The Latest Information on Cannabis for the Prevention Professional

CSHRB
CENTER FOR THE STUDY OF HEALTH AND RISK BEHAVIORS

@cshrb_uw

Jason R. Kilmer, Ph.D.
University of Washington
Associate Professor
Psychiatry & Behavioral Sciences
Adjunct Associate Professor
Psychology

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Overview of this presentation

- **Special thank you to:**
  - Aisha Hamid, Conor Burke, Agnes Skowron, and Scott Gagnon
  - All of you for making the time for today's presentation
- **What I said I would cover:**
  - *How does cannabis today differ from potency in the 1970s, 1980s, 1990s, and 2000s? How does cannabis affect sleep? What are the effects of cannabis use on attention and memory? Hear the answers to these questions and more, with an emphasis on opportunities for prevention.*
    - *Learning objectives:*
      - *(1) Participants will be able to identify a screening measure for Cannabis Use Disorder*
      - *(2) Participants will be able to describe at least 2 risks/outcomes associated with cannabis use*
      - *(3) Participants will be able to identify at least one prevention or public health approach/opportunity for use in their community*

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CANNABIS 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 (2020). *Cannabis/marijuana research report*. Retrieved from https://nida.nih.gov/publications/research-reports/marijuana/

3

Norms (and highest misperceptions among those who report use)

Wolfson, S. (2000). Students' estimates of the prevalence of drug use: Evidence for a false consensus effect. *Psychology of Addictive Behaviors, 14*(3), 295–298. https://doi.org/10.1037/0893-164X.14.3.295

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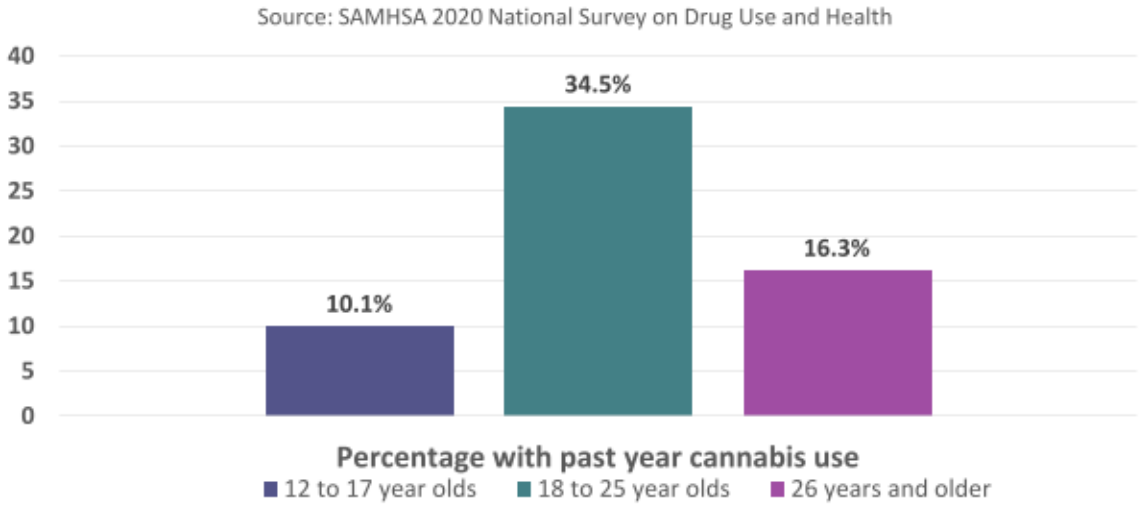
Past year cannabis use by age group



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A lot of times we hear "it's safe" or "it's safer than alcohol"

The "who's who" of cannabis researchers globally have weighed in on risks of cannabis use

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Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

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,*], Tessa Robinson[b,d], Chris Bullen[a,e], Valerie Curran[f,g], Didier Jutras-Aswad[h,i], Maria Elena Medina-Mora[j,k], Rosalie Liccardo Pacula[l], Jürgen Rehm[m,n], Robin Room[o,p], Wim van den Brink[q,r], Wayne Hall[s,t]

[a] Schools of Population Health and Pharmacy, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand
[b] Centre for Applied Research in Mental Health and Addiction, Faculty of Health Sciences, Simon Fraser University, Vancouver, Canada
[c] Department of Psychiatry, Federal University of Sao Paulo, Sao Paulo, Brazil
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[e] National Institute for Health Innovation (NIHI), The University of Auckland, Auckland, New Zealand
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[h] Department of Psychiatry and Addictology, Université de Montréal, Montreal, Canada
[i] Research Centre of the Centre Hospitalier de l'Université de Montréal (CRCHUM), Montreal, Canada
[j] Center for Global Mental Health Research, National Institute of Psychiatry Ramón de la Fuente Muñiz, Mexico City, Mexico
[k] Department of Psychiatry and Mental Health, Faculty of Medicine, National Autonomous University of Mexico, Mexico City, Mexico

Fischer, B., Robinson, T., Bullen, C., Curran, V., Jutras-Aswad, D., Medina-Mora, M. E., Pacula, R. L., Rehm, J., Room, R., Brink, W. V. D., & Hall, W. (2022). Lower-Risk Cannabis Use Guidelines (LRCUG) for reducing health harms from non-medical cannabis use: A comprehensive evidence and recommendations update. *The International Journal on Drug Policy*, *99*, 103381.

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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."

Fischer, B., Robinson, T., Bullen, C., Curran, V., Jutras-Aswad, D., Medina-Mora, M. E., Pacula, R. L., Rehm, J., Room, R., Brink, W. V. D., & Hall, W. (2022). Lower-Risk Cannabis Use Guidelines (LRCUG) for reducing health harms from non-medical cannabis use: A comprehensive evidence and recommendations update. *The International Journal on Drug Policy*, *99*, 103381.

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Potency/concentration is at never before seen levels, so statements like "it's just weed," or "it's natural," or "I used when I was younger and I turned out fine" need to be addressed

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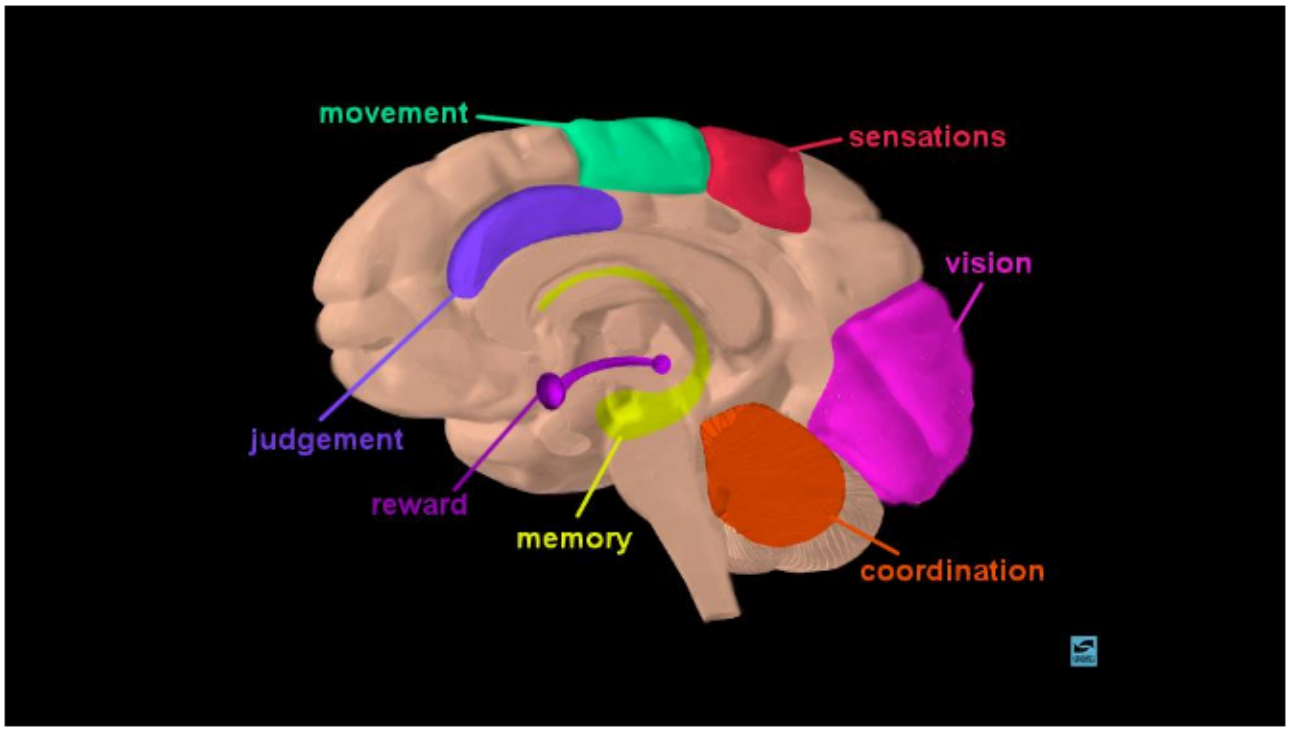

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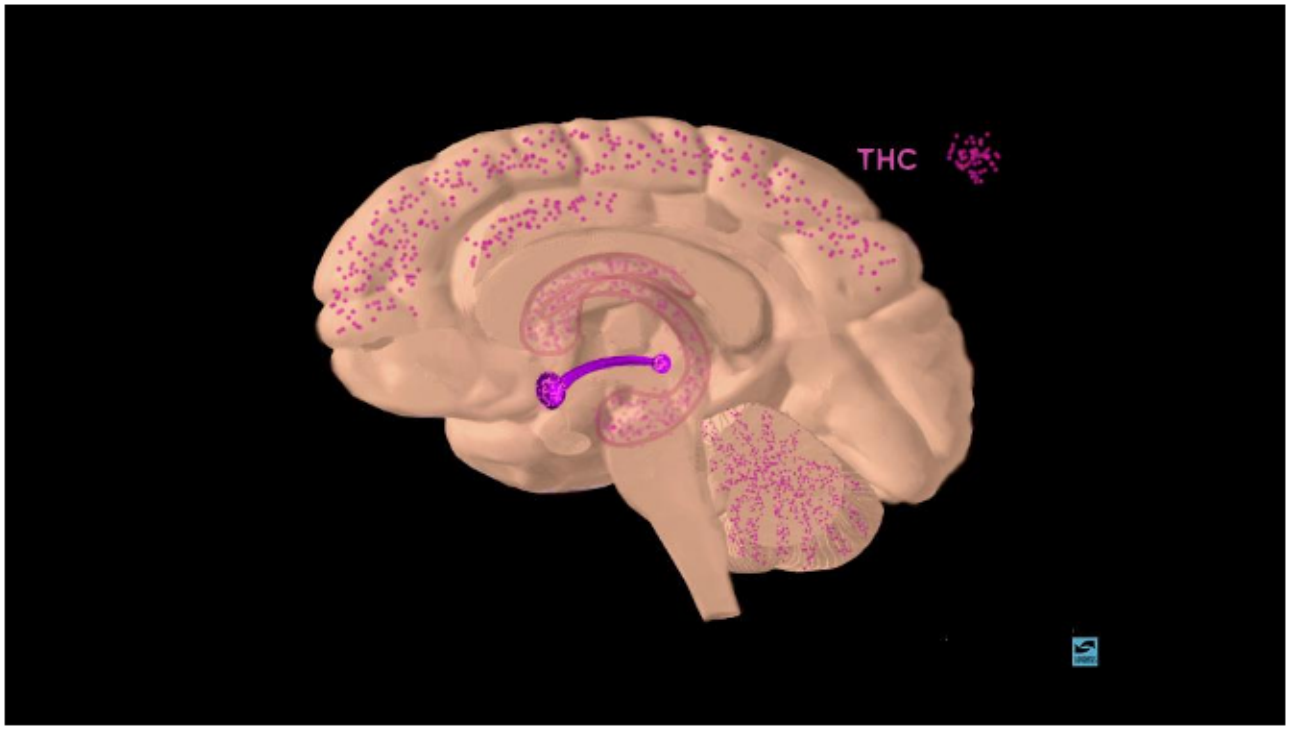

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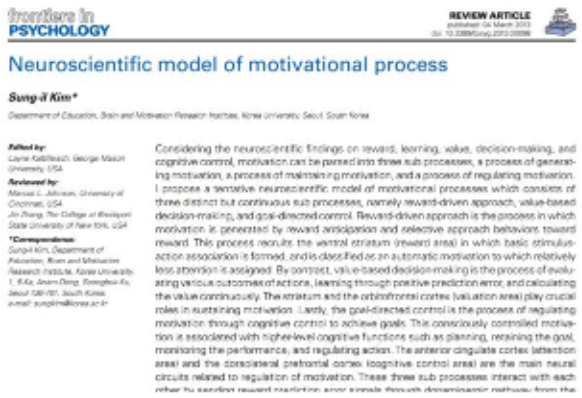

frontiers in PSYCHOLOGY

REVIEW ARTICLE

Neuroscientific model of motivational process

Sung-il Kim*

Considering the neuroscientific findings on reward, learning, value, decision-making, and cognitive control, motivation can be parsed into three sub processes, a process of generating motivation, a process of maintaining motivation, and a process of regulating motivation. I propose a tentative neuroscientific model of motivational processes which consists of three distinct but continuous sub processes, namely reward-driven approach, value-based decision-making, and goal-directed control. Reward-driven approach is the process in which motivation is generated by reward anticipation and selective approach behaviors toward reward. This process recruits the ventral striatum (reward area) in which basic stimulus-action association is formed, and is classified as an automatic motivation to which relatively less attention is assigned. By contrast, value-based decision-making is the process of evaluating various outcomes of actions, learning through positive prediction error, and calculating the value continuously. The striatum and the orbitofrontal cortex (valuation area) play crucial roles in sustaining motivation. Lastly, the goal-directed control is the process of regulating motivation through cognitive control to achieve goals. This consciously controlled motivation is associated with higher-level cognitive functions such as planning, retaining the goal, monitoring the performance, and regulating action. The anterior cingulate cortex (attention area) and the dorsolateral prefrontal cortex (cognitive control area) are the main neural circuits related to regulation of motivation. These three sub processes interact with each

"The anterior cingulate cortex (attention area) and the dorsolateral prefrontal cortex (cognitive control area) are the main neural circuits related to regulation of motivation."

