Enforcement
- Education
- Prevention
- Intervention
- Treatment

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Implementation strategies are key

“...the use of effective interventions on a scale sufficient to benefit society requires careful attention to implementation strategies as well. One without the other is like serum without a syringe; the cure is available, but the delivery system is not.” (p. 448)

Fixsen, D. L., Blase, K. A., Duda, M. A., Naoom, S. F., & Van Dyke, M. (2010). Implementation of evidence-based treatments for children and adolescents: Research findings and their implications for the future. In J. R. Weisz & A. E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (p. 435–450). The Guilford Press

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Even for adults, be aware of recommendations for “lower risk” rather than “low risk” use

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AJPM POLICY

Lower-Risk Cannabis Use Guidelines: A Comprehensive Update of Evidence and Recommendations

Brooklynn Fisher, PhD, Caelynn Bland, MEd, Brooke Schmitz, PhD, Wren van den Brink, MD, PhD, Ronald Lu, PhD, MD, PhD, Wayne Hall, PhD, Jason Rubin, PhD, and Brian Bonn, PhD

Background: Cannabis use is common in North America, especially among young people, and is associated with a risk of various acute and chronic adverse health outcomes. Currently, clinical guidelines are outdated, for example, based on evidence published prior to 2010, and the current national public health and research authorities have not updated their guidance. As cannabis-related health outcomes may be differentially affected by use in different ways, more evidence-based guidance is needed. **Guidelines:** Our Guidelines (GUGs) summarize guidance in other health fields, offer evidence-based recommendations to improve public health outcomes, and identify evidence gaps. **Conclusions:** To support evidence-based, equitable, and quality public medicine in the United States, evidence-based guidance is needed to inform public health practice. Various factors determining adverse health outcomes from cannabis that may be

Modifiable: For most recommendations, there was at least “substantial” or “good” quality evidence. We developed 10 major recommendations for cannabis use. (1) The most effective way to avoid cannabis use-related health risks is abstinence. (2) Avoid daily use of cannabis for fun, recreational, or medicinal use. (3) Consider the timing and frequency of use. (4) Avoid using cannabis in combination with other substances, especially alcohol and prescription medications. (5) Avoid cannabis use in high-risk situations. (6) Avoid cannabis use in high-risk situations. (7) Avoid high-frequency (e.g., daily or near-daily) cannabis use. (8) Obtain from cannabis required driving, the operation of a high-risk vehicle, or cannabis use-related health problems should avoid use altogether, and

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April 2018

The April 20 Cannabis Celebration and Fatal Traffic Crashes in the United States

John A. Staples, MD, MPH^{1,2,3}, David A. Redelmeier, MD, MPH^{4,5,6}

JAMA Network Open. 2018;1(4):e180026.

PMID: 30081784 | DOI: 10.1001/jamaopen.2018.0268

On April 20 each year, thousands of Americans celebrate the intoxicating properties of marijuana on a popular counterculture holiday known as "4/20." Legal marijuana sales surge in anticipation of the "High Holiday," and college students report increased cannabis consumption on 4/20 itself.^{1,2} In many cities,

Staples & Redelmeier (2018)

- Obtained data from US NHTSA's Fatality Analysis Reporting System
- From 1992 through 2016, between 4:20 p.m. and 11:59 p.m. on 4/20 compared to same interval on 4/13 and 4/27
 - The risk of a fatal crash was significantly higher on April 20 (relative risk 1.12, p<.001)

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Correct misperceived norms

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How Can We Use This Information to Prevent & Reduce Harm from Marijuana?

- **Correct Normative Misperceptions**
 - Most people are not using
 - Most people are not driving under the influence
 - The more people use, the more they think others are using
 - Opportunity for positive community norms (e.g., Jeff Linkenbach's Montana Institute)

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Increase risk perception, and support prevention/intervention efforts that could impact motivation to change

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Utilize parents as partners in prevention

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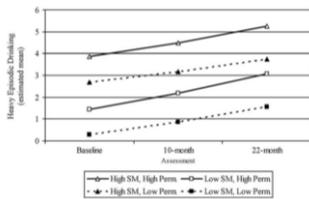
Examining role of parents and peers

- Fairlie, Wood, & Laird (2012) collected data during summer before starting college, 10 month follow-up (spring semester of first year), and 22 month follow-up (spring semester of second year)
- Looked at social modeling (e.g., # of close friends who drink heavily, perceived friend approval of drinking and getting drunk) and parental permissiveness



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Heavy episodic drinking as a function of high or low social modeling + high or low parental permissiveness



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<https://www.learnaboutmarijuana.org/parents/>



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<http://www.collegeparentsmatter.org>



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collegeparentsmatter.org/cannabis.html

As a parent, what should I do?

The guidance that might be most useful for you differs by the level of involvement with cannabis.
How would you describe your grown child's cannabis use?
Click on one of the buttons below for discussion points and examples of what to say.

I'm not sure if my child is using cannabis

[Click for suggestions ▼](#)

My child uses cannabis, but I'm not sure how much or how often

[Click for suggestions ▼](#)

My child uses cannabis regularly

[Click for suggestions ▼](#)

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<http://www.collegeparentsmatter.org>

- 1) Don't be afraid to start the conversation
- 2) As a family member, you are allowed to disapprove of substance use. Give yourself permission to disapprove.
- 3) Banish any fear that your disapproval is naïve.
- 4) Focus on one message during the conversation.
- 5) Reject the myth that discouraging substance use is useless because everyone is doing it.
- 6) Make communication a regular activity.
- 7) Recognize the power of your influence.

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***Keep collaborating –
communities that get people on
the same page as far a plan for
prevention are the ones seeing
successes***

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