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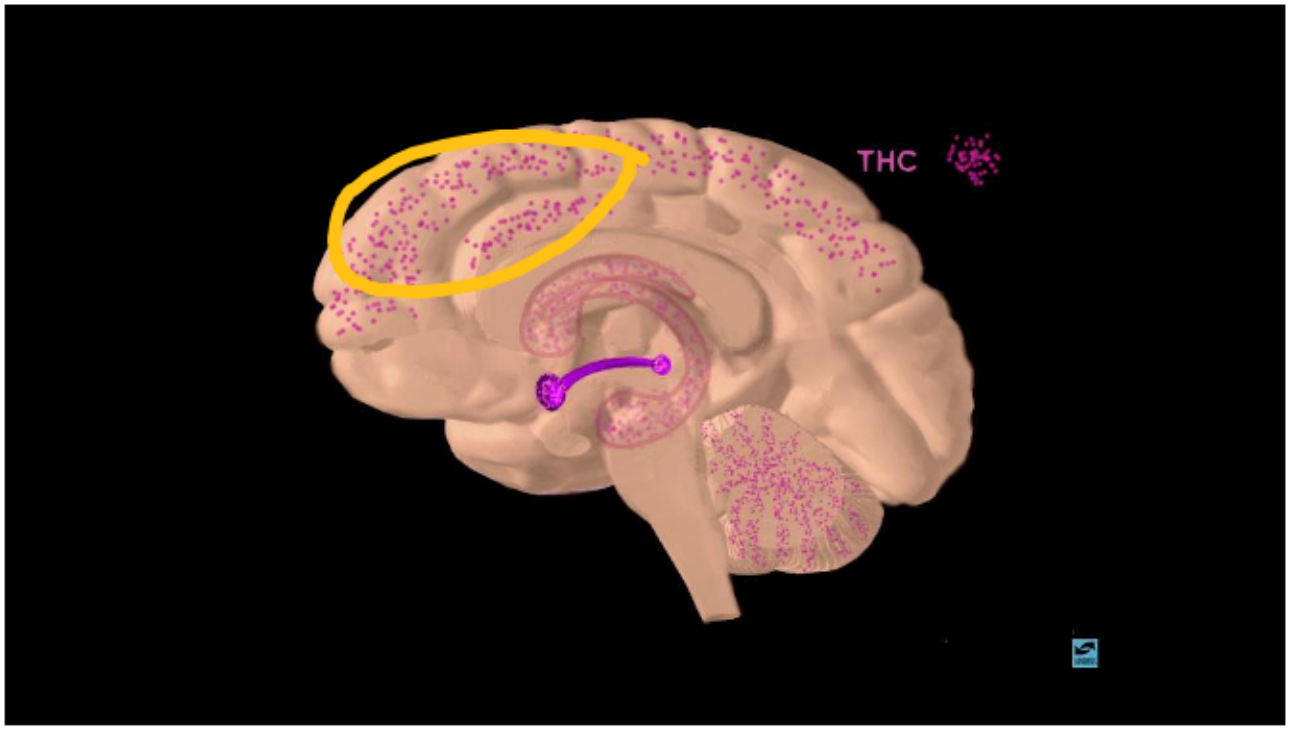

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What do researchers and scientists consider “high potency” cannabis?

Anything over
10% THC

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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

Mahmoud A. ElSohly, Zlatko Mehmedic, Susan Foster, Chandrani Gon, Suman Chandra, and James C. Church

ABSTRACT

BACKGROUND: Marijuana is the most widely used illicit drug in the United States and all over the world. Reports indicate that the potency of cannabis preparation has been increasing. This report examines the concentration of cannabinoids in illicit cannabis products seized by the U.S. Drug Enforcement Administration over the last 2 decades, with particular emphasis on Δ^9-tetrahydrocannabinol and cannabidiol.

METHODS: Samples in this report were received over time from materials confiscated by the Drug Enforcement Administration and processed for analysis using a validated gas chromatography with flame ionization detector method.

RESULTS: Between January 1, 1995, and December 31, 2014, 38,881 samples of cannabis preparations were received and analyzed. The data showed that although the number of marijuana samples seized over the last 4 years has declined, the number of sinsemilla samples has increased. Overall, the potency of illicit cannabis plant material has consistently increased over time since 1995 from ~4% in 1995 to ~12% in 2014. The cannabidiol content has decreased on average from ~.28% in 2001 to <.15% in 2014, resulting in a change in the ratio of Δ^9-tetrahydro-

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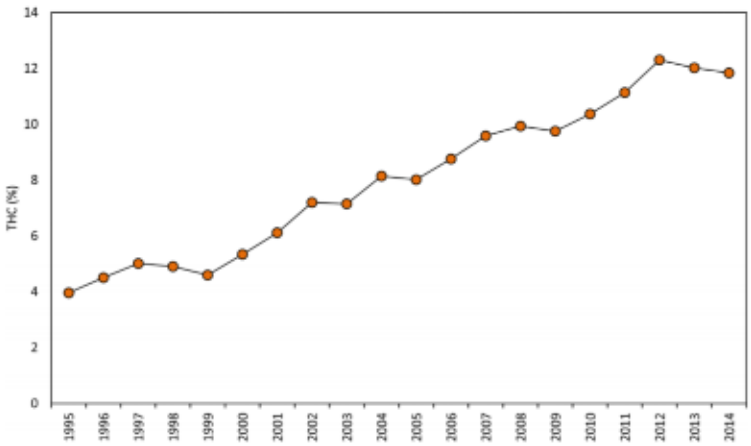

El Sohly, M.A., Mehmedic, Z., Foster, S., Gon, C., Chandra, S., & Church, J.C. (2016). Changes in cannabis potency over the last two decades (1995-2014) – Analysis of current data in the United States. *Biol Psychiatry, 79,* 613-619.

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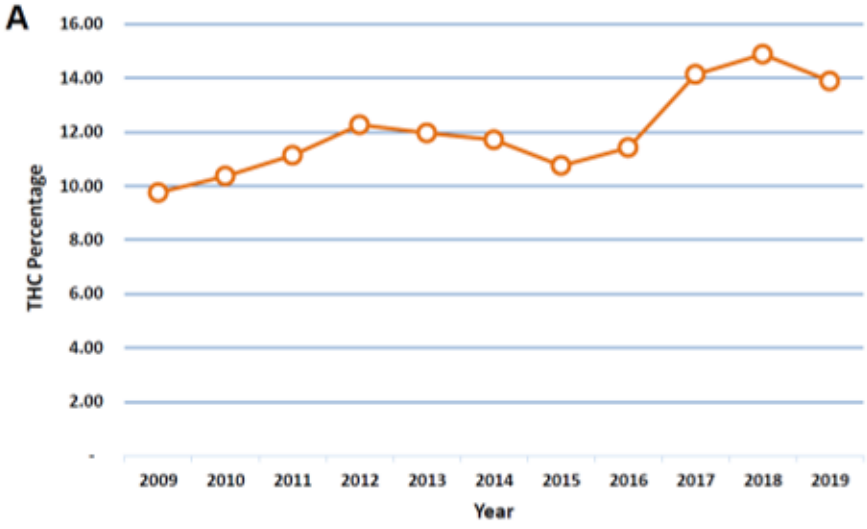

ElSohly, M.A., Chandra, S., Radwan, M., Majumdar, C.G., Church, J.C. (2021). A comprehensive revie of cannabis potency in the United states in the last decade. *Biological Psychiatry: Cognitive Neuroscience, and Neuroimaging, 6,* 603-606.

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ADDICTION
SSA
RESEARCH REPORT
doi:10.1111/add.13886

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

Rosanna Smart[1], Jonathan P. Caulkins[1,2], Beau Kilmer[1], Steven Davenport[1] & Greg Midgette[1]

RAND Corporation, Santa Monica, CA, USA[1] and Heinz College, Carnegie Mellon University, Pittsburgh, PA, USA[2]

ABSTRACT

Aims To (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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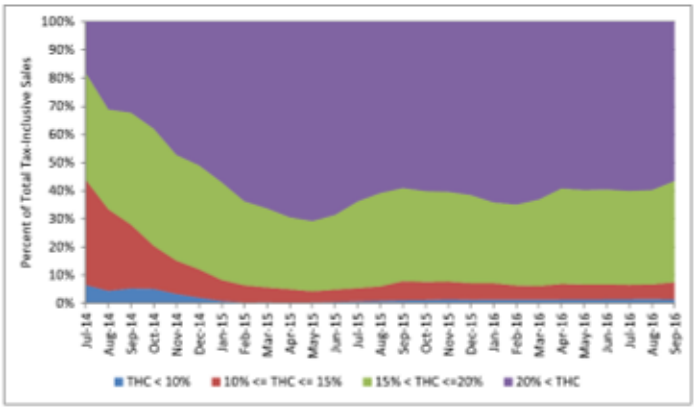

Figure 3 Market shares for cannabis flower products sold, by delta-9-tetrahydrocannabinol (THC) % category. Market share is calculated as a percent of total cannabis flower expenditures (excise-tax-inclusive). [Colour figure can be viewed at wileyonlinelibrary.com]

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

19

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 Cunnane[2]*, Chuyin Fan[1], E. Alfonso Romero-Sandoval[2]*

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

These authors contributed equally to this work.
* earomero.sandoval@gmail.com

Check for updates

OPEN ACCESS

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 medicinal cannabis use, information from dispensary websites has the potential to shape the attitude of pain patients towards cannabis. This is relevant because cannabis

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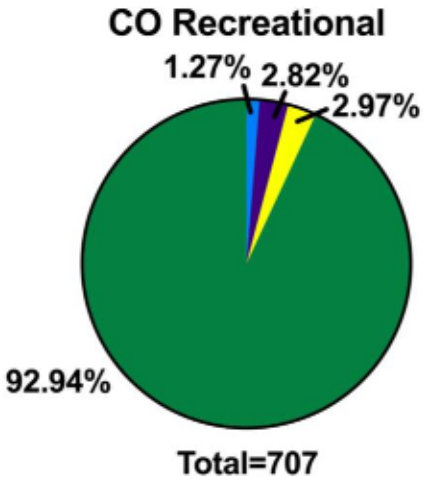

95.91% of Colorado market is "high potency" cannabis

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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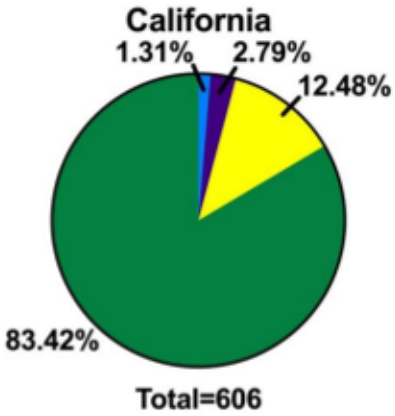

95.90% of California market is "high potency" cannabis

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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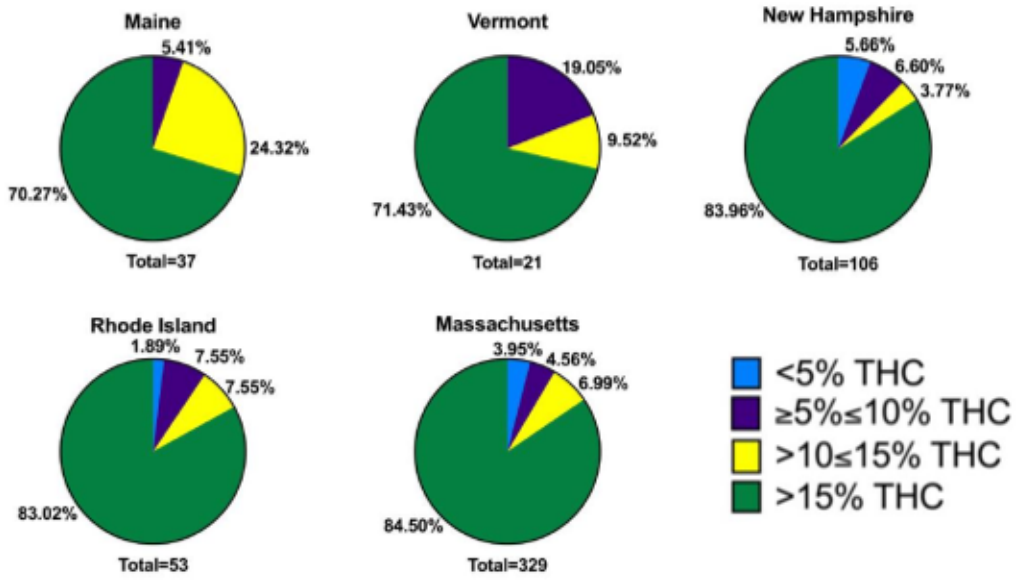

Cash, M.C., Cunnane, K., Fan, C., Romero-Sandoval, E.A. (2020). Mapping cannabis potency in medical and recreational programs in the United States. *PLoS ONE 15*(3): e0230167. https://doi.org/10.1371/journal.pone.0230167

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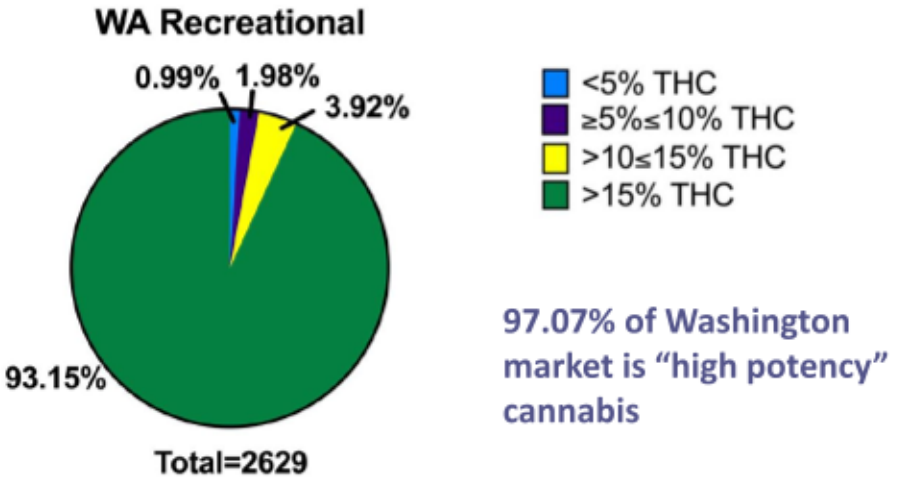

97.07% of Washington market is "high potency" cannabis

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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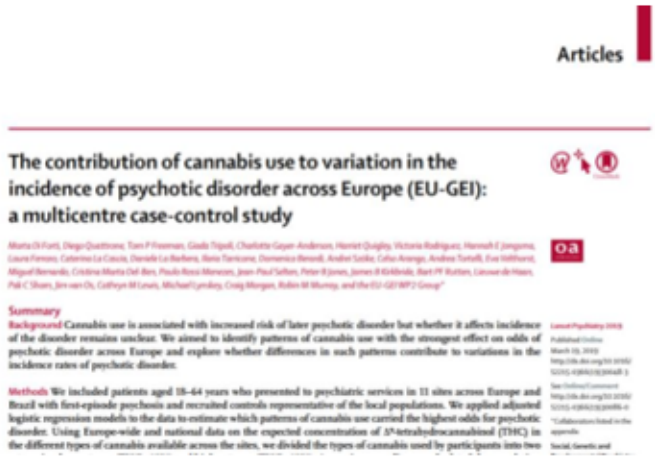
Why potency matters

25

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

oa

Summary

Background 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 odds of psychotic disorder across Europe and explore whether differences in such patterns contribute to variations in the incidence rates of psychotic disorder.

Methods We included patients aged 18–64 years who presented to psychiatric services in 11 sites across Europe and Brazil with first-episode psychosis and recruited controls representative of the local populations. We applied adjusted logistic regression models to the data to estimate which patterns of cannabis use carried the highest odds for psychotic disorder. Using Europe-wide and national data on the expected concentration of Δ⁹-tetrahydrocannabinol (THC) in the different types of cannabis available across the sites, we divided the types of cannabis used by participants into two

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JAMA Psychiatry | Original Investigation

Association of High-Potency Cannabis Use With Mental Health and Substance Use in Adolescence

Lindsey A. Hines, PhD; Tom P. Freeman, PhD; Suzanne H. Gage, PhD; Stanley Zammit, PhD; Matthew Hickman, PhD; Mary Cannon, PhD; Marcus Munafo, PhD; John MacLeod, PhD; Jon Heron, 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. Present data on outcomes and exposures were collected between June 2015 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 exposure of use of high-potency cannabis or lower-potency cannabis

Supplem

Increased risk of addiction and generalized anxiety disorder

Hines, L.A., Freeman, T.P, Gage, S.H., Zammit, S., Hickman,M., Cannon, M., Munafo, M., MacLeod, J., & Heron, J. (2020). Association of high-potency cannabis use with mental health and substance use in adolescence. *JAMA Psychiatry, 77,* 1044-1051. doi: 10.1001/jamapsychiatry.2020.1035.

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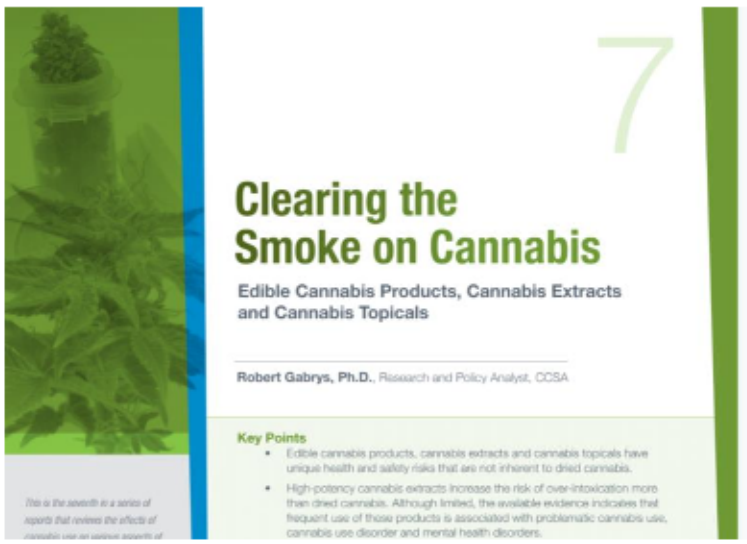

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Clearing the Smoke on Cannabis

Edible Cannabis Products, Cannabis Extracts and Cannabis Topicals

Robert Gabrys, Ph.D., Research and Policy Analyst, CCSA

Key Points

- Edible cannabis products, cannabis extracts and cannabis topicals have unique health and safety risks that are not inherent to dried cannabis.
- High-potency cannabis extracts increase the risk of over-intoxication more than dried cannabis. Although limited, the available evidence indicates that frequent use of these products is associated with problematic cannabis use, cannabis use disorder and mental health disorders.

This is the seventh in a series of reports that reviews the effects of

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

Gabrys, R. (2020). *Clearing the Smoke on Cannabis: Edible Cannabis Products, Cannabis Extracts and Cannabis Topicals*. Canadian Centre on Substance Use and Addiction.

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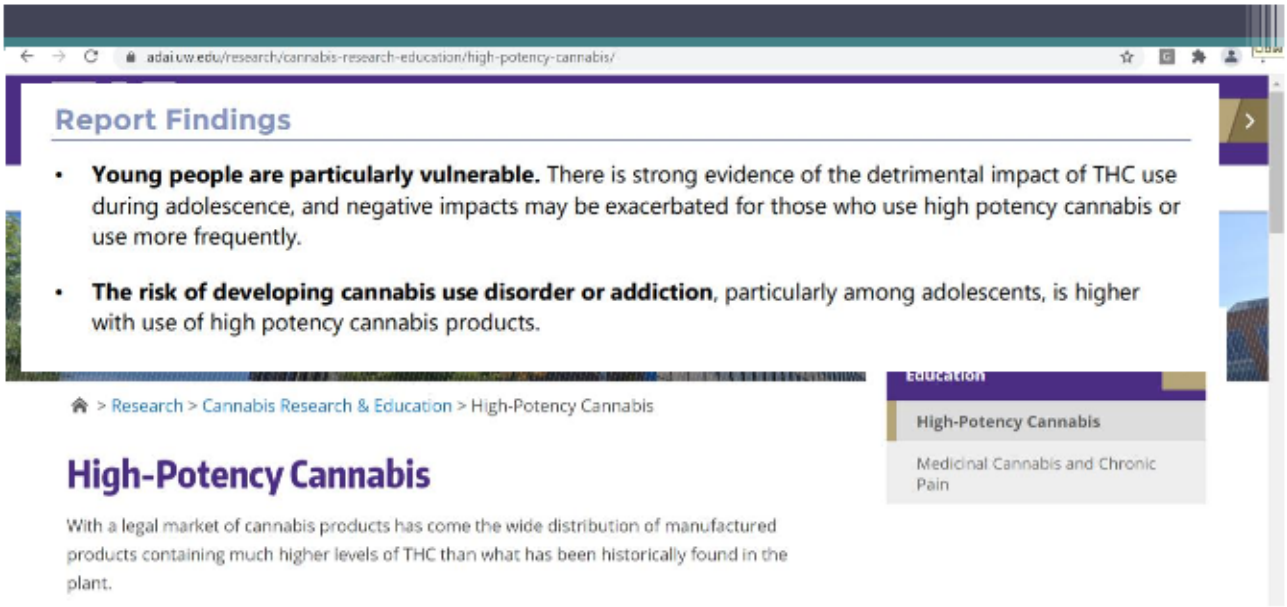

https://adai.uw.edu/cerp/high-potency-cannabis/

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If student success is important and a priority, then investment in prevention also has to be important and a priority.

Help principals, administrators, teachers, and parents understand why prevention matters.

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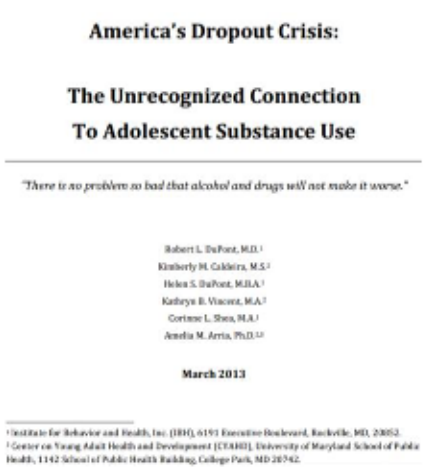

America's Dropout Crisis:

The Unrecognized Connection To Adolescent Substance Use

"There is no problem so bad that alcohol and drugs will not make it worse."

Robert L. DuPont, M.D.[1]
Kimberly M. Caldeira, M.S.[2]
Helen S. DuPont, M.B.A.[1]
Kathryn B. Vincent, M.A.[2]
Corinne L. Shea, M.A.[1]
Amelia M. Arria, Ph.D.[2,1]

March 2013

[1] Institute for Behavior and Health, Inc. (IBH), 6191 Executive Boulevard, Rockville, MD, 20852.
[2] Center on Young Adult Health and Development (CYAHD), University of Maryland School of Public Health, 1142 School of Public Health Building, College Park, MD 20742.

"Of all the problems that contribute to dropping out, substance use is one of the easiest to identify and one of the most easily stopped by interventions including treatment."

"Research evidence shows that when adolescents stop substance abuse, academic performance improves."

http://www.cls.umd.edu/docs/AmerDropoutCrisis.pdf

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America's Dropout Crisis:

The Unrecognized Connection To Adolescent Substance Use

"There is no problem so bad that alcohol and drugs will not make it worse."

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[2] Center on Young Adult Health and Development (CYAHD), University of Maryland School of Public Health, 1142 School of Public Health Building, College Park, MD 20742.

Students who use substances are at increased risk for academic failure, including drop out

Cannabis has stronger negative relationship to GPA and other outcomes and risk for dropout than alcohol use

"The more severe the substance use, the more likely the impact on academic performance and risk for dropout."

http://www.cls.umd.edu/docs/AmerDropoutCrisis.pdf

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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)**

Arria, A.M., Caldeira, K.M., Bugbee, B.A., Vincent, K.B., O'Grady, K.E. (2015). The academic consequences of marijuana use during college. *Psychology of Addictive Behaviors, 29,* 564-575.

Arria, A.M., Caldeira, K.M., Vincent, K.B., Winick, E.R., Baron, R.A., O'Grady, K.E. (2013). Discontinuous college enrollment: Associations with substance use and mental health. *Psychiatric Services, 64,* 165-172.

Suerken, C.K., Reboussin, B.A., Egan, K.L., Sutfin, E.L., Wagoner, K.G., Spangler, J. & Wolfson, M. (2016). Marijuana use trajectories and academic outcomes among college students. *Drug and Alcohol Dependence, 162,* 137-145.

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Marijuana and cognitive abilities

- **Effects on the brain**
  - **Hippocampus**
    - **Attention, concentration, and memory**
  - **Research with college students shows impact on these even 24 hours after last use (Pope & Yurgelun-Todd, 1996)**
  - **After daily use, takes 28 days for impact on attention, concentration, and memory to go away (Pope, et al., 2001)**
  - **Hanson et al. (2010):**
    - **Deficits in verbal learning (takes 2 weeks before no differences with comparison group)**
    - **Deficits in verbal working memory (takes 3 weeks before no difference with comparison group)**
    - **Deficits in attention (still present at 3 weeks)**

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There are other ways in which cannabis use could contribute to academic outcomes – we can help people connect dots they might not be connecting

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Student-identified barriers to academic success

n =23,600 undergraduate students from 41 colleges/universities in Fall 2021

- Of 51 possibilities, the top five student-identified factors affecting academic performance:
  - **52.3% Procrastination**
  - **42.3% Stress**
  - **33.7% Anxiety**
  - **24.6% Depression**
  - **24.3% Sleep difficulties**

  - **1.7% Cannabis use (tied for 36th of 51 factors with urinary tract infection and concussion/TBI)**

American College Health Association, 2022

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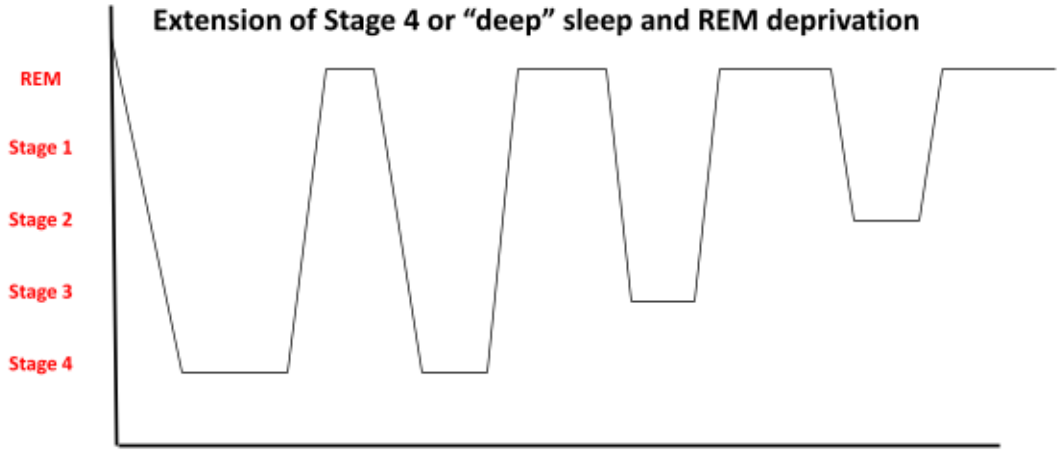
With cannabis, two things happen…
Extension of Stage 4 or "deep" sleep and REM deprivation



Angarita, G.A., Emadi, N., Hodges, S., & Morgan, P.T. (2016). Sleep abnormalities associated with alcohol, cannabis, cocaine, and opiate use: A comprehensive review. *Addiction Science & Clinical Practice, 11:* 9.

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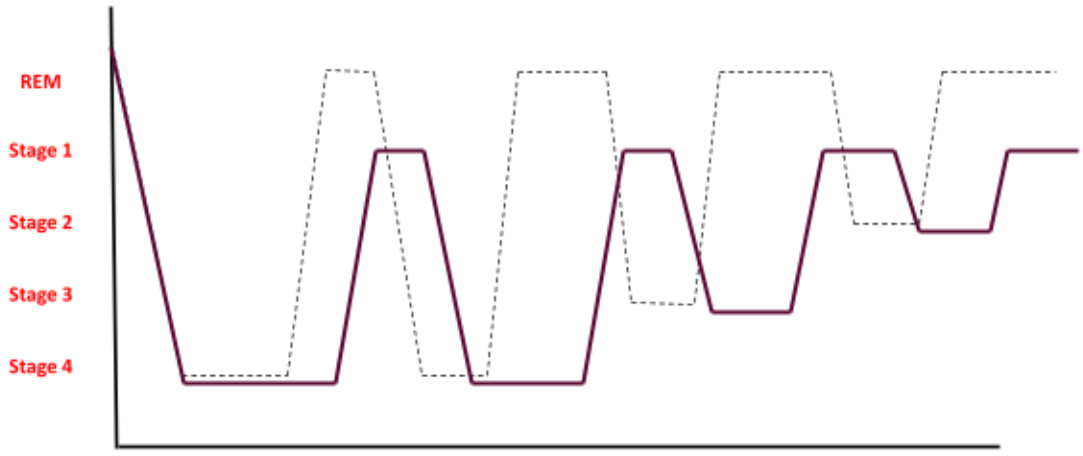

Next day, increase in:
- **Daytime sleepiness**
- **Anxiety**
- **Irritability**
- **Jumpiness**

Angarita, et al., 2016

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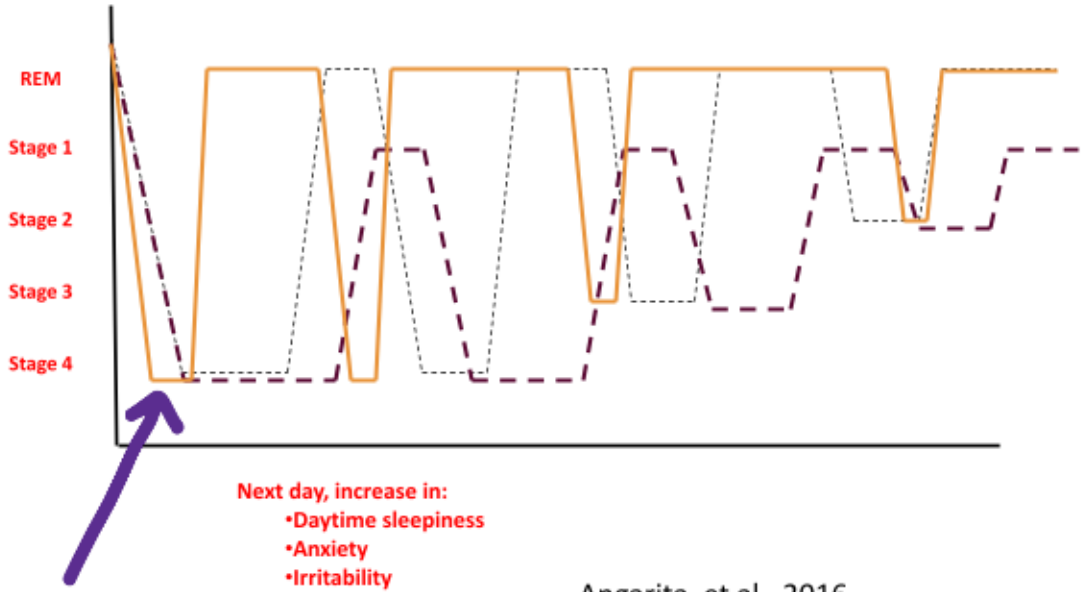
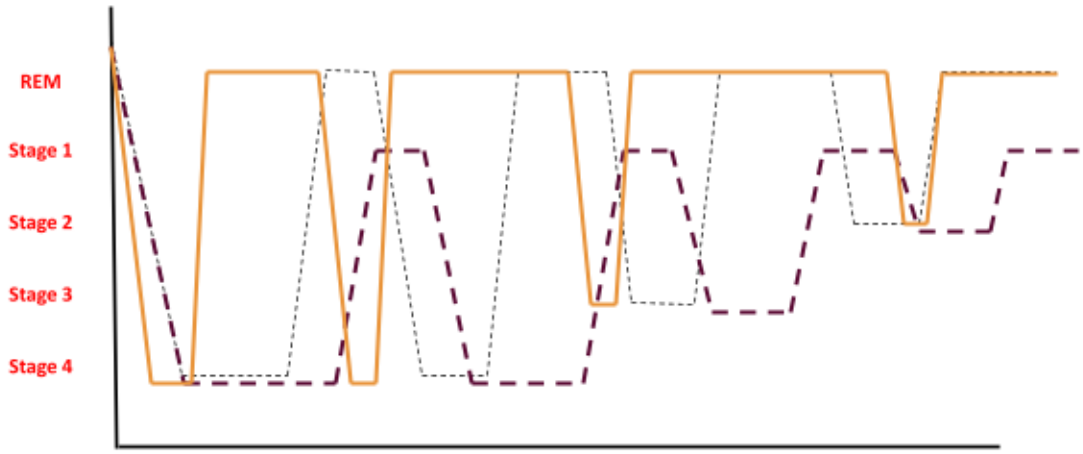


Next day, increase in:
- Daytime sleepiness
- Anxiety
- Irritability
- Jumpiness

Angarita, et al., 2016

39



Next day, increase in:
- Daytime sleepiness
- Anxiety
- Irritability
- Jumpiness

Next day, feel:
- Fatigue

Angarita, et al., 2016

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Cannabis is, without question, an addictive substance. Statements like "you can't get addicted to weed" need to be addressed. For so many reasons, including validating those struggling with making a change.

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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		✓

DSM-5 Cannabis Use Disorder Criteria

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

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Separating reported medical use from management of withdrawal

43

Motivations for Use

	Motive Category	Proportion of participants endorsing motive	Proportion of primary motives
Enjoyment/fun	Enjoyment/fun (e.g., to be happy, get high, enjoy feeling)	62.14%	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	Boredom (e.g., something to do, nothing better to do)	25.08%	4.15%
	Relaxation (e.g., to relax, helps me sleep)	24.84%	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)	10.86%	0.96%
Altered perception	Altered perception or perspectives (e.g., to enhance experiences, makes things more fun)	10.56%	1.81%
Activity enhancement	Activity enhancement (e.g., music sounds better, every day activities more interesting)	5.68%	0.80%
	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	Image enhancement (e.g., to be cool, to feel cool)	2.85%	0.32%
Celebration	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%
	Habit (e.g., feeling was addictive, became a habit)	0.95%	0.00%

Lee, Neighbors & Woods (2007)

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Motivations for Use

Motive Category	Proportion of participants endorsing motive	Proportion of primary motives
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)	41.26%	29.36%
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%	4.16%
Relaxation (e.g., to relax, helps me sleep)	24.84%	6.97%
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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)	5.68%	0.80%
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Medical use (e.g., alleviate physical pain, have a headache)	1.26%	0.16%
Habit (e.g., feeling was addictive, became a habit)	0.95%	0.00%

Relaxation (includes helping w/sleep)

Coping (includes when depressed)

Food motives

Anxiety reduction

Medical use (including pain and headache)

Lee, Neighbors & Woods (2007)

45

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 or anxiety.
3. Sleep difficulty (e.g., insomnia, disturbing dreams).
4. Decreased appetite or weight loss.
5. Restlessness.
6. Depressed mood.
7. At least one of the following physical symptoms causing significant discomfort: abdominal pain, shakiness/tremors, sweating, fever, chills, or 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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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	Monthly or less	2-4 times a month	2-3 times a week	4+ times a week
0	1	2	3	4

2. How many hours were you "stoned" on a typical day when you had been using cannabis?

Less than 1	1 or 2	3 or 4	5 or 6	7 or more
0	1	2	3	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	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	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	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	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	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	4

6. How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	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	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	4

8. Have you ever thought about cutting down, or stopping, your use of cannabis?

Never	Yes, but not in the past 6 months	Yes, during the past 6 months
0	2	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: _____

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.

Adamson SJ, Kay-Lambkin FJ, Baker AL, Lewin TJ, Thornton L, Kelly BJ, and Sellman JD. (2010). An Improved Brief Measure of Cannabis Misuse: The Cannabis Use Disorders Identification Test – Revised (CUDIT-R). *Drug and Alcohol Dependence* 110:137-143.

Source: Washington Recovery Helpline

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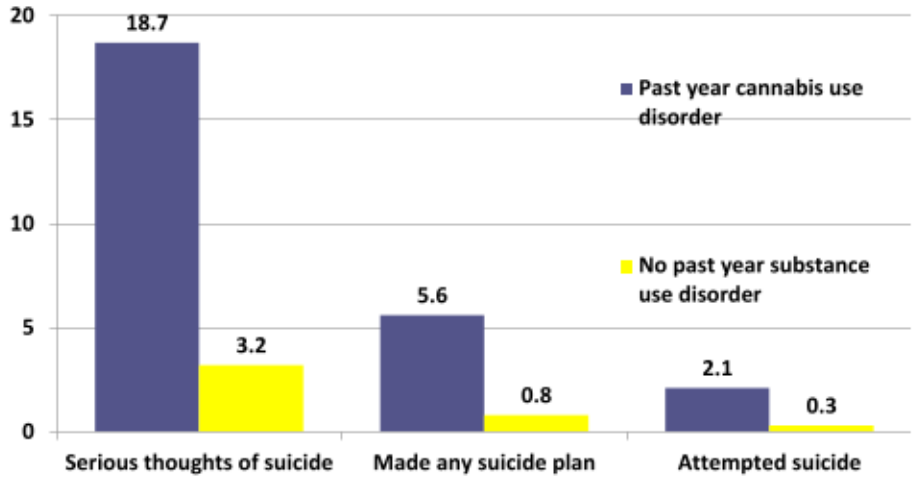
Percentage endorsing item as a function of having a past year cannabis use disorder or no past year substance use disorder



Source: SAMHSA, 2021, Table 8.61B

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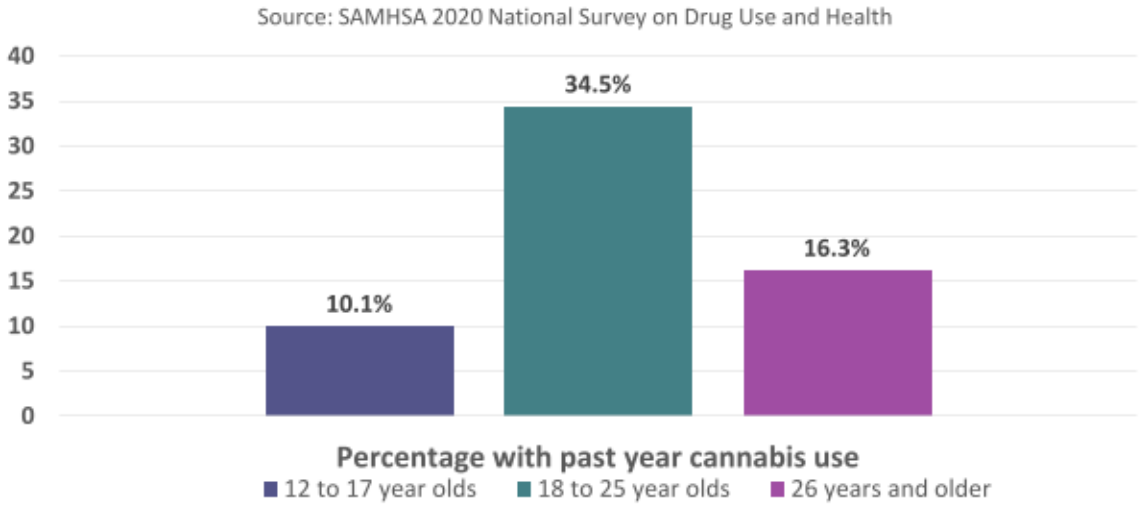
At least in Washington, the age group that already reports the highest prevalence of cannabis use is increasing use (and use with risk of Cannabis Use Disorder) following implementation of legalization

50

Past year cannabis use by age group



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Washington Young Adult Health Survey (YAHS)

- Funded by Division of Behavioral Health & Recovery (DBHR):
  - Sarah Mariani
  - Sandy Salivaras
- Young Adult Health Survey Team:
  - Jason Kilmer
  - Mary Larimer
  - Isaac Rhew
  - Alice Yan
  - Rose Lyles-Riebli

Washington State Health Care Authority (Division of Behavioral Health and Recovery) (PI: Kilmer).

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Young Adult Health Survey Recruitment

- Aimed to collect all Year One data before the first store opened in July 2014
  - 69.3% collected before the first store opened
  - Remaining 30.7% collected into August 2014
    - Only 18 stores had opened statewide in July
    - Only 31 stores had opened by August

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Young Adult Health Survey Recruitment

- Participants recruited using a combination of direct mail advertising to a random sample from DOL, as well as online advertising (Facebook, Craigslist, Instagram, study web site, etc.)
- Assessed demographics on ongoing basis and modified strategies to recruit under-represented groups
- Convenience sample, not a random sample

54

Post-stratification weighting and analyses

- To improve generalizability, used post-stratification weights based on gender, race, and geographic region
- Weighted results are consistently very similar to non-weighted

55

Young Adult Health Survey

- Each year we collect data from a new cohort of 18-25 year olds

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Sample sizes over time

• Cohort 1 (2014):	2,101
• Cohort 2 (2015):	1,675
• Cohort 3 (2016):	2,493
• Cohort 4 (2017):	2,342
• Cohort 5 (2018):	2,412
• Cohort 6 (2019):	1,942
• Cohort 7 (2020)	1,643
• Cohort 8 (2021):	1,756
• **TOTAL:**	**16,364**

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Young Adult Health Survey

- Each year we follow up with previous cohorts
- Our 9th year of data collection just ended at the end of 2022 (and the cohort we recruited as 18-25 year olds in 2014 is now 26-33)
- Dr. Katarina Guttmannova applied for and obtained a secondary data analysis grant (NIDA grant R01DA047996, PI: Guttmannova)

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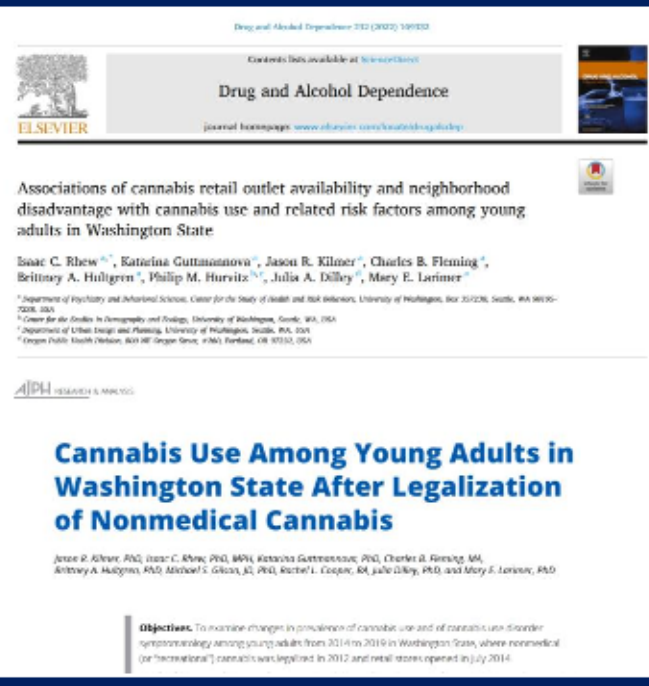
Trends in Alcohol, Cigarette, E-Cigarette, and Nonprescribed Pain Reliever Use Among Young Adults in Washington State After Legalization of Nonmedical Cannabis

Substance-Specific Risk Factors for Cannabis and Alcohol Use Among Young Adults Following Implementation of Nonmedical Cannabis Legalization



Associations of cannabis retail outlet availability and neighborhood disadvantage with cannabis use and related risk factors among young adults in Washington State

Cannabis Use Among Young Adults in Washington State After Legalization of Nonmedical Cannabis

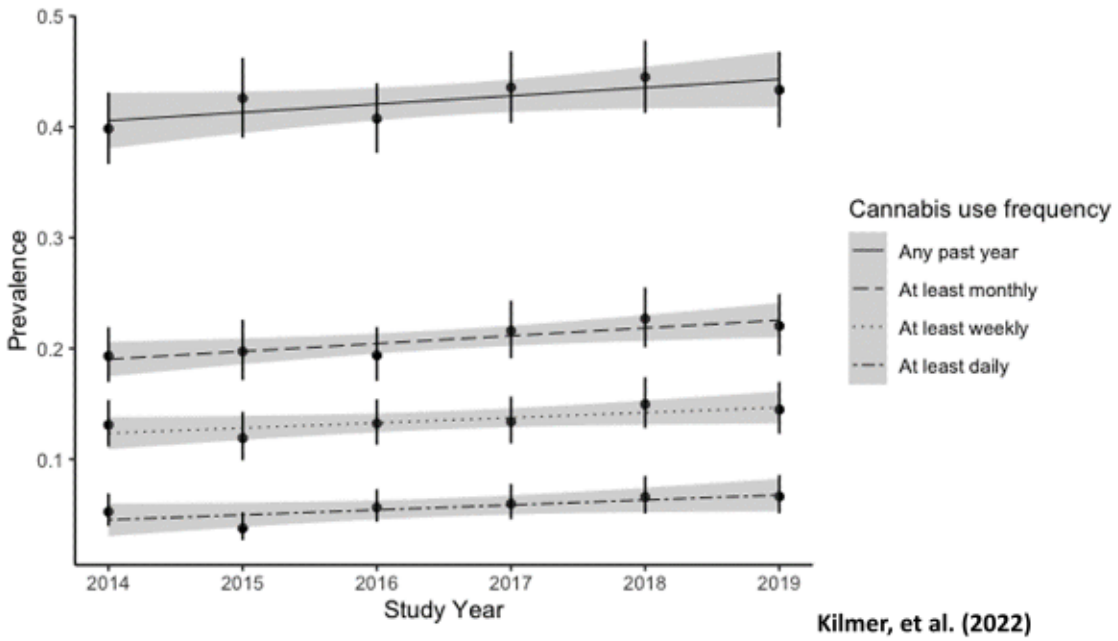
59

Kilmer, J.R., Rhew, I.C., Guttmannova, K., Fleming, C.B., Hultgren, B., Gilson, M.S., Cooper, R.L., Dilley, J., & Larimer, M.E. (2022). Cannabis use among young adults in Washington State after legalization of nonmedical cannabis. American Journal of Public Health, 112, 638-645.

- n=12,963 young adults in Washington over 6 time points
- Included covariates for:
  - Sex assigned at birth
  - Race
  - Ethnicity
  - Geographic region of the state
  - Age
  - Attending 4 year college
  - Full time employment status
- Computed post-stratification weights to further control for distribution across the samples

Cannabis Use Among Young Adults in Washington State After Legalization of Nonmedical Cannabis

60



Kilmer, et al. (2022)

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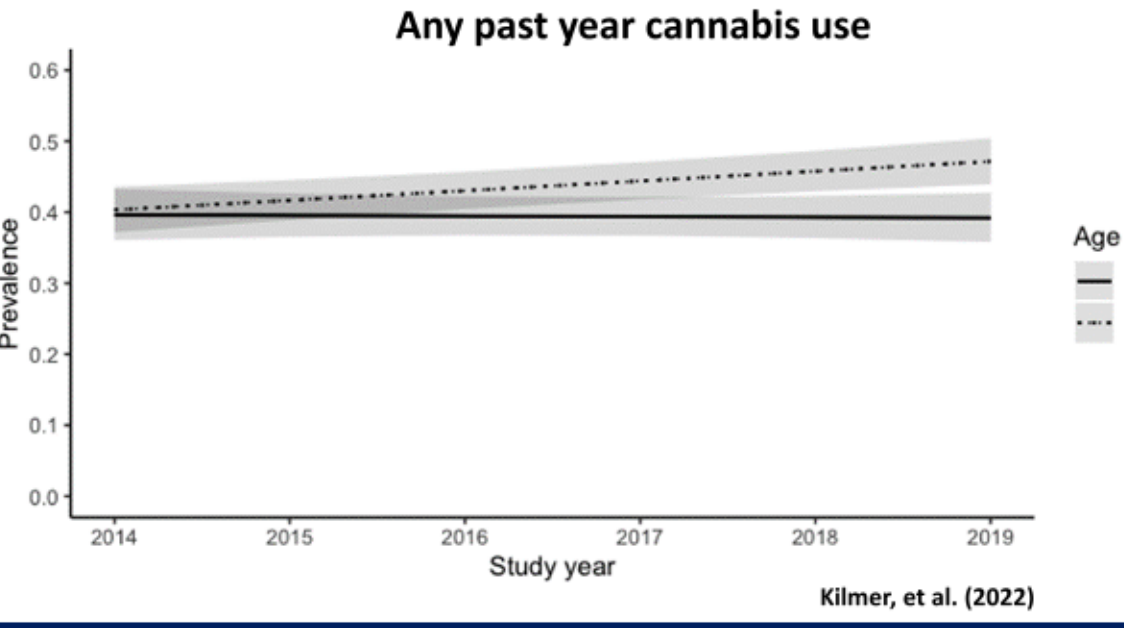

Kilmer, et al. (2022)

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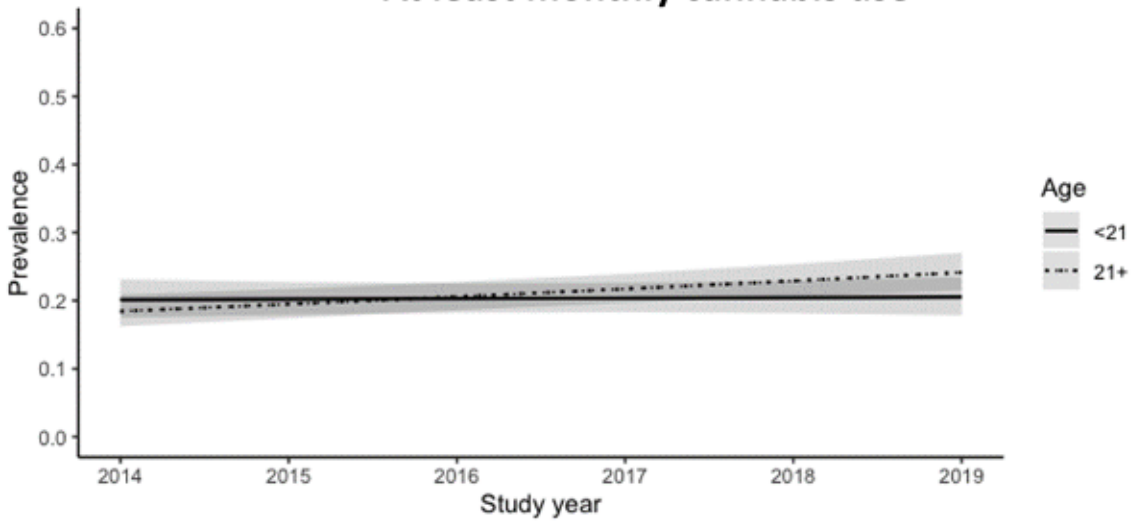
At least monthly cannabis use



Kilmer, et al. (2022)

63

MaCoun (2013), Frontiers in Psychiatry

Criterion	DSM-IV substance dependence	DSM-5 substance use disorder
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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		✓

DSM-5 Cannabis Use Disorder Criteria

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

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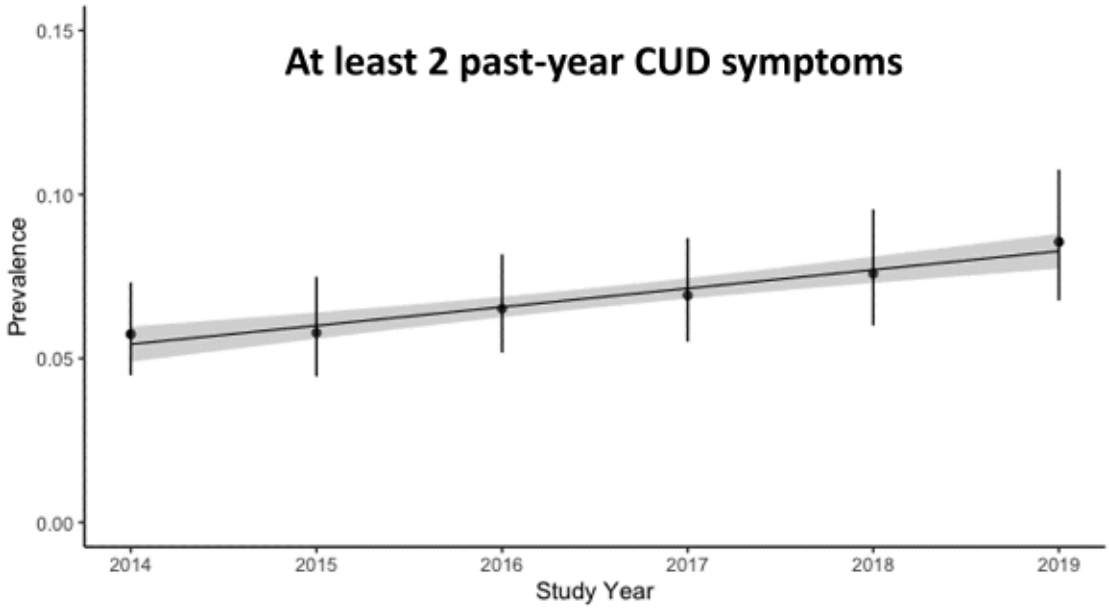

65

Perceived risk of cannabis use keeps decreasing

** significant decreasing linear trend **
** significant increasing linear trend **

- **Cannabis**
  - Physical risk of occasional cannabis use
  - Psychological/emotional risk of occasional cannabis use
  - Physical risk of regular cannabis use
  - Psychological/emotional risk of regular cannabis use
- **Alcohol**
  - Physical risk of 2 drinks every day
  - Psychological risk of 2 drinks every day
  - Physical risk of 5+ drinks every weekend
  - Psychological risk of 5+ drinks every weekend

Gilson, M.S., Kilmer, J.R., Fleming, C.B., Rhew, I.C., Calhoun, B.H., & Guttmannova, K. (in press). Substance-specific risk factors for cannabis and alcohol use among young adults following implementation of nonmedical cannabis legalization. *Prevention Science,* online ahead of print, doi: 10.1007/s11121-022-01435-8. Online ahead of print.

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There are many opportunities to communicate risks associated with impaired driving

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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 (2022) encourages waiting at least 6-8 hours after inhaling and 8-12 hours after ingesting

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www.seattletimes.com/seattle-news/marijuana/more-pot-use-found-in-fatal-cras

The Seattle Times — Marijuana

TRANSPORTATION CRIME LOCAL POLITICS EDUCATION EASTSIDE HEALTH OBITUARIES

Crime | Data | Local News | Marijuana

More pot use found in fatal crashes, data says

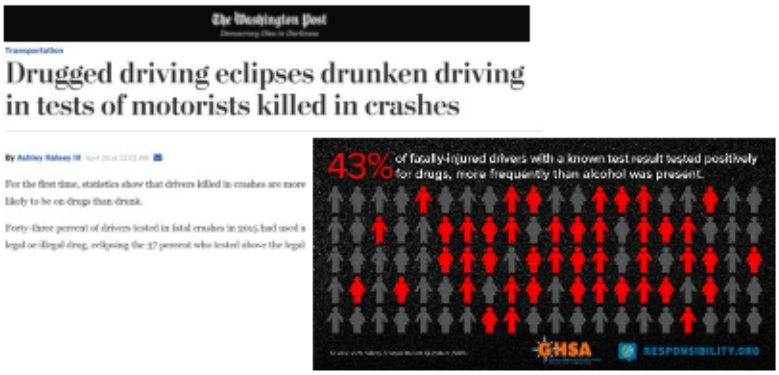
Marijuana use appears to have increased as a factor in deadly crashes last year in Washington.

By Bob Young

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

New data from the Washington Traffic Safety Commission shows the number of drivers involved in fatal crashes with THC in their body increased from 38 in 2013 to 75 this past year. About half those 75 drivers had active THC — the main psychoactive chemical in pot — above the level that legally determines intoxication.

Source: Seattle Times, August 20, 2015



The Washington Post

Transportation

Drugged driving eclipses drunken driving in tests of motorists killed in crashes

By Ashley Halsey III

For the first time, statistics show that drivers killed in crashes are more likely to be on drugs than drunk.

Forty-three percent of drivers tested in fatal crashes in 2015 had used a legal or illegal drug, eclipsing the 37 percent who tested above the legal

43% of fatally-injured drivers with a known test result tested positively for drugs, more frequently than alcohol was present.

GHSA RESPONSIBILITY.ORG

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

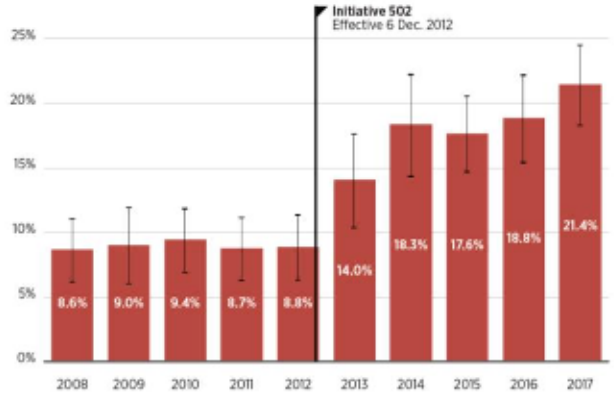


Figure 1. Estimated Percentage of Drivers Involved in Fatal Crashes Who Were THC-Positive, Washington State, 2008-2017.

Vertical bars represent 95% Confidence Intervals.

Tefft, B. C. & Arnold, L. S. (2020). *Cannabis Use Among Drivers in Fatal Crashes in Washington State Before and After Legalization* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.

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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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Mike Graham-Squire & Neighborhood House: MostSteerClear

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Mike Graham-Squire & Neighborhood House: MostSteerClear

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There are also opportunities to discuss cannabis and birth outcomes

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Neurotoxicology and Teratology 68 (2018) 84–90

Contents lists available at ScienceDirect

Neurotoxicology and Teratology

journal homepage: www.elsevier.com/locate/neutera

Full length article

Prevalence and associated birth outcomes of co-use of *Cannabis* and tobacco cigarettes during pregnancy

Victoria H. Coleman-Cowger[a,*], Emmanuel A. Oga[a], Erica N. Peters[a], Katrina Mark[b]

[a] Battelle Memorial Institute, United States
[b] Department of Obstetrics, Gynecology and Reproductive Sciences, University of Maryland School of Medicine, United States

ARTICLE INFO

Keywords:
Co-use
Prenatal *Cannabis* exposure
Tobacco
Birth outcomes
Pregnancy

ABSTRACT

Use of *Cannabis* and use of tobacco overlap, and co-use of *Cannabis* and tobacco has increased over the past decade among adults. The current study aims to document the prevalence and correlates of co-use of *Cannabis* and tobacco cigarettes among adult pregnant women utilizing secondary data from a larger study that compared and validated screeners for illicit and prescription drug use during pregnancy. Pregnant women ($N = 500$; 71% African American; 65% never married, average age of 28 years) were recruited from two urban University obstetric clinics between January and December 2017. Participants self-reported demographic, *Cannabis*, and tobacco cigarette use characteristics, and provided urine and hair samples for drug testing. Within two weeks after due date, research staff reviewed participants' electronic medical records to collect birth outcome data. Results showed that 9.0% reported co-use of *Cannabis* and tobacco, 12.1% reported *Cannabis* only use, 7.8% reported

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Coleman-Cowger, et al. (2018)

- **Significant differences in:**
- **1) head circumference (marker of brain development, and smaller head circumference associated with cognitive impairment)**
  - **Co-use group had a 5.7 times greater odds of having a small head circumference than no-use group**
- **2) occurrence of birth defects**
  - **Co-use group had a 3 times greater odds of having birth defects than no-use group**
- **3) stillbirth/miscarriage**
  - **Cannabis only group had 12 times greater odds of a stillbirth or miscarriage compared to the no-use group**

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Journal of Perinatology
https://doi.org/10.1038/s41372-020-0643-z

ARTICLE

Impact of pregnancy marijuana use on birth outcomes: results from two matched population-based cohorts

Beth A. Bailey[1,2] · David L. Wood[2] · Darshan Shah[2]

Received: 17 October 2019 / Revised: 4 February 2020 / Accepted: 25 February 2020

Abstract
Objective To examine associations between in utero marijuana exposure and birth outcomes.
Study design In two separate cohorts (Appalachian, Rocky Mountain), data were collected from medical records. Marijuana exposure was positive based on urine drug screening at delivery, with nonexposed controls matched on multiple factors including other substance exposure.
Result Marijuana-exposed newborns (n = 531) had significantly worse birth outcomes than controls (n = 531), weighing 218 g less, 82%, 79%, and 43% more likely to be low birth weight, preterm, or admitted to the NICU, respectively, and significantly lower Apgar scores.
Conclusion Marijuana exposure in utero predicted newborn factors linked to longer-term health and development issues. Effects were not attributable to other comorbidities in this study due to rigorous matching and biochemical verification of marijuana and other drug use. Findings add to growing evidence linking marijuana exposure to adverse birth and longer-term outcomes. Women should be encouraged to avoid marijuana use during pregnancy.

Bailey, B.A., Wood, D.L., & Shah, D. (2020). Impact of pregnancy marijuana use on birth outcomes: results from two matched population-based cohorts. *Journal of Perinatology* (epub ahead of print, 3/5/2020, doi: 10.1038/s41372-020-0643-z)

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Table 2 Newborn outcomes by in utero marijuana exposure status.

	Non-marijuana exposed ($n = 531$)	Marijuana exposed ($n = 531$)	OR[a] or difference	$t/\chi 2$	p
Birth weight (g) (mean ± SD)	3092 ± 580	2874 ± 665	218 g	5.68	<0.001
Low birth weight (% <2500 g)	11.5%	20.9%	1.82	17.46	<0.001
Gestational age (week) (mean ± SD)	38.8 ± 2.2	38.1 ± 3.1	0.6 week	3.89	<0.001
Preterm delivery (% <37 week)	10.1%	18.1%	1.79	13.88	<0.001
Apgar score 1 min (mean ± SD)	7.8 ± 1.4	7.5 ± 1.8	0.3	2.24	0.026
Apgar score 5 min (mean ± SD)	8.8 ± .8	8.6 ± 1.4	0.2	2.90	0.004
NICU admission (% yes)	9.5%	13.6%	1.43	4.03	0.045

Groups matched on: delivery year (±1), delivery hospital (exact), maternal age (±1 year), maternal marital status (married, single), race (white, minority), parity (0, 1, 2+), medical insurance (public, private), pregnancy smoking (yes, no), alcohol use (yes, no), benzodiazepine use (yes, no), opioid use (yes, no).

[a]OR = Odds Ratio reflecting increased risk of the outcome for the marijuana-exposed group compared with the non-marijuana-exposed group for low birth weight, preterm delivery, cesarean delivery, and NICU admission. Differences in mean outcomes are given for birth weight, gestational age, and Apgar scores at 1 and 5 min.

"In the current study, marijuana exposure in utero independently predicted poorer birth outcomes across the board, especially indicators such as birth weight and preterm birth that are known to impact longer-term health and development. Effects could not be attributed to other comorbidities including other drug exposure and sociodemographic risks in this study that involved rigorous matching and biochemical verification of self-report of marijuana and other drug use…Consequently, women should continue to be encouraged to avoid marijuana use during pregnancy (p. 5 of 6) (Bailey, Wood, & Shah, 2020)"

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Recommendations addressing both of these previous sections are in the Fischer et al (2022) lower risk guidelines article

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International Journal of Drug Policy 99 (2022) 103381

Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

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,*], Tessa Robinson[b,d], Chris Bullen[a,e], Valerie Curran[f,g], Didier Jutras-Aswad[h,i], Maria Elena Medina-Mora[j,k], Rosalie Liccardo Pacula[l], Jürgen Rehm[m,n], Robin Room[o,p], Wim van den Brink[q,r], Wayne Hall[s,t]

[a] Schools of Population Health and Pharmacy, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand
[b] Centre for Applied Research in Mental Health and Addiction, Faculty of Health Sciences, Simon Fraser University, Vancouver, Canada
[c] Department of Psychiatry, Federal University of Sao Paulo, Sao Paulo, Brazil
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Published in January 2022 issue of International Journal of Drug Policy

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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:

- People who use cannabis should use low potency cannabis products
- "Overall, there is no categorically 'safe' route of use for cannabis and each route option brings some level of distinct risks that needs to be taken into account for use. " That said, smoking is particularly risky.
- Keep use occasional (no more than 1 or 2 days a week, weekend only)
- If a person notices impacts to attention, concentration, or memory, "consider temporarily suspending or substantially reducing the intensity (e.g., frequency/potency) of their cannabis use."
- 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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Recommendation #9: ***It is prudent for people who intend to procreate and for women who are pregnant or breastfeeding to abstain from cannabis use towards reducing possible risks for reproduction and of health harm to offspring, respectively.*** There is some evidence that especially intensive cannabis use may somewhat compromise reproductive abilities for women and men. Cannabis use, especially during pregnancy, may adversely affect some pre- and post-natal health outcomes in offspring. Cannabinoids may also be passed on to infants via breastmilk. The magnitude of any of these adverse effects from these exposures on conception, the fetus or infant development is likely small but it is generally prudent for those intending to reproduce, and for women who are pregnant or breastfeeding, to abstain from cannabis use during these particular periods of risk.

Fischer, et al. (2022)

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Recommendation #11: ***Some specific groups of people are at elevated risk for cannabis use-related health problems because of biological pre-dispositions or co-morbidities. They should accordingly (and possibly on medical advice as required) avoid or adjust their cannabis use.*** Higher risks for harm extend to individuals with a genetic predisposition (e.g., a first-degree family or personal history) for, or an active psychosis, mood (e.g., depressive) disorder, or substance use disorder.

85

Lessons learned:
Be aware of things that can contribute to perceived norms, including media

86

Media

Brief summary from Kilmer, J.R., Kilmer, R.P., & Grossberg, P.M.(2014). The role of media on adolescent substance use: Implications for patient visits. *AM STARs: Adolescent Medicine, 24,* 684-697.

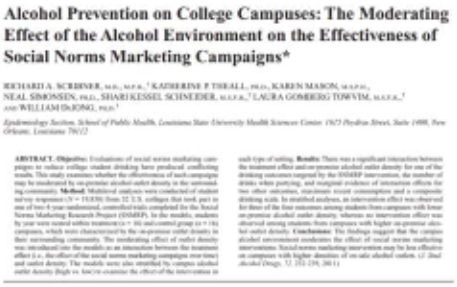
87

Potential role of media

- **Impact of media exposure related to alcohol (including television, advertisements, and movie content)**
  - **In a review of 13 studies, 12 of the 13 showed media exposure was associated with increased likelihood of:**
    - **Initiating drinking among abstainers**
    - **Increased consumption among those already drinking**

Anderson P, de Bruijn A, Angus K, Gordon R, Hastings G. (2009). Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. *Alcohol and Alcoholism, 44*:229-243

88



Alcohol Prevention on College Campuses: The Moderating Effect of the Alcohol Environment on the Effectiveness of Social Norms Marketing Campaigns*

RICHARD A. SCRIBNER, M.D., M.P.H.,† KATHERINE P. THEALL, PH.D., KAREN MASON, M.S.P.H., NEAL SIMONSEN, PH.D., SHARI KESSEL SCHNEIDER, M.S.P.H.,† LAURA GOMBERG TOWVIM, M.S.P.H.,† AND WILLIAM DeJONG, PH.D.†

Epidemiology Section, School of Public Health, Louisiana State University Health Sciences Center, 1615 Poydras Street, Suite 1400, New Orleans, Louisiana 70112

ABSTRACT. Objective: Evaluations of social norms marketing campaigns to reduce college student drinking have produced conflicting results. This study examines whether the effectiveness of such campaigns may be moderated by on-premise alcohol outlet density in the surrounding community. **Method:** Multilevel analyses were conducted of student survey responses (*N* = 19,030) from 32 U.S. colleges that took part in one of two 4-year randomized, controlled trials completed for the Social Norms Marketing Research Project (SNMRP). In the models, students by year were nested within treatment (*n* = 16) and control group (*n* = 16) campuses, which were characterized by the on-premise outlet density in their surrounding community. The moderating effect of outlet density was introduced into the models as an interaction between the treatment effect (i.e., the effect of the social norms marketing campaign over time) and outlet density. The models were also stratified by campus alcohol outlet density (high vs. low) to examine the effect of the intervention in each type of setting. **Results:** There was a significant interaction between the treatment effect and on-premise alcohol outlet density for one of the drinking outcomes targeted by the SNMRP intervention, the number of drinks when partying, and marginal evidence of intervention effects for two other outcomes, maximum recent consumption and a composite drinking scale. In stratified analyses, an intervention effect was observed for three of the four outcomes among students from campuses with lower on-premise alcohol outlet density, whereas no intervention effect was observed among students from campuses with higher on-premise alcohol outlet density. **Conclusions:** The findings suggest that the campus alcohol environment moderates the effect of social norms marketing interventions. Social norms marketing intervention may be less effective on campuses with higher densities of on-sale alcohol outlets. (*J. Stud. Alcohol Drugs*, 72: 252–259, 2011)

Scribner et al (2011) found:

- No overall effect of a social norms campaign on 32 college campuses, but…
  - Campaign DID work on campuses with a lower alcohol outlet density
- "*Neon signs, storefront advertising, and direct observation of heavy drinking may convey their own normative message to students, thereby heightening student misperceptions of peer drinking norms*" (page 238).

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Realize the amazing influence parents, caregivers, and community members can have

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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**

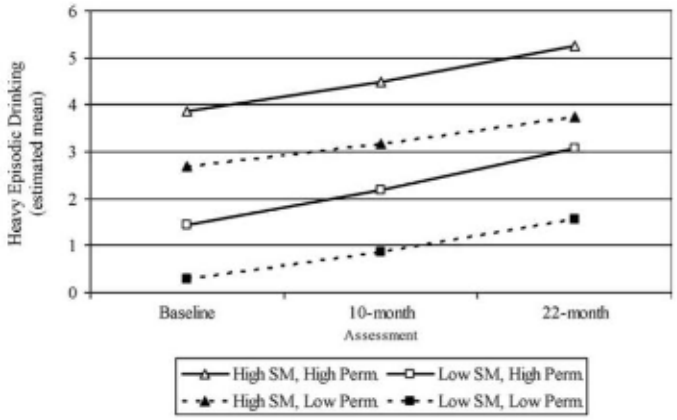
Prospective Protective Effect of Parents on Peer Influences and College Alcohol Involvement

Anne M. Fairlie and Mark D. Wood
University of Rhode Island

Robert D. Laird
University of New Orleans

91

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



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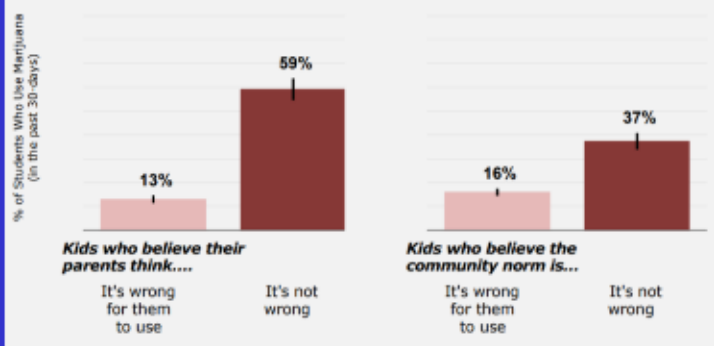
Relationship between Marijuana Use and Perceived Parental and Community Norms, Grade 10, 2016



What does this chart say?

- Statewide, 10th graders are less likely to use marijuana if they believe their parents think it is wrong for them to use.
- Statewide, 10th graders are less likely to use marijuana if they believe their community thinks it is wrong for them to use.

Source: Healthy Youth Survey, 2016

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WHERE DO PEOPLE GET MARIJUANA, 18-20 year olds

	Cohort 1 2014	Cohort 2 2015	Cohort 3 2016	Cohort 4 2017	Cohort 5 2018	Cohort 6 2019	Cohort 7 2020	Cohort 8 2021
From friends	72.86%	76.24%	69.68%	77.40%	63.75%	60.74%	66.87%	65.62%
Gave money to someone	23.29%	26.47%	34.72%	41.45%	39.29%	43.17%	40.55%	39.80%
Got it from someone w/ medical mj. card	17.60%	14.12%	4.30%	5.24%	2.79%	2.82%	4.27%	4.58%
Got it from a med. dispensary	13.65%	18.99%	5.58%	4.72%	6.50%	8.28%	8.41%	12.03%
Got it at a party	22.99%	22.14%	23.08%	24.92%	20.12%	22.91%	8.82%	24.67%
Got it from family	5.65%	5.18%	11.75%	9.75%	11.24%	10.92%	13.49%	7.09%
Got it some other way	11.64%	4.12%	6.12%	9.02%	7.30%	6.21%	5.04%	6.24%
Bought from retail store	0.99%	4.58%	1.73%	1.92%	2.03%	3.55%	1.58%	1.03%
Got it from parents w/ permission	5.75%	6.02%	12.33%	10.44%	11.69%	12.91%	13.08%	13.91%
Grew it themselves	1.91%	1.15%	1.65%	0.23%	1.47%	2.78%	1.64%	0.42%
Stole it from store/dispensary	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.16%	2.40%

For 18-20 year olds...

Decreasing
* Getting it from friends
* Getting it from someone with a medical marijuana card

Increasing
* Giving money to someone
* Getting it from parents with permission
* Stole it from a store/dispensary are increasing

Source: Young Adult Health Survey, Kilmer (PI)

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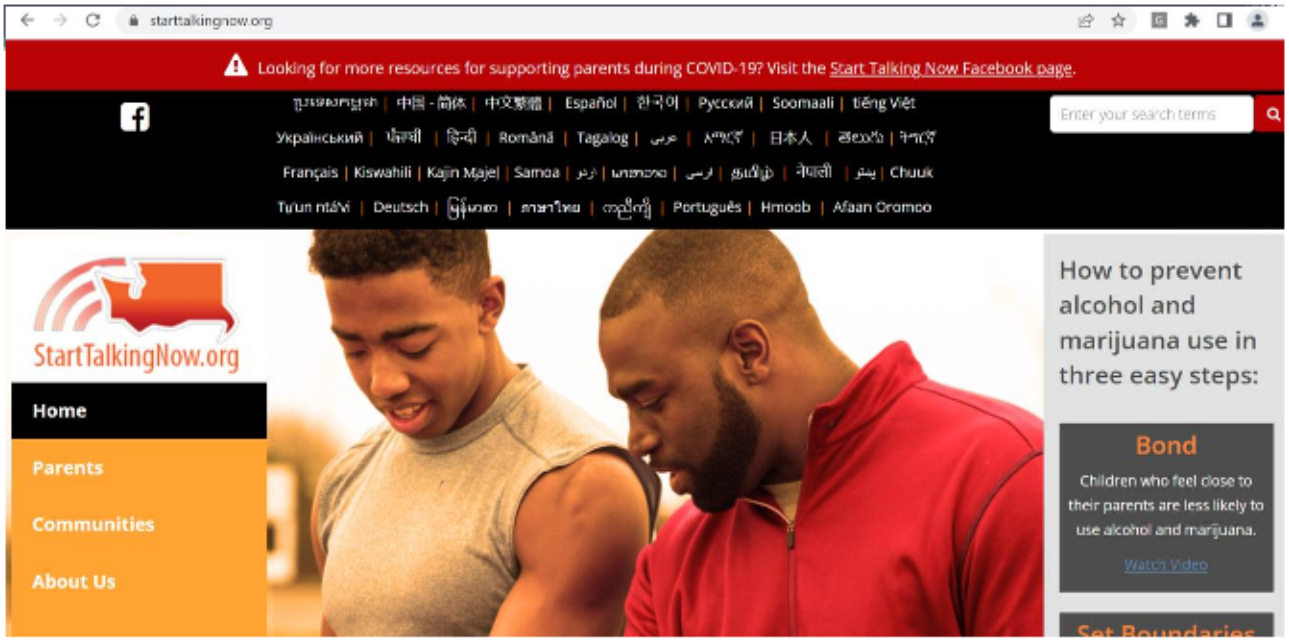


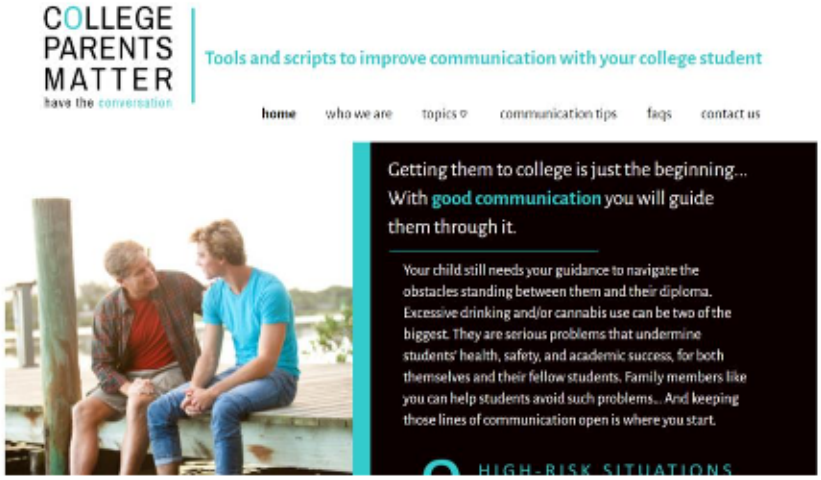
Available in 37 languages at StartTalkingNow.org

95

https://www.learnaboutcannabiswa.org/parents/

96

http://www.collegeparentsmatter.org



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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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Opportunities for Prevention Professionals

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(1) Consider SBIRT

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Screening: Universal screening for quickly assessing use/severity/risks

Brief **I**ntervention: Motivational/awareness-raising intervention to prompt contemplation of or commitment to change

Referral to **T**reatment: Referral to specialty care or follow-ups

102

In-person, personalized feedback interventions have shown reductions in use, time spent high, and consequences (e.g., Lee, et al., 2013)

Lee, C.M., Kilmer, J.R., Neighbors, C., Atkins, D.C., Zheng, C., Walker, D.D., & Larimer, M.E. (2013). Indicated prevention for college student marijuana use: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 81,* 702-709.

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(2) Consider event-specific prevention and/or enforcement, particularly if it's an event where there will be driving

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High-risk events

Is 4/20 an Event-Specific Marijuana Holiday? A Daily Diary Investigation of Marijuana Use and Consequences Among College Students

ADRIAN J. BRAVO, PH.D.,[a,*] MATTHEW R. PEARSON, PH.D.,[a] BRADLEY T. CONNER, PH.D.,[b] & JAMIE E. PARNES, M.S.[b]

[a]*Center on Alcoholism, Substance Abuse, & Addictions, University of New Mexico, Albuquerque, New Mexico*
[b]*Department of Psychology, Colorado State University, Fort Collins, Colorado*

ABSTRACT. Objective: Given the popular association between April 20 ("4/20") and marijuana, the present study examined marijuana use and consequences on 4/20 compared with other days in order to test whether 4/20 is a high-risk, event-specific marijuana use holiday among college student marijuana users. **Method:** Fifty-nine college student marijuana users from three different, large U.S. universities located in Virginia, New Mexico, and Colorado completed daily brief surveys (<10 minutes) over a 12-day (April 15–April 26) period assessing prior-day marijuana use (i.e., percentage of users who consumed marijuana, number of unique marijuana use sessions, subjective high/intoxication while under the influence of marijuana, and number of grams of marijuana consumed) and marijuana-related consequences. **Results:** Using one-way repeated-measures analyses of variance, we found that (a) 50% of students reported using marijuana on 4/20, which was significantly more than weekdays (28%) and weekend days (37%); (b) students reported a significantly higher number of unique marijuana use sessions on 4/20 (M = 1.47) compared with weekdays (M = 0.91); and (c) students reported a significantly higher number of grams consumed on 4/20 (M = 0.79) compared with weekdays (M = 0.35) and weekend days (M = 0.47). **Conclusions:** Our study provides preliminary support that 4/20 is a day associated with increased marijuana use but provides little evidence for an association with more problematic use. *J. Stud. Alcohol Drugs, 78,* 134–139, 2017)

RATES OF MARIJUANA USE and cannabis use disorder peak during traditional college years (ages 18–25 years) in the United States (Farmer et al., 2015). In a recent study across 11 different U.S. universities, Pearson and colleagues (in press-a) found that between 15.5% and 38.7% (M = 26.2%) of college students report using marijuana in the past Vandermeer, 2014) host 4/20 gathering events to celebrate that day. However, little research has examined whether marijuana users "choose to celebrate 4/20 as a special event or treat it as simply another day to consume marijuana" (Queally, 2016). Common perception suggests that marijuana users may experience increased use and consequences

Bravo et al (2017) found:

- **Compared to weekdays or weekends, on 4/20 there is:**
  - **More people reporting use**
  - **More unique sessions of use**
  - **Larger amount used**

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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], Donald A. Redelmeier, MD, MSHSR[4,5,6]

Author Affiliations | Article Information

JAMA Intern Med. 2018;178(4):569-572. doi:10.1001/jamainternmed.2017.8298

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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(3) Correct misperceived norms

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- **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
    - Personalized normative feedback
    - Personalized feedback interventions
    - Social norms campaigns

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(4) Bring in the science on 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., Ramji, 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.


CFP MFC

The official journal of the College of Family Physicians of Canada

Simplified guideline for prescribing medical cannabinoids in primary care

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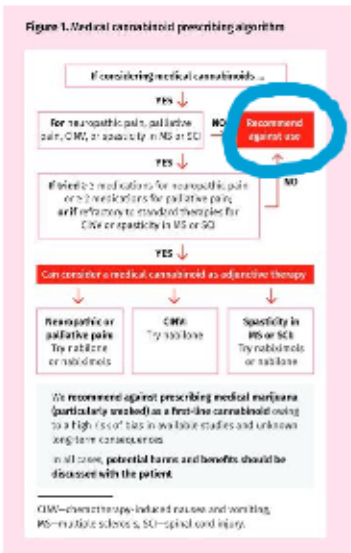

Only are recommending for neuropathic pain, palliative and end-of-life pain, chemotherapy-induced nausea and vomiting, and spasticity due to multiple sclerosis or spinal cord injury…

AND

If tried traditional therapies/treatments first…

Allan, et al. (2018)

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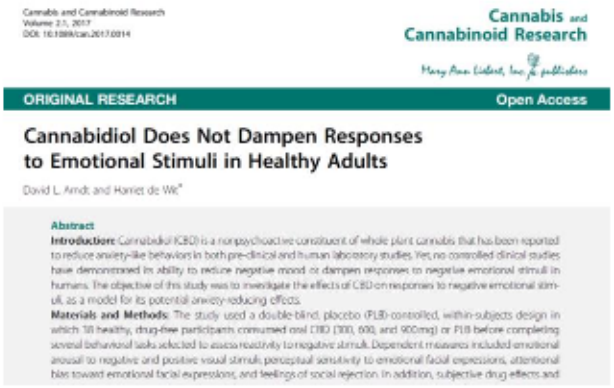

Cannabis and Cannabinoid Research
Volume 2.1, 2017
DOI: 10.1089/can.2017.0014

Cannabis and Cannabinoid Research
Mary Ann Liebert, Inc. publishers

ORIGINAL RESEARCH Open Access

Cannabidiol Does Not Dampen Responses to Emotional Stimuli in Healthy Adults

David L. Arndt and Harriet de Wit*

Abstract

Introduction: Cannabidiol (CBD) is a nonpsychoactive constituent of whole plant cannabis that has been reported to reduce anxiety-like behaviors in both pre-clinical and human laboratory studies. Yet, no controlled clinical studies have demonstrated its ability to reduce negative mood or dampen responses to negative emotional stimuli in humans. The objective of this study was to investigate the effects of CBD on responses to negative emotional stimuli, as a model for its potential anxiety-reducing effects.

Materials and Methods: The study used a double-blind, placebo (PLB)-controlled, within-subjects design in which 18 healthy, drug-free participants consumed oral CBD (300, 600, and 900 mg) or PLB before completing several behavioral tasks selected to assess reactivity to negative stimuli. Dependent measures included emotional arousal to negative and positive visual stimuli; perceptual sensitivity to emotional facial expressions; attentional bias toward emotional facial expressions; and feelings of social rejection. In addition, subjective drug effects and

"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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JAMA Network | Open.

Original Investigation | Psychiatry

Effect of Medical Marijuana Card Ownership on Pain, Insomnia, and Affective Disorder Symptoms in Adults
A Randomized Clinical Trial

Jodi M. Gilman, PhD; Randi M. Schuster, PhD; Kevin W. Potter, PhD; William Schmitt, BA; Grace Wheeler, BA; Gladys N. Pachas, MD; Sarah Hickey, BSN; Megan E. Cooke, PhD; Alyson Dechert, BA; Rachel Plummer, BA; Brenden Tervo-Clemmens, PhD; David A. Schoenfeld, PhD; A. Eden Evins, MD, MPH

Abstract

IMPORTANCE Despite the legalization and widespread use of cannabis products for a variety of medical concerns in the US, there is not yet a strong clinical literature to support such use. The risks and benefits of obtaining a medical marijuana card for common clinical outcomes are largely unknown.

OBJECTIVE To evaluate the effect of obtaining a medical marijuana card on target clinical and cannabis use disorder (CUD) symptoms in adults with a chief concern of chronic pain, insomnia, or anxiety or depressive symptoms.

DESIGN, SETTING, AND PARTICIPANTS This pragmatic, single-site, single-blind randomized clinical trial was conducted in the Greater Boston area from July 1, 2017, to July 31, 2020. Participants

Key Points

Question What are the risks and benefits of obtaining a medical marijuana card for adults who seek medical marijuana for pain, insomnia, and anxiety or depressive symptoms?

Findings In this randomized clinical trial involving 186 participants, immediate acquisition of a medical marijuana card increased the incidence and severity of cannabis use disorder (CUD) and resulted in no significant improvement

Gilman, et al. (2022) (released 3/18/2022)

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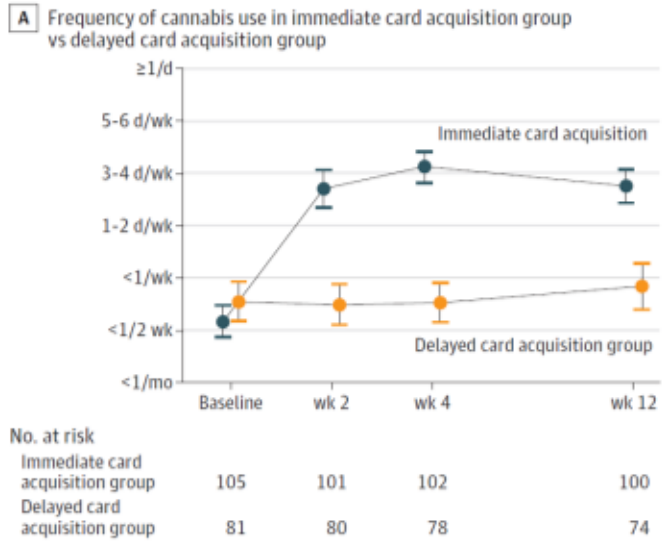

Gilman, et al. (2022) (released 3/18/2022)

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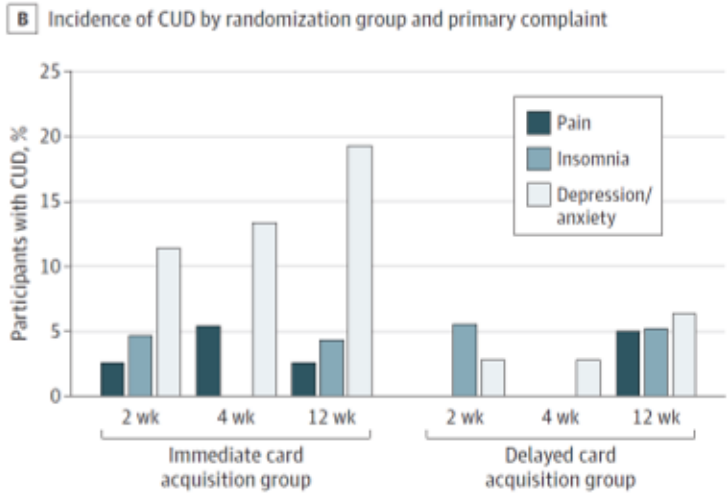

Gilman, et al. (2022) (released 3/18/2022)

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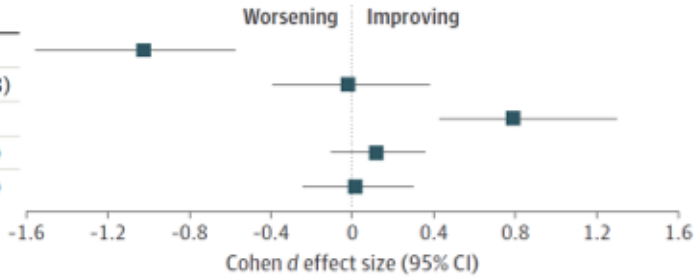
Figure 3. Effect Sizes for Primary, Secondary, and Exploratory Outcomes

A Primary outcomes

Source	Cohen *d* effect size (95% CI)
CUD symptoms	1.02 (0.57 to 1.55)
Pain severity	-0.02 (-0.39 to 0.38)
Insomnia	0.79 (0.43 to 1.30)
Depression	0.12 (-0.11 to 0.36)
Anxiety	0.02 (-0.24 to 0.30)



"There were no observed benefits of obtaining a medical marijuana card for pain, anxiety, or depressive symptoms. (p. 11)"

Gilman, et al. (2022) (released 3/18/2022)

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- Those with affective disorders have 3.9 higher odds of meeting criteria for Cannabis Use Disorder
- "These data suggest that a medical marijuana card may pose a high risk or may even be contraindicated for people with affective disorders. This finding is important to replicate because depression has been reported as the third most common reason that people seek a medical marijuana card." (page 10)

Gilman, et al. (2022) (released 3/18/2022)

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(5) 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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Collaborating

- Explore ways to put science in people's hands
  - Parent meetings
  - Town hall meetings
  - Peer educators
  - SBIRT
- Work with colleges, universities, researchers, scientists (and so many other potential sources) to help translate findings to communities

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Some of the most effective strategies are carried out in the communities and states surrounding the campuses, such as enforcing the minimum legal drinking age. Campus leaders can be influential in bringing about off-campus environmental changes that protect students.

To achieve success off campus, partner with leaders and coalitions in your community and state. Building these partnerships takes time, so you may want to make it part of a long-term plan. For models of campus-community collaboration, see the Frequently Asked Questions section of the *CollegeAIM* website (see URL below).

CollegeAIM, page 6

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(6) Put science in people's hands

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“Without data, you’re just another person with an opinion…”

W. Edwards Deming

123

“Without data, all we have are opinions…”

Data matter, and all data tell a story

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So, how do we translate findings to the real world?

Tell the story. Make the findings digestible and clear (without being too simplistic), and provide all citations/references to boost legitimacy/credibility.

125

- **Special thank you to:**
  - Aisha Hamid
  - Conor Burke
  - Agnes Skowron
  - Scott Gagnon

Jason Kilmer – jkilmer@uw.edu

@cshrb_uw

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